

## ECO27: Chemicals: Assessment of Risks to Ecosystem Services (CARES)

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The direct and indirect contributions of ecosystems to human wellbeing are known as ecosystem services. The ecosystem services concept is gaining broad interest in regulatory and policy groups for use in landscape management and ecological risk assessment for chemicals. The approach has potential to bring greater ecological relevance to setting and assessing environmental protection goals compared to current regulatory frameworks such as REACH and EC 1107/2009. The aim of the CARES project was to facilitate engagement of the chemical industry, academia and regulators to help develop and evaluate the ecosystem service approach in guiding risk assessment schemes (prospective and retrospective) for any type of xenobiotic chemical. The project reviewed existing test methods and identified and prioritised research needs. The outcomes and recommendations from these discussions will be published in the scientific literature.

### EXECUTIVE SUMMARY

1. Human wellbeing depends on nature and the benefits it provides. The direct and indirect contributions of ecosystems to human wellbeing are known as ecosystem services.
2. Chemical products entering the environment have the potential to enhance or reduce human wellbeing. Ecosystem services provide a common currency for comparing the wellbeing benefits of chemical use with the potential wellbeing costs via environmental degradation.
3. The European chemical industry is highly regulated, although legislation varies across chemical sectors and involves different European agencies. Effective and robust regulatory risk assessment requires clear environmental protection goals stating what is to be protected, where it is to be protected and why it is to be protected.
4. The ecosystem services concept is gaining broad interest in regulatory and policy groups for use in landscape management and ecological risk assessment. The approach has potential to bring greater ecological relevance to setting and assessing environmental protection goals compared to current regulatory frameworks such as REACH and EC 1107/2009.
5. The European Food Safety Authority has produced guidance for developing protection goals for assessing the ecological risk of chemicals in plant protection products and feed additives to ecosystem services. However, there is a need to bring stakeholders together to develop a common understanding of the advantages and potential challenges of implementing an ecosystem services approach to chemical risk assessment more broadly.
6. The aim of the Cefic LRI CARES project (ECO27) was to facilitate engagement of the chemical industry, academia and regulators to help develop and evaluate the ecosystem service approach in guiding risk assessment schemes (prospective and retrospective) for any type of xenobiotic chemical.
7. Three workshops were organised under the auspices of SETAC Europe. The workshops brought together 39 key stakeholders from the European chemical industry (11), EU and Member State regulatory agencies (10), academia (11) and consultancies (7) to evaluate the use of an ecosystem services approach in guiding chemical environmental risk assessment schemes and to reach consensus on a roadmap for implementing such an approach.
8. Workshop 1 (15-16 July 2015) reviewed and evaluated the state of knowledge and available approaches and tools for applying an ecosystem services approach to chemical risk assessment. The key outcomes from workshop 1 were:

- Identification of clear advantages of using an ecosystem services approach in chemical risk assessment (e.g. increased ecological and societal relevance, increased transparency in communicating risks and trade-offs, integrating across stressors), but also a number of challenges (e.g. increased complexity in assessment, increased data requirement, limitations of current standardised ecotoxicity tests).
  - Agreement that the approach was widely applicable across chemical sectors, but the scale of the challenge of applying an ecosystem services approach to general chemicals with widespread and dispersive uses was highlighted.
  - Agreement that a tiered approach was necessary and that an ecosystem services-based ecological risk assessment should be based on magnitude and duration of impact, not on exposure toxicity thresholds.
  - Recognition of the possible need for more bioassays/tests with functional endpoints and the need for ecological models (including ecological production functions) to link measurement endpoints to assessment endpoints.
  - Recognition of the potential to develop environmental scenarios (species or trait-based) that can be combined with spatial information on exposure, ecosystem services delivery and the vulnerability of ecological components providing services.
9. Workshop 2 (3-4 May, 2016) evaluated research needed to effectively implement an ecosystem services approach into both prospective and retrospective risk assessment. It explored the use of novel approaches from ecology, ecotoxicology and ecological modelling to address gaps identified in Workshop 1. Illustrating approaches using case studies in prospective and retrospective risk assessment, workshop participants prioritized four areas for further work:
- Development of environmental scenarios for use in ecological risk assessment
  - Development of mechanistic models, in particular ecological production functions, to link measurement endpoints (e.g. ecotoxicity test endpoint, indicator measurement in field study) to assessment endpoints (i.e. ecosystem services)
  - Development of guidance on the use and interpretation of tools and test methods used to assess the risk of chemicals to ecosystem services. This includes developing reference values for key ecosystem services.
  - Development of an integrated decision making framework for risk assessors and risk managers.
10. Workshop 3 (24-25 November, 2016) explored how an ecosystem services approach could be implemented and considered the implications for regulatory risk assessment. Workshop participants discussed the development of an implementation plan and concluded that a 'proof of concept' project was required to assess the feasibility of evaluating the impact of chemical exposure to ecosystem services delivery based on current knowledge, and integrating this approach within existing regulatory risk assessment frameworks.