

PEER POSITION PAPER: ENVIRONMENTAL RESEARCH AND INNOVATION ARE STRATEGIC INVESTMENTS IN EUROPE'S COMPETITIVENESS, RESILIENCE AND SECURITY

In a changing world, the European Union is facing unprecedented challenges. Since the design of the current Horizon Europe Programme, strong global competition and taxation in international trade urge Europe to restrengthen its competitiveness. The geopolitical context in Europe requires an increase in crisis preparedness and defence capability. Europe's competitiveness and security are major challenges of today that require investment in research and innovation (R&I) activities for securing our future. At the same time, accelerating climate change, biodiversity loss, ecosystem degradation and pollution are increasingly recognised as systemic economic and financial risks. They affect macroeconomic stability, supply chains, insurance systems and long-term growth prospects. Environmental research must therefore be understood not as a thematic add-on, but as a structural foundation of Europe's economic resilience, strategic autonomy, preparedness and defence capability.

The scale and urgency of current challenges require a step-change in ambition compared to previous Framework Programmes. With this paper, the Partnership for European Environmental Research (PEER)¹, comprising eight major environmental research centres, demonstrates why strengthening environmental research and innovation investments in the next Framework Programme for Research and Innovation (FP10) and the European Competitiveness Fund (ECF) will support the EU's long-term competitiveness, resilience and sovereignty and highlights critical research areas to be covered by FP10.

I. ENVIRONMENTAL RESEARCH'S CONTRIBUTION TO EUROPE'S COMPETITIVENESS

Environmental research and innovation represent **powerful drivers of sustainable growth, industrial leadership, and competitiveness across multiple sectors of the EU economy** by creating opportunities to improve the efficiency of production processes, to develop new products, services and markets.

- In industry, environmental research and innovation enable advances in new production processes and materials that foster technological leadership in emerging or improved value chains. Simultaneously, environmental research enables risk assessment of chemicals supporting the development of safer and more competitive substances.

¹ The **Partnership for European Environmental Research** (PEER) is comprised of 8 environmental research centers: CIENS - Oslo Centre for Interdisciplinary Environmental and Social Research (NO), DCE - Danish Centre for Environment and Energy (DK), Aarhus University, INRAE - National Research Institute for Agriculture, Food and the Environment (FR), Syke - Finnish Environment Institute (FI), UFZ - Helmholtz Centre for Environmental Research (DE), UKCEH - UK Centre for Ecology and Hydrology (UK), and WENR - Wageningen Environmental Research (NL), Wageningen University Research.

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- In urban development, new approaches to housing design integrating zero run-off systems and urban heat management increase infrastructure resilience and human wellbeing.
- In international trade, environmental research leads the way to equitable, resilient and sustainable global trading systems fostering economic stability

In a rapidly changing geopolitical and economic landscape, **Europe's competitiveness can only be sustained with a holistic approach moving beyond siloed policies.** Environmental research demonstrates the increasing interconnection between technological progress, social innovation, environmental performance and industrial competitiveness, demonstrating how these dimensions reinforce one another when addressed jointly.

By strengthening knowledge transfer from research to innovation and market deployment, promoting close collaboration between all stakeholders in the value chain and strengthening the role of the humanities and social sciences to foster acceptance, environmental research strongly contributes to this complex but essential system approach. To this end, it is necessary to strengthen European observation, experimentation and modelling capabilities through the maintenance, upkeep, upgrading and development of strategic European research infrastructures. Such infrastructures are indispensable for detecting tipping points, attributing change, supporting climate adaptation, and informing political, industrial and financial decision-making. Their importance has grown significantly in recent years as Europe faces increasing risks of cascading impacts and systemic shocks.

Europe's competitiveness goes hand in hand with economic stability, performance, preparedness and resilience. Environmental R&I draws a connection between these intrinsically linked aspects.

II. ENVIRONMENTAL RESEARCH'S CONTRIBUTION TO EUROPE'S RESILIENCE

Environmental research and innovation also enhance Europe's strategic autonomy, preparedness and resilience of supply chains by reducing structural dependencies on imported raw materials, energy and critical natural resources through circular economy approaches, resource efficiency and Nature-based Solutions. By improving energy system integration, industrial symbiosis and sustainable resource use, environmental innovation lowers operational costs for European companies and increases their resilience to increasingly volatile global markets.

Research supporting **risk mitigation** in the face of flooding, water shortage, forest fires and other climate-related hazards reduces economic losses, insurance expenses and supply chain disruptions, thereby strengthening business continuity and investment confidence. It further contributes to strengthening preparedness and resilience to the impacts of global change through the scaling-up of climate adaptation technologies, ecosystem restoration methods, pollution monitoring and remediation systems and sustainable bio-based products.

More broadly, **environmental research supports Europe's preparedness and sovereignty** in terms of food, other natural resources and raw materials. Environmental research e.g. significantly contributes to ensuring the continuity of food production under changing climatic and geopolitical conditions by improving soil health, water availability and climate resilience in agricultural systems.

III. ENVIRONMENTAL RESEARCH'S CONTRIBUTION TO EUROPE'S SECURITY

Environmental research and innovation also make a critical contribution to Europe's defence and security architecture by strengthening territorial resilience, protecting strategic assets and enhancing food, water and ecosystem security. Many environmental monitoring, modelling and restoration tools already demonstrate

strong dual-use potential. For instance, environmental observation technologies such as hydrophones and other acoustic or remote sensing systems - initially developed to monitor marine biodiversity or ecosystem health - can also support surveillance, critical infrastructure protection and early-warning capabilities. Likewise, nature restoration measures can directly contribute to defence and border security objectives. Improving the ecological condition of landscapes through actions such as mires, rehabilitating former peat production areas or maintaining storm-felled trees in forested regions can create natural barriers that hinder unwanted movement across sensitive border areas while simultaneously supporting biodiversity recovery and ecosystem stability. Afforested or structurally diverse landscapes not only increase habitat connectivity, but can also provide strategic concealment in drone warfare scenarios or protect critical ground infrastructure from observation. Integrating environmental targets into defence planning thus represents a novel and cost-effective approach to reinforcing Europe's security posture, aligning biodiversity restoration with strategic resilience objectives. Arctic and polar research must be recognised as strategically relevant for Europe's climate security, maritime safety, biodiversity protection and geopolitical resilience.

Europe must follow a forward-looking vision in which natural capital becomes an integral component of Europe's economic strength, defence readiness and long-term resilience.

IV. FIVE PRIORITY RESEARCH AND INNOVATION AREAS FOR THE FP10

Environmental research is a key discipline for the prosperity and security of many sectors. **PEER strongly supports a holistic and transdisciplinary approach to environmental research within the FP10 and ECF.** We wish to emphasise five priority research and innovation areas to be funded in the FP10.

1. Support climate change mitigation and adaptation

- Develop multi-criteria assessments of mitigation and adaptation solutions, particularly Nature-based Solutions
- Explore synergies between adaptation, mitigation, and biodiversity maintenance/restoration
- Strengthen climate scenario and impact modelling capabilities
- Develop forest management approaches and genetic resources adapted to future climate conditions
- Strengthen the analysis of economic aspects related to climate change adaptation and mitigation, including carbon markets

2. Restore biodiversity and strengthen resilient ecosystems

- Ensure stable and long-term funding for harmonised European biodiversity and ecosystem monitoring infrastructures, including eDNA, remote sensing and ecosystem-level observatories, enabling comparable data across Member States
- Continue work on the design and deployment of Nature-based Solutions, with a multi-criteria evaluation including the economic perspective
- Strengthen the assessment of the economic value of biodiversity, including the economic damage associated with biodiversity loss and the hidden costs of human activities
- Strengthen the development of evidence-based, reliable and trustworthy systems for biodiversity credits fostering nature conservation and restoration

3. Foster long-term resilience and sustainability

- Understand the complex interactions between environmental, social, technological and economic systems

- Develop innovative tools for sustainable management of natural resources (water, soil, forests), optimising their use and assess the impact of public policies and economic strategies of stakeholders on natural resource management
- Strengthen the resilience of socio-economic-ecosystems to global risks, developing strategies to prevent/reduce vulnerabilities to extreme events and deploying a multi-risk approach for prevention and adaptation
- Develop and implement concepts of equity, governance, environmental and social justice in the face of climate change
- Support water resilience and mitigate and manage water scarcity

4. Nexus approaches

- Biodiversity-trade nexus: research toward equitable, resilient and sustainable global trading systems, with case studies linking local socio-economic and landscape effects of trade to (changing) global trade flows and patterns and a broader focus on governance processes
- Soil-water-biodiversity-energy nexus: a balanced approach to uses (biomass/food-feed, biodiversity, carbon storage, energy production, etc.), contributing to climate change mitigation and adaptation
- Health -environment: analysis of the effects of pollution on biodiversity and ecosystems with a view to global health and evaluating the impacts of pollutants in all compartments (water, soil, biota); identification and implementation of pollution prevention and mitigation techniques

5. Dual use / security

- Strengthen rapid detection, monitoring and decontamination of chemical, biological and radiological hazards and deliberate disruption of critical water infrastructures
- Strengthen diversified, ecosystem-based terrestrial and marine food systems to enhance protein security and reduce dependency on imported feed and fertilisers
- Advance environmental observation technologies, including remote sensing, acoustic systems and integrated sensor networks
- Implement nature restoration and natural barriers to support defence, territorial resilience and border security

In conclusion, environmental research is not an obstacle to European development, it is a **mandatory strategic investment** in Europe's enhanced competitiveness, resilience and sovereignty. FP10 and the ECF must therefore ensure stable, predictable and sufficiently ambitious funding for environmental sciences as foundational pillars of Europe's future.

These investments will only fully deliver if the whole knowledge value chain is tackled, **financing both fundamental and applied research** to reinforce Europe's mid- to long-term innovation capacity in the face of intensifying global competition. This also requires a clear and operational interface between the FP10 and ECF. European research infrastructures, long-term observation systems and public-private partnerships can act as connectors between FP10 and ECF, ensuring continuity from scientific discovery to application.

For all these reasons, a ring-fenced budget for environmental R&I within FP10 is essential to safeguard Europe's long-term scientific capacity and long-term economic development.

Signatories



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