

4-6 May 2026 | Hotel The Standard , Brussels

ADVANCING BIODIVERSITY PROTECTION

UNIFYING APPROACHES TO CHEMICAL RISK ASSESSMENT IN THE EU CONTEXT

This workshop is part of ECETOC's 2026 NEXUS WEEK

Workshop report: Advancing biodiversity protection in chemical management

Report of the ECETOC Workshop held in Brussels on 6-7 May 2026. Event page: Advancing biodiversity protection

AI disclaimer: Microsoft Copilot was used to assist with drafting the initial text of this report based on the workshop transcript. All AI-assisted content was reviewed, developed and validated by the report authors.

Disclaimer: Representatives and experts from the European Commission, ECHA, EFSA, OECD and Member State Competent Authorities participated in the workshop in their individual capacities. Their participation does not imply any official endorsement of, or agreement with, the views, interpretations, conclusions or positions expressed during the workshop or reflected in this report. This workshop report is intended to accurately reflect the workshop discussions and conclusions, but it is noted that not all workshop participants provided written input to the workshop report.

Abstract

This ECETOC workshop brought together 45 experts from regulatory agencies, policy bodies, academia and research institutes, industry, and consultancies to consider how chemical management can better support biodiversity protection.

Discussions confirmed broad agreement that biodiversity is already recognised as a policy priority, but that current chemical assessment approaches do not yet provide a clear, operational bridge between standard ecotoxicological endpoints and biodiversity outcomes at population, community, ecosystem and landscape levels.

The main workshop outcome was not a single new metric or definition, but a shared set of priorities: clarify operational protection goals and associated biodiversity metrics; assess the extent to which current risk assessment approaches protect biodiversity; better connect laboratory and single-species ecotoxicology data with real-world biodiversity outcomes using systems-based approaches; account for mixtures, indirect effects, multiple stressors and interactions between biodiversity-loss drivers; improve the mapping and use of existing tools, models and datasets; and promote and facilitate further cross-disciplinary dialogue amongst key players, including ecotoxicologists, ecologists, economists and sustainability reporting experts.

Proposed next steps included preparing a workshop report, refining short- and longer-term research concepts to support future European project calls, and fostering cross-disciplinary engagement via ECETOC, SETAC and other relevant platforms.



1. Workshop session summaries

1.1 Introductory session: policy and regulatory context

Welcome and workshop objectives – Blanca Serrano (ECETOC) and Lorraine Maltby (University of Sheffield). Blanca Serrano welcomed participants and Lorraine Maltby introduced the workshop objectives: to explore biodiversity definitions, metrics and methodologies relevant to chemical risk assessment; understand links with sustainable finance; and identify priority gaps and actions to better align chemical management with biodiversity policy goals.

1.1.1 Presentation summaries

Science-policy interface and key challenges – Vujadin Kovacevic (DG ENV). Vujadin Kovacevic set out the policy context, highlighting the major drivers of biodiversity loss, including pollution, as well as the policy initiatives from global to EU level such as the Kunming-Montreal Global Biodiversity Framework, the EU Biodiversity Strategy, the Chemicals Strategy for Sustainability, the Zero Pollution Action Plan and Farm to Fork. He emphasised the need for more holistic, system-based risk assessment that better reflects chronic and sublethal effects, population-level impacts, indirect food-chain effects, mixtures of chemicals, uncertainty, non-linearity as well as irreversibility of species loss. Vujadin highlighted relevant recent research investments including TerraChem[1], SYBERAC[2], PollinERA[3], WildPosh[4], as well as PARC[5] and SPRINT[6]. He also highlighted the need for integrated long-term monitoring of both chemicals and biodiversity, using the EU Pollinator Monitoring Scheme[7], the European Monitoring of Biodiversity in Agricultural Landscapes (EMBAL) project[8], and the INSIGNIA honeybee monitoring project [9] as examples.

Current regulatory status and vision for biodiversity – Domenica Auteri (EFSA). Domenica Auteri introduced the regulatory framework of environmental risk assessment of plant protection products (PPPs), including Regulation 1107/2009 and the Sustainable Use Directive, as well as retrospective assessment initiatives, such as the Water Framework Directive and EU Biodiversity Strategy. She highlighted two recent guidance updates in the context of Regulation 1107/2009 relating to birds and mammals[10] as well as bees[11]. She highlighted the relevance of other non-target terrestrial organisms and recent EFSA mandates to review and revise the existing SANCO guidance document on PPP terrestrial ecotoxicology (SANCO/10329/2002) and to develop a framework for assessing indirect effects of pesticides on biodiversity via trophic interactions. She highlighted the important of, and process for,

[1] https://terrachem.eu/
[2] Towards a SYstems-Based, holistic Environmental Risk Assessment of Chemicals; https://www.syberac.eu/
[3] Understanding pesticide-Pollinator interactions to support EU Environmental Risk Assessment and policy; https://pollinera-horizon.eu/
[4] https://wildposh.eu/
[5] Partnership for the Assessment of Risks from Chemicals; https://www.eu-parc.eu
[6] Sustainable plant protection transition; https://sprint-h2020.eu/
[7] https://green-forum.ec.europa.eu/nature-and-biodiversity/pollinators-hive/integrated-european-framework-monitoring-pollinators_en
[8] https://data.jrc.ec.europa.eu/dataset/723355a8-e549-4691-9c0d-83ab7fc7a0c4
[9] https://www.insignia-bee.eu/
[10] https://doi.org/10.2903/j.efsa.2023.7790
[11] https://doi.org/10.2903/j.efsa.2023.7989

setting specific protection goals (SPGs), based on 2016 EFSA guidance[12], in translating broad regulatory aims into operational risk assessment criteria, including decisions on what to protect, where, for how long and to what degree.

Current regulatory status and vision for biodiversity – Anna-Maija Nyman (ECHA). Anna-Maija Nyman outlined the regulatory processes and approaches to environmental hazard and risk assessment under the REACH Regulation, Biocidal Product Regulation as well as the EU water protection directives (Water Framework Directive, Environmental Quality Standards Directive, Groundwater Directive). She noted that protection goals are broad (e.g. 'an overall protection of the environment'), ecotoxicological data requirements can be limited to just a few species, and assessment approaches rely on standard test species and associated assessment factors to extrapolate to ecosystem level effects. She highlighted the need to ask whether standard information requirements, current test species and assessment factors adequately protect the ecosystem, particularly given limited terrestrial and sediment data and the fact that assessment factors are not applied in all hazard-based assessments, such as PBT, PMT or endocrine disruption assessments. She highlighted ECHA's Key Areas of Regulatory Challenges publications[13] which encourage the development of new methods and approaches to better understand how current approaches protect ecosystems and biodiversity, and how they might be further enhanced.

Consideration of biodiversity in chemicals regulations/policy – Christoph Mayer (BASF) - *Online*. Christoph Mayer presented findings from the ECETOC Task Force review of legal, policy and strategic documents for biodiversity definitions as well as evaluation methods and metrics in terms of impact of chemicals, with a focus on the EU. The group screened 41 documents and identified 25 of these for detailed evaluation. The review found that biodiversity is increasingly referenced since the 1990s, with definitions generally following the broad 1992 Convention on Biological Diversity (CBD) wording. It also found that specific metrics are often qualitative or descriptive, or located in technical guidance (which were not in the Task Force scope) rather than primary legislation, with metrics being more advanced for chemicals that have intentional release, i.e. plant protection products and biocidal products. The work also highlighted that environmental risk assessment and risk management methods, as well as methods in the more recent financial reporting obligations, vary across chemical uses, likelihood of environmental exposure and regulatory frameworks.

Definitions and metrics of biodiversity in the academic literature – Aaron Stoler (Exponent). Aaron Stoler summarised the ECETOC Task Force review of academic literature in terms of how biodiversity is being defined and measured in the academic literature, which was analysed for the period 2014 – 2024 across 10 biomes, including marine, forest, freshwater, soil/agriculture/cropland, coral, grassland, coastal/estuary, desert, urban and tundra/taiga/arctic systems. The analysis showed that biodiversity is discussed and measured differently across ecosystems, with trait diversity and ecosystem function among the most widely applied essential biodiversity variable (EBV) - related framings. The species considered in each biome were also reviewed. While differences in focus were, in some cases, expected, because of the distinct characteristics of each ecosystem, others may be driven by practical considerations. The limited consideration of microorganisms in the soil/agriculture/cropland biome was noted as surprising given their essential role in maintaining soil ecosystem functions. Aaron highlighted the growing use of next-generation methods such as eDNA and remote sensing. He also shared perspectives on the importance of focussing on connectivity and critical habitats, and on ecosystem function rather than number of species.

[12] https://doi.org/10.2903/j.efsa.2016.4499
[13] https://echa.europa.eu/science/research

1.2 Session 1: Biodiversity metrics and tools/methodologies relevant to assessing chemical impacts

Session Chair: Sarah Hughes

1.2.1 Presentation summaries

Metrics gap in ecotoxicology to effectively protect biodiversity in chemical regulation – Marta Baccaro (DG JRC). Marta Baccaro described the misalignment between the standard ecotoxicological metrics and approaches applied in chemical risk assessment and the broader biodiversity descriptors within the essential biodiversity variables (EBVs). She stressed the importance of linking effects observed in laboratory, mesocosm and field studies to higher levels of biological organisation, including populations, communities and ecosystems, in both prospective and retrospective assessments. She introduced the idea of eco-AOP (adverse outcome pathway) thinking to bridge these levels, highlighting that this becomes especially complex at the community and ecosystem levels in part due to trophic, but also abiotic, interactions. She provided some examples of already existing methods to link ecotoxicology studies to biodiversity impacts including modelling impacts at the population level, simulating food web impacts and extrapolating impacts across species. She also presented initial outcomes from the JRC evidence map under development, which uses human and AI-supported screening and extraction across thousands of papers to examine extrapolation methodologies from lab tests, field evidence of chemical impacts on biodiversity, and which biological organisation levels and taxa are addressed.

Linking biodiversity to ecotoxicological testing – David Bohan (INRAE). David Bohan presented network-based approaches for linking ecotoxicological effects to biodiversity and ecosystem function. He described the use of agro-ecosystem ecological networks (or food webs) to explore perturbations of the system on removal of certain species and inclusion of sub-lethal effects which can lead to secondary extinctions. He also described expert-derived quantitative networks for soil health, connecting ecosystem services, biodiversity metrics and soil indicators. He emphasised that while such network-based approaches can be linked conceptually to ecological testing to identify gaps, biases and research priorities, they are static representations and can be costly to build.

TerraChem: From soils to apex species – Gabriele Treu (UBA). Gabriele Treu introduced TerraChem, which is a Horizon Europe project addressing chemical pathways, effects and impacts on terrestrial biodiversity and ecosystem services, whilst also considering whether current chemical risk assessment approaches protect terrestrial biodiversity. The project combines food-chain sampling from soils to apex predators, target and non-target chemical analysis, eDNA analysis in soil and invertebrates, and stable isotope analysis, across 12 European case studies. First results from the targeted chemical analysis detected 305 substances out of the 2.4K substances screened. The detected substances were dominated by plant protection products, which is not surprising as mainly agricultural areas were sampled. REACH chemicals (including legacy chemical) as well as pharmaceuticals were also identified. TerraChem aims to provide a proof-of-concept for quantifying impact of chemical exposure on biodiversity, covering species diversity, genetic diversity, functional diversity and ecosystem services, and to support development of early warning signals and prioritisation. Initial case studies have investigated mapping species richness against mixture toxic pressure, and functional diversity against environmental concentrations. Data outcomes from TerraChem are available in the NORMAN database.

MIND: A strategic & collaborative platform for advancing chemical environmental risk assessment, together – Romana Hornek-Gausterer (University of Applied Sciences Technikum Wien). Romana Hornek-Gausterer presented the MIND network, a PARC-linked platform intended to bring relevant stakeholders together and streamline efforts to advance environmental risk assessment. Structured around Mapping, Integrating, Networking and

Driving, the project aims to connect regulatory needs, research initiatives, tools and experts across areas such as next-generation risk assessment, integrated assessment of mixtures of chemicals as well as other stressors, and system-based environmental risk assessment. Its emphasis is on coordination, regulatory relevance, knowledge sharing and building a sustainable expert community within and beyond PARC. MIND partners include EU agencies (ECHA, EEA, EFSA), EU member states, academia, JRC and several Horizon projects.

1.2.2 Q&A and Discussion

The discussion developed several themes that became important for the rest of the workshop. Participants agreed that biodiversity-relevant assessment may need to go beyond taxonomic snapshots, particularly for dynamic systems such as microbial communities, and consider function, functional traits, resilience and recovery. This also raised a broader question about whether “function” should be defined only through human-benefit lenses or more broadly in terms of ecosystem processes.

A recurring theme was the need to distinguish chemical effects from other biodiversity loss drivers. Discussions on mixture toxic pressure, land use, indirect effects and geographical evidence gaps reinforced the importance of combining exposure data, biodiversity monitoring and contextual information. It was also asked whether regulatory testing should focus on species sensitivity alone, or also on vulnerability.

Mentimeter polling of workshop participants took place with the aim to understand the diversity of perspectives across different stakeholders. Participants broadly supported considering biodiversity across genetic, species, functional and ecosystem dimensions, with the majority reporting considering all life, including microbes, when discussing biodiversity. Participants recognised biodiversity as dynamic across time and space, and ecosystem functions and services received higher priority in terms of a primary protection lens compared to species/populations/communities whilst other participants highlighted the importance of considering all. The strongest perceived misalignments between biodiversity science and chemical regulation were: protection goals versus regulatory endpoints; laboratory tests versus environmental realism; single-chemical assessments versus multiple stressors; spatial and temporal scale; and direct vs indirect effects.

It was highlighted that participants may have interpreted the poll questions differently, and the outcomes should be treated with caution.

Full Mentimeter polling results from this session can be found in Appendix I.

1.2.3 Breakout group summaries

Tools [Room 1/Plenary] – Moderator: Nika Galic; Rapporteur: David Bohan. This breakout group focused on the tools or methodologies for assessing chemical impacts on ecosystems and biodiversity. Key discussion points included the need to understand how effects build across biological scales, from laboratory studies to ecosystems and wider social or financial systems. There was some discussion on the limitations and challenges of assigning financial and social values to biodiversity. Participants identified mode of action, genomics, AOPs, eDNA, remote sensing, ecosystem services and AI-supported data exploitation as important areas to advance linking across biological scales. A key recommendation was to develop system-level approaches that link scales of organisation and help prioritise action, recognising that biodiversity protection cannot wait for perfect tools.

Metrics [Room 3] – Moderator: Aaron Stoler; Rapporteur: Marta Baccaro. This breakout group discussed which biodiversity metrics are most useful for chemical risk assessment. Views differed on the relative value of functional versus taxonomic diversity: some prioritised functional diversity for its practicality, while others favoured taxonomic diversity as a more precautionary approach, noting that ecosystem functions are not yet fully understood. The group also expressed differing views on acceptable species loss and the relative importance

of vulnerable versus endemic species for ecosystem stability and resilience. Participants agreed that a transdisciplinary approach involving ecologists and ecotoxicologists is essential, and emphasised the need to account for geographical context through scalable metrics. Key recommendations were to improve metric scalability and foster continued ecologist–ecotoxicologist dialogue to bridge differences in terminology, assumptions and priorities.

Definitions/protection goals [Room 4] – Moderator: Siân Ellis; Rapporteur: Gabriele Treu. This breakout group concluded that the UN CBD definition of biodiversity is appropriate as an overarching definition but requires greater specificity for application in the chemical regulation context, for example regarding genetic and spatial diversity. The group emphasised the importance of life-cycle considerations, noting that upstream processes (e.g. extraction) may have greater biodiversity impacts than downstream applications. It recommended post-monitoring of chemical emissions and biodiversity impacts, alongside efforts to identify where current environmental risk assessment approaches may be inadequate. The group also proposed mapping standard ecotoxicity data requirements against their relevance to ecosystem functioning, while recognising that biodiversity is important not only for ecosystem functioning but also for resilience. Finally, it suggested considering the impacts of chemicals both relative to and in combination with other stressors when assessing biodiversity outcomes.

1.3 Session 2: Gaps and synergies between chemicals regulation and sustainable finance initiatives

Session Chair: Johannes Tolls

1.3.1 Presentation summary

Biodiversity accounting: How can we accelerate tomorrow's value into today's decisions – Christian Hell (EY Parthenon). Christian Hell outlined the main drivers of sustainable economic change, including the EU Green Deal and EU legislation on corporate sustainability reporting and sustainable finance. He explained the concept of double materiality, whereby companies must report both their impacts on biodiversity and ecosystems and their dependencies on them. Combined with assessments of risks and opportunities, these considerations can be translated into economic, societal and ecological value. He noted the complexity of the biodiversity and ecosystems reporting standard (ESRS E4) under the Corporate Sustainability Reporting Directive (CSRD). He highlighted the Taskforce on Nature-related Financial Disclosures (TNFD) LEAP (Locate, Evaluate, Assess and Prepare) framework as a recognised approach for identifying and assessing biodiversity-related impacts, risks and opportunities, as well as the work of the Value Balancing Alliance to help translate biodiversity impacts into monetary terms. He concluded by highlighting the growing importance of recognising biodiversity dependencies and opportunities for value creation, and associated resilience, in corporate and investor decision-making, and the need for a multi-stakeholder approach to their identification and valuation.

1.3.2 Q&A and Discussion

The discussion explored the link between biodiversity, business resilience and investor decision-making. Participants emphasised the need to frame biodiversity information in terms of risk, value protection and value creation. This was seen as especially relevant for medium- and long-term investors, for whom unmanaged biodiversity risks could affect business resilience.

A key development was recognition that chemical pollution is not yet well represented in biodiversity finance and reporting frameworks. Participants noted that biodiversity valuation is less mature than climate-risk valuation and depends strongly on sector, business model and location. The discussion therefore pointed to the need for earlier engagement between ecotoxicology, biodiversity, finance and corporate reporting experts so that chemical impacts are translated into credible, decision-useful metrics.

1.3.3 Breakout group summaries

Approaches in finance and chemicals regulation [Room 1/Plenary] – Moderator: Johannes Tolls; Rapporteur: Artemis Kostareli. This breakout group explored approaches to assigning financial value to biodiversity. Discussions covered the valuation of biodiversity and ecosystem services, as well as methods for valuing the impacts of chemicals on ecosystems, for example through willingness-to-pay approaches to avoid or reduce those impacts. The group highlighted the challenge of reconciling "no risk, no impact" conclusions for individual chemicals with cumulative toxic pressures at larger scales. It recommended engaging with the TNFD and the International Sustainability Standards Board (ISSB) to better understand and potentially contribute to their proposals for metrics relating to impacts of chemicals on biodiversity. It also emphasised the need to strengthen dialogue between biodiversity experts and ecotoxicologists.

Voluntary approaches to assessment [Room 3] – Moderator: Hans Sanderson; Rapporteur: Samantha Deacon. This breakout group explored the gap between ecotoxicology metrics and sustainable finance metrics used by business and finance institutions. Participants agreed on the need for dialogue between the ecotoxicology community and corporate sustainability reporting actors to better understand the gap and identify ways to bridge it. Some emphasised the urgency of this work, noting that metrics for other drivers of biodiversity loss identified by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) are already in use. Recommendations included technical discussions involving a broad range of disciplines and stakeholders (e.g. ecotoxicologists, conservation biologists, environmental and behavioural economists, and perhaps Indigenous Peoples), with outcomes shared with initiatives such as the Science Based Targets Network (SBTN) and TNFD with the aim to contribute to the further development of their methods, guidance and recommended metrics. The group also proposed developing a 'statement of intent' that acknowledges the gap and signals work to address it. Organisations such as ECETOC and the Society of Environmental Toxicology and Chemistry (SETAC) were identified as potential platforms to support this broader dialogue and collaboration.

Connections between tools and other topics [Room 4] – Moderator: Sarah Hughes; Rapporteur: Francesca Trivelloni. This breakout group considered interfaces with approaches and tools such as safe and sustainable by design (SSbD) and life cycle assessment (LCA), and asked what role ECETOC could play. Participants saw opportunities to connect risk assessment with life cycle thinking, while recognising that current LCA approaches may not be effectively capture biodiversity because of global scale, indirect proxies and uncertainty. A key recommendation was to foster multistakeholder interactions to share cross-sector best practice, including LCA, in terms of risk management and sustainability reporting. It was proposed that ECETOC could be a platform for this engagement.

1.4 Session 3: Addressing gaps between implementable chemical management and available knowledge and tools

Session Chair: Nika Galic

1.4.1 Presentation summary

EU research projects on chemicals and biodiversity – Anja Gladbach (Bayer). Anja Gladbach presented ECETOC Task Force findings from a review of EU-funded research projects on biodiversity and chemicals. Using the keywords 'biodiversity' and 'chemicals' over 1250 Horizon projects were identified, 34 of which were considered directly relevant to assessing chemical impacts on biodiversity. The review found that detailed information on the projects was challenging to find and that current regulatory concepts and data requirements

were not consistently reflected, limiting the translation of research findings into actionable regulatory recommendations. It was further identified that very recent projects have started to include system- and landscape-level aspects. Anja framed biodiversity protection as a "wicked" or potentially "super wicked" problem requiring systems-based approaches that consider all five IPBES-identified drivers of biodiversity loss, including pollution and chemical pollution. She mentioned already existing approaches that have been applied to other wicked problems, highlighting in the biodiversity context the importance of FAIR[14] data, metanalyses, integrating data on all biodiversity loss drivers, holistic modelling, system level thinking and trade-off considerations e.g. in terms of unintended consequence in other global regions.

1.4.2 Q&A and Discussion

The discussion developed a strong message on the need to make EU-funded research outputs more usable for regulatory development and industry decision-making. Participants noted that substantial investments have generated valuable data, but project outputs are often difficult to find, compare, synthesise or maintain after funding ends. This pointed to a need for a more permanent, centralised and interoperable knowledge infrastructure, as well as obligations for project partners to use standardised data formats compatible with the EU Common Data Platform.

1.4.3 Breakout group summaries

Both breakout groups reviewed the following eight key gaps, which had been drafted in advance by the Organising Committee based on the workshop discussions so far:

1. Tools for extrapolating from laboratory studies
2. Understanding how protective current risk assessment are
3. Toxic pressure concept (fraction of species potentially affected by mixture of chemicals)
4. Systems-level thinking, including socioeconomic value
5. Availability of emission and exposure data
6. Monetarising biodiversity
7. Enable biodiversity metrics to provide a competitive edge and improve resilience of European chemical industry
8. Capacity building, e.g. for SMEs, including for SSbD

The breakout groups were invited to review and refine this list, identify any additional gaps, and prioritise the three areas considered to most urgently require further research. For each prioritised gap, groups were asked to formulate a research question and describe how addressing it could contribute to: (a) improved protection of biodiversity; and (b) enhanced resilience and competitiveness of the European chemical industry, including SMEs.

Prioritise key gaps and recommend concrete actions [Room 3] – Moderator: Anja Gladbach; Rapporteur: Frédérik De Laender. This breakout group refined several of the eight key research gaps and identified an additional gap: integration of multiple stressors.

The group prioritised the first three research gaps and combined them into a single research question focused on **screening, evaluating, and improving the availability of tools and data for extrapolating findings from laboratory studies**. This research would facilitate meta-analyses, identify opportunities to test current practices, and, where necessary, develop new approaches or adapt ("upcycle") existing methods.

The group envisaged that these advances would strengthen biodiversity protection while also enhancing the resilience and competitiveness of EU industry.

[14] Findable, Accessible, Interoperable, and Reusable

Prioritise key gaps and recommend concrete actions [Room 4] – Moderator: Lorraine Maltby; Rapporteur: Virginie Ducrot. This breakout group refined several of the eight key gaps and added three additional priorities: Integration and synthesis of existing models, including systems dynamics and mitigation measures; Identification of indicators / metrics for field monitoring of biodiversity; Creation of networks.

The group prioritised three linked research areas, with each building on the previous one:

1. **Understanding how protective current risk assessment** is by:
    - defining clear protection goals that safeguard ecosystem services and ecosystem resilience; and
    - evaluating whether current risk assessment approaches achieve these goals, while accounting for uncertainties, natural biodiversity variability, and a dynamic baseline.
2. **Developing systems-level thinking** by integrating socioeconomic values, co-drivers and system dynamics across different chemical sectors, while considering trade-offs. This research would address the questions identified in Priority 1.
3. **Integrating and synthesising existing models**, including system dynamics and mitigation measures, by developing a framework to collate, evaluate and prioritise existing approaches, identify knowledge gaps, and support the selection of risk assessment approaches tailored to different contexts. This framework would provide the tools needed to address Priorities 1 and 2.

The group envisaged that this research would not only strengthen biodiversity protection but also deliver a more structured, harmonised and integrated approach to risk assessment, providing greater regulatory stability for industry alongside increased transparency and public confidence.

1.4.4 Discussion on Section 3 breakout group outcomes

The plenary discussion focused on how the prioritised research needs from the breakout groups could be taken forward. Participants noted strong convergence between the groups around the need to collate, integrate and, where appropriate, “upcycle” existing models, tools and data to support extrapolation from laboratory studies to real-world biodiversity impacts, with systems-based approaches identified as a key enabling framework.

It was highlighted that the funding directed towards biodiversity-related research will increase to 10% of the total Horizon Europe budget in the current cycle (2026-2027). Participants recognised an opportunity to present ideas to the Horizon Europe Programme Committee to support the development of future calls, with an estimated timeframe of one to one-and-a-half years for putting forward such ideas. It was also noted that Horizon Europe includes both Research and Innovation Actions (RIAs) and Innovation Actions (IAs), which differ in their funding arrangements and objectives, with Innovation Actions placing greater emphasis on stakeholder engagement, demonstration, and the practical application of research outcomes.

Participants discussed how a Horizon Europe concept should be framed to maximise its relevance and attractiveness. Any proposal would need clear expected impacts, alignment with EU policy objectives, multistakeholder involvement and relevance to the resilience and competitiveness of European chemical industry, including SMEs. It was highlighted that a shorter-term activity - potentially through ECETOC, CEFIC LRI and/or agency-linked funding - could map available extrapolation tools, modelling frameworks and datasets, thereby providing a stronger evidence base for a subsequent Horizon Europe application. It was suggested that synthesising the workshop outcomes into a peer-reviewed paper could provide a useful starting point for discussion with the Horizon Europe Programme Committee.

As a next step, it was suggested that the workshop Organising Committee could collate and refine the ideas emerging from the workshop into more specific short- and longer-term

research concepts, with additional input to be invited from the workshop participants and other relevant contributors.

1.5 Closing discussion

A final polling session invited participants to reflect on where further work is most needed, which perspectives were missing from the workshop, and the most important insights they would take away. Responses reinforced several themes from the preceding discussions, including the need to develop operational protection goals, improve understanding of sublethal and indirect effects and impact of mixtures, develop harmonised biodiversity metrics/indicators, understand how protective current approaches are and how systems-based approaches might support, and strengthen connection to finance approaches. Key takeaways from the workshop identified by participants included recognition that whilst biodiversity protection in chemical management is complex and problem formulation needs to be more precise, there is certainly willingness to act despite uncertainty, and progress will require a common language and cross-disciplinary collaboration. Reinforcing earlier discussions, it was also highlighted that significant tools, approaches and data already exist and should be collated and integrated.

Full Mentimeter polling results from this session can be found in Appendix II.

Participants also identified several stakeholder groups that had not been sufficiently represented, particularly environmental economists, finance and sustainability reporting experts, NGOs, and additional ecology expertise. This echoed earlier discussions on the need to connect ecotoxicology more effectively with wider biodiversity, business, finance and policy communities.

The closing discussion confirmed that the workshop outcomes would be captured in a short report and used to inform follow-up research concepts as well as continued engagement with relevant stakeholders.

2. Workshop outcomes, recommendations and next steps

The outcomes and recommendations below draw on discussions throughout the workshop. The final working session (Session 3) strongly shaped the proposed next steps and research agenda, but the outcomes and recommendations also reflect recurring points raised throughout the workshop.

2.1 Clarify protection goals, operational definitions and appropriate metrics

Participants generally considered the Convention on Biological Diversity definition of biodiversity to be a suitable overarching definition. The practical challenge is to operationalise this definition for chemical regulation: *W*hat should be protected, at what spatial and temporal scale, and with what acceptable level of effect or recovery? A recurring recommendation was to develop clearer, context-specific protection goals, together with associated regulatory endpoints and biodiversity metrics which could cover genetic, species, functional and ecosystem dimensions. Workshop discussions highlighted differing views on the relative value of functional versus taxonomic diversity metrics. A key aspect to advancing these discussions is to foster continued ecologist–ecotoxicologist dialogue to bridge differences in terminology, assumptions and priorities.

2.2 Assess the extent to which current risk assessment protects biodiversity

A central recommendation was to test the hypothesis that current chemical risk assessment procedures are protective of biodiversity, and to identify where existing approaches are sufficient, where refinement is needed and where new tools are required. This should include analysis of assessment factors, standard test species, exposure models, regulatory endpoints, indirect effects, mixture toxicity, and the extent to which current approaches cover vulnerable, sensitive or functionally important species.

Participants emphasised the need to connect standard ecotoxicological data with higher-level biodiversity outcomes, including effects at population, community, ecosystem and functional levels. Promising approaches include population models, food-web models, trait-based approaches, adverse outcome pathway concepts, mixture toxicity pressure methods and damage-level modelling, provided these tools are transparent, practical, validated and fit for regulatory use.

This work should also consider that environmental organisms are also exposed to multiple non-chemical stressors, including land-use change, climate change, habitat alteration, invasive species and resource exploitation. Participants therefore recommended approaches that consider all major drivers of biodiversity loss, including their interactions, while also distinguishing, where possible, the specific contribution of chemical exposure.

2.3 Strengthen monitoring, data infrastructure and evidence synthesis

The workshop highlighted that many relevant tools, models, approaches and datasets already exist, but are dispersed and not always visible, accessible or directly usable for regulatory application. Participants therefore recommended a systematic mapping and evaluation of available resources to identify what can already be used or adapted, where important gaps remain, and where new development is genuinely needed. Better access to EU-funded research outputs, harmonised data formats, and a central FAIR data infrastructure were seen as essential to support future meta-analyses, evidence synthesis and follow-up research.

2.4 Engage with corporate sustainability reporting experts

Discussions highlighted that sustainable finance and corporate reporting frameworks are increasingly shaping how companies identify, assess and communicate biodiversity-related impacts, dependencies, risks and opportunities. Participants agreed that the chemical risk assessment / ecotoxicology community should engage with corporate sustainability reporting experts to better understand the gap between ecotoxicology metrics and sustainable finance metrics used by business and finance institutions, and identify ways to bridge it.

2.5 Next steps: Develop a research and collaboration agenda

Key next steps identified from the workshop were:

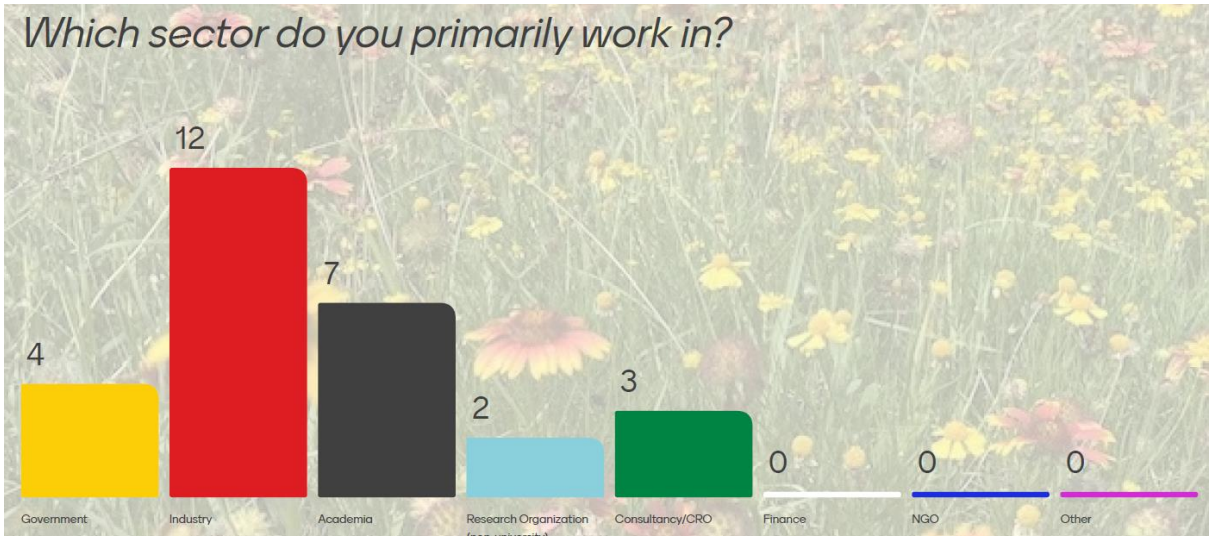
1. **ECETOC Secretariat / Organising Committee:** Prepare a concise workshop report capturing the main priorities, uncertainties and proposed follow-up actions.
2. **ECETOC Secretariat / Organising Committee, with input from workshop participants:** Collate and refine the ideas emerging from the workshop into more specific short- and longer-term research concepts, with a priority focus on systems-based approaches for linking laboratory ecotoxicology data to real-world biodiversity impacts, and explore opportunities to present these to the Horizon Europe Programme Committee.
   The research concepts could include preparatory mapping of existing tools, models and datasets to support longer-term research.

3. **ECETOC, SETAC and other relevant platforms:** Promote and facilitate further cross-disciplinary dialogue among ecotoxicologists, ecologists, economists, regulators, industry and other relevant stakeholders towards operationalising a biodiversity definition for chemical regulation and developing protection goals and associated metrics. Also foster targeted engagement with corporate sustainability reporting experts and LCA experts, e.g. TNFD, ISSB, SBTN, to contribute to the further development of the sustainable finance methods, guidance and recommended metrics relating to chemical impact and biodiversity.

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- Marta Baccaro (JRC, EU)
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- Anna-Maija Nyman (ECHA, FI)
- Hans Sanderson (Aarhus University, DK)
- Aaron Stoler (Exponent, US)
- Johannes Tolls (Henkel, DE)

APPENDIX I: MENTIMETER POLLING RESULTS FOR SESSION 1



Which dimensions do you include when you think about biodiversity? (Select all that apply)



17 Genetic diversity (within species/populations)



22 Species diversity



20 Ecosystems / habitats



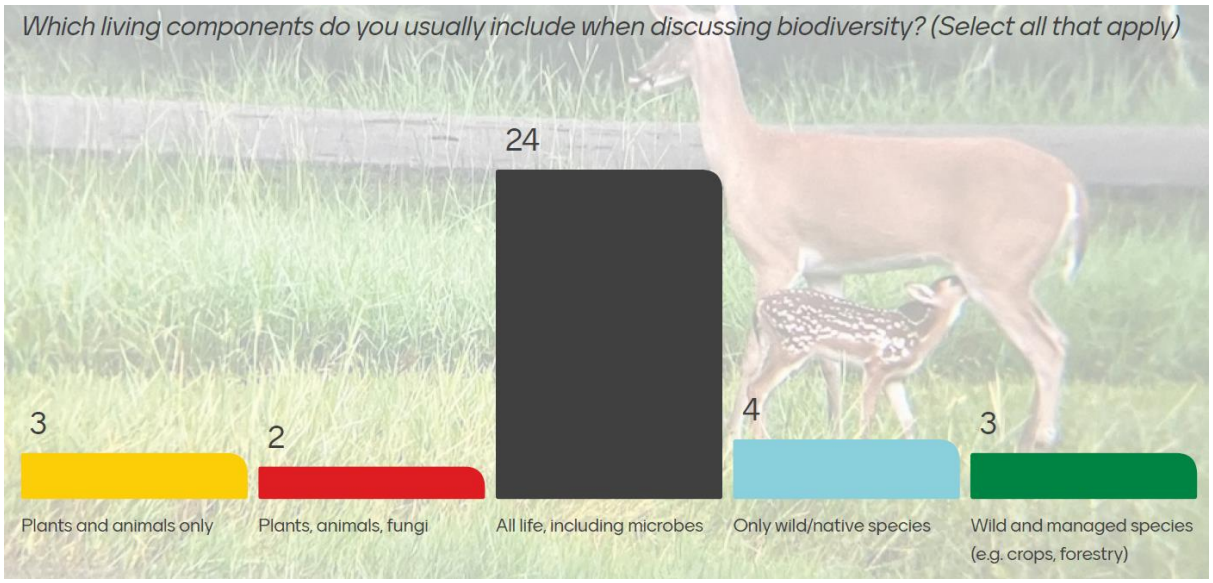
19 Ecosystem functions and interactions



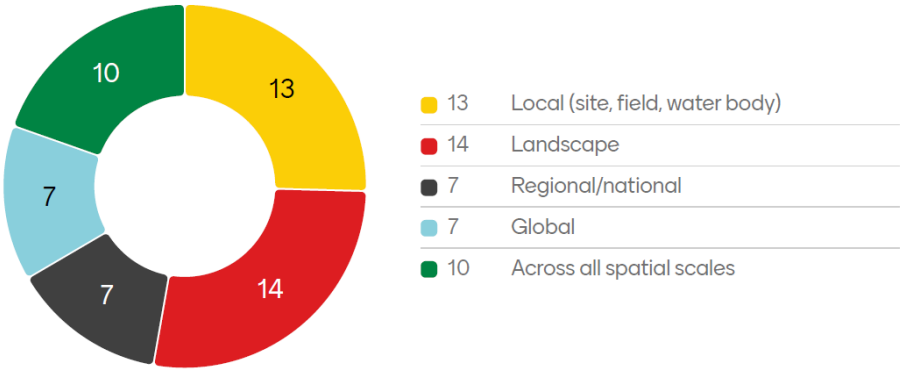
5 Mostly functioning, regardless of which species

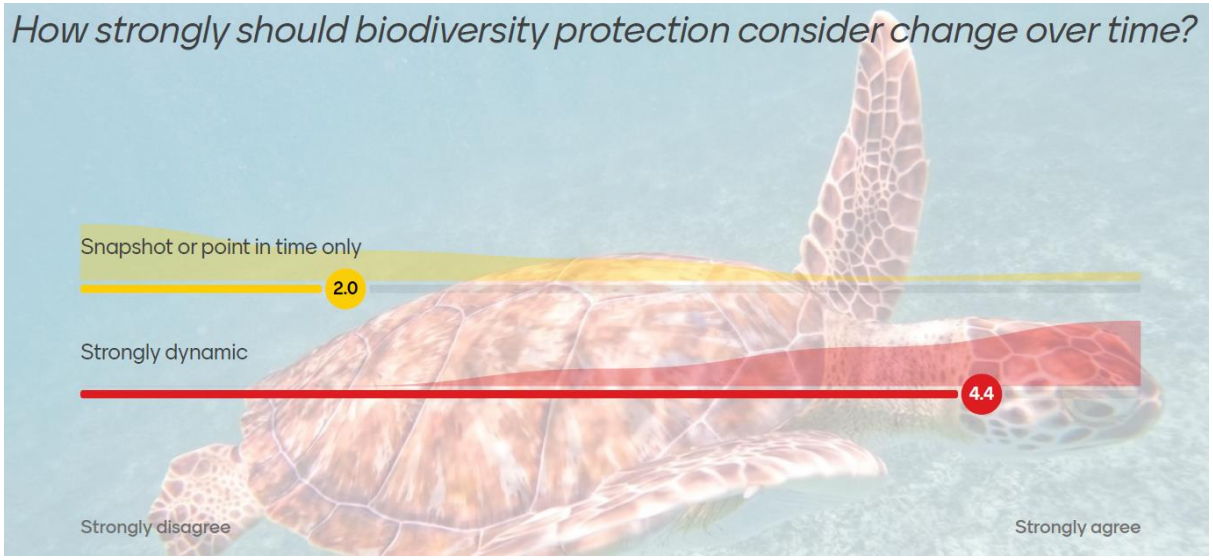


5 Not sure / depends on context

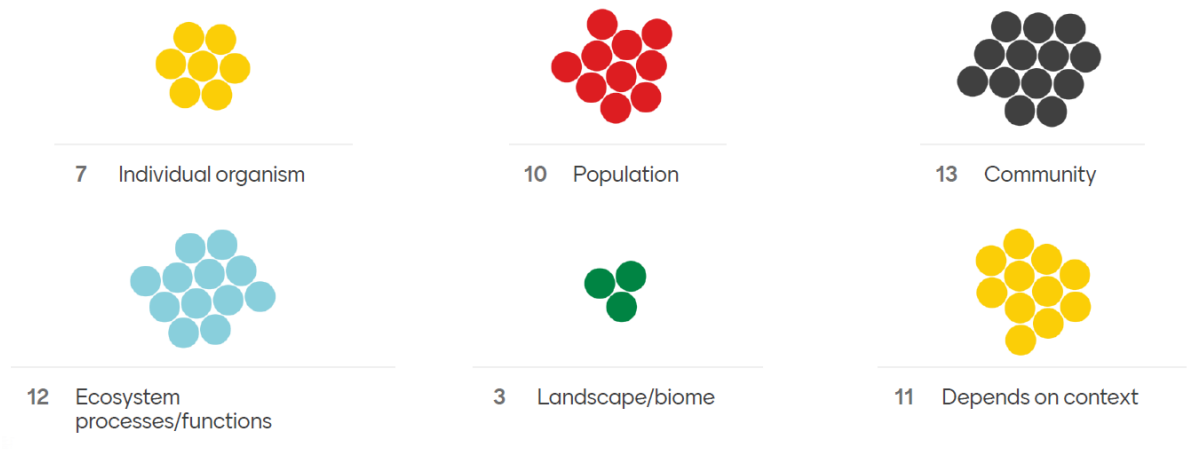


When considering impacts of chemicals on biodiversity, which scales matter most to you? (Select all that apply)

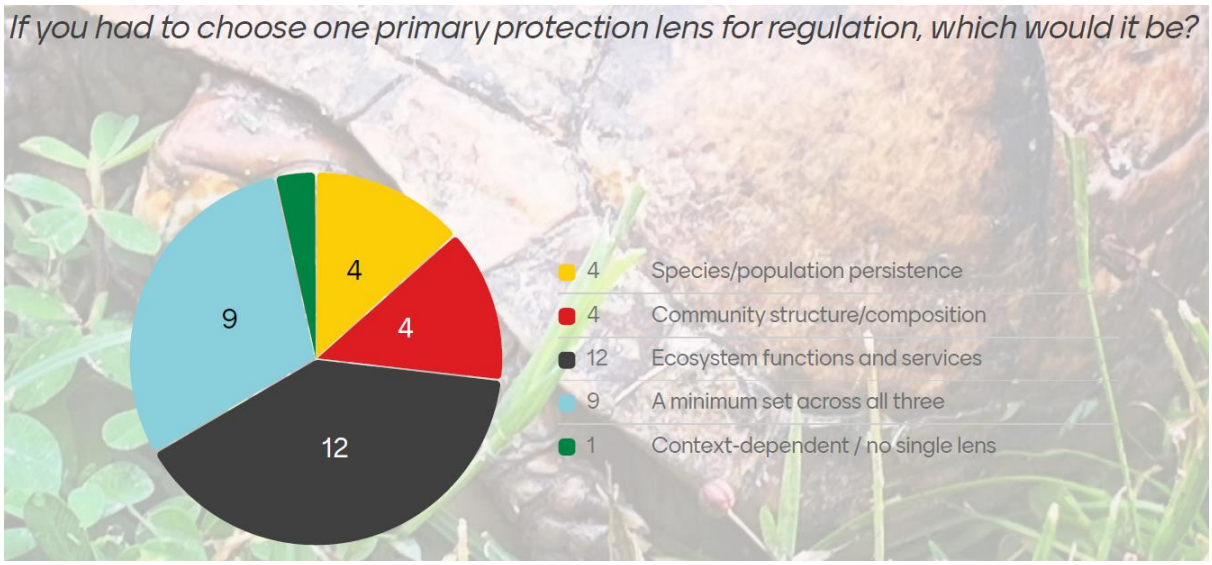




When you hear "impacts of chemicals on biodiversity", which level comes to mind first?



If you had to choose one primary protection lens for regulation, which would it be?



In 1-2 sentence(s), how would you define biodiversity?

Variety of life	Biodiversity is the variation in life that generates function	Protecting nature and planet we live on / ensuring ecosystems are maintained	Variability within and among living organisms
All life on Earth	Diversity across all living organisms and their respective habitats.	The ensemble of genetic variation	Abundance and richness of species

Variability in species within a defined space and time

A level of environmental (biotic) complexity that provides happiness and wealth to the most people.

Number of species necessary to provide a certain functionality at a certain area an point in time

Maximum number of species that can be supported by a particular ecosystem or landscape

The diversity and abundance of species

Biodiversity represents all we do not know exactly what it is and what it does

The variety of species and functions of all living organisms in a define area/region/biome.

Diversity of allels

Diversity of traits, packaged into species, and their interactions within a network in a specific context.

Everything which isn't covered by OECD Test organisms algae daphnia fish (One species each)

Variety within species and species abundance

Variability of life with respect to functional integrity and cultural/historical heritage

Network of interacting populations and species

Biodiversity is the most important matter for our current a future life on this planet

Variety of living coexisting organisms

For regulatory purposes: follow gbc but define specific protection goals for each Biodiv level(structural, functional, genetic, ess)

The normal function and species activity and population in a biome

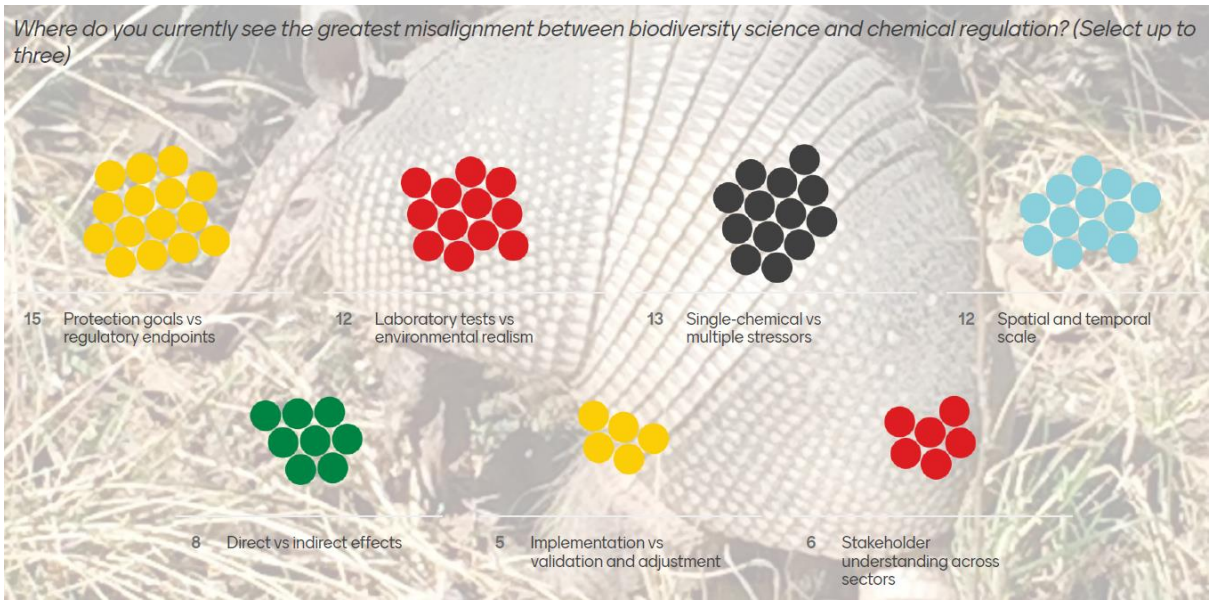
The variation in genotypes and phenotypes that occur within a species over the different habitats it has and over time (adaptation)

Stability (resilience to perturbations) of food web structure (complexity))

variety of species in a habitat

Food web complexity (resilience to perturbations)

for regulatory purpose: what set of species could be carried in an area of interest?


Where do you currently see the greatest misalignment between biodiversity science and chemical regulation? (Select up to three)
15 Protection goals vs regulatory endpoints
12 Laboratory tests vs environmental realism
13 Single-chemical vs multiple stressors
12 Spatial and temporal scale
8 Direct vs indirect effects
5 Implementation vs validation and adjustment
6 Stakeholder understanding across sectors

APPENDIX II: MENTIMETER POLLING RESULTS FOR CLOSING SESSION

Where do you see the most work needing to be done related to chemical risk and biodiversity protection?

Geographically linked exposure data	Developing definitions of biodiversity tgat can be used for protection goals	Setting protection goal	Case studies to assess the feasibility and benefits
Harmonizing concepts	Get meaningful predictions from ltd data	System understanding	Metrics / Protection goals
Understanding sublethal effects and indirect effects and impact of mixtures	Systems-level understanding	Defining operational and specific protection goals across chemistries	System understanding, based on leveraging available data (from ecotox to basic ecology)
Connecting chemical pressure to biodiversity decline	Determine whether ever-more complex approaches, such as food webs are a distraction or genuinely useful.	Metrics; connectivity; value; risks; prioritization	Harmonisation of terms, approaches, practices
Better understanding of upstream vs downstream assessments	Relationship between pollution climate change and land use pressures	Identifying the link between existing species-based ecotoxicology data and total biodiversity protection goals, with attention to socio economic needs	Agreeing with all stakeholders on defining the Protection goals that can be integrated in the chemical risk assessment concept already applied in the different EU chemical regulations
Define the protection goal and check what are the gaps in current practises in being effective towards that goal	Linking existing chemical risk assessments to protection goals	System level understanding, including resilience mechanisms	Forming „Biodiversity to Protection goals

Concepts for good question to ask to huge datasets to derive system understanding and drivers

Developing tools to assist ecosystems resilience building

Short term: check - how protective is current risk assessment for bodiversity

Connecting to finance amd socio-economic systems

Agree on biodiversity indicators

Some basic terminology clarification (eg what do we understand as a „tool"? A test? A model? A concept?)

Framework for integrating modelling approaches

What are the most important insights you are taking away from this workshop?

Consensus on the priorities

It's complicated

There is lots of space for consensus

Agree to take action now

Gaps in our knowledge and between stakeholders

Stakeholders need to engage more

Biodiversity is more complex than I assumed

Willingness to improve system to improve biodiversity

It's complex and to understand the complexity we need data. And there is a huge amount of data available, we just need to make it accessible

Discussion what are the next steps

There is a significant divide (still) between the ecotoxicologists, ecologists, and economists in terms of system thinking

We need to ask the right questions

Too vague Problem formulation

We need to find a common language

Many puzzles pieces are available, next step would be to connect them

We need to step outside our comfort zones

I have the feeling there is a lot of knowledge out there. Connection is needed.

Regarding a few exceptions, overall well alignment between participants

Lots of energy and engagement to tackle this complex question

More framing why biod is important and why it is relevant for our industries i.e business case for biod.

Biodiversity is a shared priority, avoiding silos discussion but reconnecting with multiple stakeholders and expertises

Situation looks different for the different types of chemistries, where do we have a common ground? How to manage the differences practically?

Ipieca is happy to engage with ECETOC on biod. There is a pool of biod experts from the energy sector, over 70 experts that ECETOC can tap into.