POLICY BRIEF

Interoperability by Design: Building the Data Infrastructure for Biodiversity Finance – Recommendations from the BIO-CAPITAL Project

BIO-CAPITAL Project (a Horizon Europe RIA) | April 2026

KEY MESSAGES

- BIO-CAPITAL research finds that the primary barrier to biodiversity finance in Europe is not a lack of data or financial instruments, but the **absence of interoperability — between ecological monitoring systems and financial reporting frameworks**, between available datasets, and between restoration project structures and investor requirements.
- Current EU policy frameworks generate substantial ecological data through instruments such as the NRR and the CAP, but this **data is not systematically structured for use in financial decision-making.** National Restoration Plans, due by 1 September 2026, represent a concrete and time-sensitive opportunity to close this gap by design.
- The transition from fragmented pilots to investable portfolios requires three conditions to be met simultaneously: **harmonised and interoperable data, risk-sharing mechanisms that align public and private capital**, and restoration measures defined with sufficient specificity to function as contractual triggers for financial instruments.

1. Introduction: A Gap in the EU Biodiversity Policy Landscape

Biodiversity loss represents a growing systemic risk to European economies, food systems, and supply chains — and a structural gap in the continent's financial architecture. Despite broad policy recognition of the problem, biodiversity finance remains significantly underdeveloped: investable structures, standardised metrics, and risk-management tools capable of mobilising private capital at scale are largely absent. Public budgets alone cannot meet Europe's restoration investment needs. The National Restoration Plans (NRPs) that EU Member States are required to submit by 1 September 2026 under the Nature Restoration Regulation (Regulation (EU) 2024/1991) represent one of the most significant near-term opportunities to change this — by advancing ecological restoration, and by generating the data infrastructure that biodiversity finance markets require.

It is these structural conditions — the gap between ecological data and financial usability, and the absence of investment-ready project architectures — that the BIO-CAPITAL project set out to investigate. BIO-CAPITAL is a Horizon Europe RIA working to mobilise investment for biodiversity protection and restoration by harnessing innovative financial solutions and advanced geospatial analytics. The research presented in this policy brief draws on the project's findings. They point to a consistent finding: the gap between Europe's biodiversity ambitions and the finance flows needed to realise them is not primarily a gap in policy intent or instrument availability, but in the operational infrastructure connecting ecological outcomes to financial decision-making.

This policy brief translates that finding into three recommendations for national authorities designing NRPs and for policymakers working to develop biodiversity finance frameworks at EU level.

2. Evidence and Analysis

The regulatory environment for biodiversity finance in Europe has undergone a series of changes since May 2024, affecting instruments related to corporate disclosure, due diligence, agricultural conditionality, and land-use transparency. These developments were systematically tracked and analysed by the BIO-CAPITAL project over the period May 2024 – April 2026 as part of its assessment of the conditions for scaling biodiversity finance in the EU. The analysis identifies two structural developments of particular relevance.

First, the scope of mandatory biodiversity-related corporate reporting has contracted substantially: the Omnibus I simplification package has removed approximately 75–80% of undertakings previously subject to CSRD obligations, with significant implications for the availability of biodiversity data across value chains.

Second, the perimeter of activities potentially qualifying as sustainable under the EU Taxonomy is under discussion, while binding verification criteria remain incomplete. Where frameworks are formally in place, the stability and predictability are critical preconditions for market adoption. In the case of ESRS for instance, ECB , EIOPA, and ESMA have each noted that new proposed changes risk creating data gaps with consequences for financial supervision, risk assesssment and investor protection.[1]

Against this background, the Nature Restoration Regulation and its National Restoration Plans remain the primary legally binding instrument for biodiversity at EU scale. BIO-CAPITAL research examined the conditions under which NRPs can contribute not only to ecological restoration, but to closing the data and structural gaps that currently constrain biodiversity finance. The following recommendations derive directly from that research.

3. Key Findings from BIO-CAPITAL Research

The following section summarises key findings from BIO-CAPITAL research deliverables, organised by work package. These findings constitute the empirical basis for the policy recommendations presented in Section 4.

3.1 Policy–Finance Alignment and MRV Frameworks

BIO-CAPITAL Deliverable D2.1 analysed the alignment between the EU biodiversity policy framework and the financial mechanisms intended to support it. The analysis identifies a central structural gap: while EU policy creates a strong strategic direction for biodiversity protection and restoration, it lacks sufficient operational alignment between ecological objectives, regulatory instruments, and financial mechanisms. Specifically, monitoring frameworks under the CAP and the NRR which generate valuable ecological data but are not systematically aligned with ESRS E4 disclosure structures, limiting their usability for financial decision-making and EU Taxonomy assessments and classification Indicator standardisation is identified as the primary bottleneck, particularly in agriculture and grassland systems, while low temporal responsiveness of biodiversity indicators — especially in forest systems — further constrains the ability to track progress and link biodiversity outcomes to financial returns. High transaction costs and fragmented land ownership are identified as additional barriers to scalability, pointing to the need for aggregation mechanisms and landscape-level financing models.

[1] https://www.esma.europa.eu/sites/default/files/2026-02/ESMA32-846262651-5440_Opinion_on_revised_ESRS.pdf; https://www.ecb.europa.eu/pub/pdf/other/ecb.staffopinion_europeansustainabilityreportingstandards202602.en.pdf; https://www.eiopa.europa.eu/publications/opinion-european-commission-efrags-technical-advice-amended-european-sustainability-reporting_e

3.2 Biodiversity Finance Instruments and Market Readiness

BIO-CAPITAL assessed the current landscape of biodiversity finance instruments, including payments for ecosystem services (PES), biodiversity bonds and credits, and insurance instruments. The analysis finds that, while innovative instruments are emerging, implementation has been constrained by fragmented land ownership and methodological uncertainty. Voluntary initiatives and multi-stakeholder platforms have demonstrated resilience, but systemic adoption requires harmonisation, risk reduction, and trusted monitoring systems. The deliverable identifies biodiversity finance as approaching a significant inflection point, with growing investor familiarity and maturing voluntary frameworks, but concludes that the absence of harmonised metrics, interoperable data systems, and EU-wide methodologies for credits and verification remains a critical bottleneck. Aggregation models and blended finance are identified as key mechanisms for converting fragmented restoration projects into investable portfolios.

3.3 Investor Segmentation and Enabling Conditions for Capital Mobilisation

BIO-CAPITAL provides a segmented analysis of how different investor groups engage with biodiversity finance in Europe. The deliverable confirms that biodiversity finance remains an emerging and fragmented field characterised by limited track records, uncertain revenue models, and high perceived risk. Banks and institutional investors require predictability, scale, and regulatory clarity; private equity and venture capital seek scalable business models and credible exit pathways; impact investors and philanthropic capital play a catalytic role by absorbing early-stage risk; and private investors require accessible and transparent products. Across all segments, the analysis identifies common structural barriers: insufficient project pipelines, high transaction costs, lack of standardised metrics, and limited mechanisms to translate biodiversity outcomes into reliable cash flows. The deliverable concludes that regulatory frameworks, combined with blended finance instruments, guarantees, and outcome-based payments, hold significant potential to reduce uncertainty and improve capital alignment with biodiversity objectives — but only where policy coherence and credible data infrastructure are in place.

3.4 Investment Value Chain Architecture and Geospatial Data Infrastructure

BIO-CAPITAL presents a reference architecture for biodiversity-positive agricultural transitions, demonstrating how fragmented ecological outcomes can be structured into a financially legible and contractually enforceable Investment Value Chain (IVC). Using a French agricultural use case, the deliverable shows how verified practices, contractual triggers, and financial execution can be integrated into a Nature Mini-Bond structure. The analysis highlights that scalability requires a sequenced validation process — progressing from local multi-stakeholder validation, through financial operator dialogue, to system demonstration and cross-sectoral proof — before the architecture can support diversified portfolio aggregation suitable for institutional investors. A Catalogue of Available Geospatial Data, focusing on BIO-CAPITAL use case sites, finds that the current data landscape for biodiversity monitoring is not limited by data availability, but by fragmentation and lack of interoperability. Multiple datasets — ranging from open-access satellite sources (e.g. Sentinel, Landsat) to commercially restricted and project-specific layers — are governed by different access conditions and licensing regimes. Significant effort is required to harmonise and standardise these datasets before joint analysis is possible, confirming that interoperability must be actively constructed rather than assumed, and that the absence of consistent standards limits the scalability and long-term usability of biodiversity data for evidence-based decision-making and private investment mobilisation.

4. Policy Recommendations

I. Design NRP monitoring frameworks for financial interoperability

National Restoration Plans should be designed from the outset so that ecological monitoring data is directly usable in financial decision-making. BIO-CAPITAL research identifies a central structural gap in the current EU framework: while instruments such as the NRR and the CAP generate substantial ecological data, these are not systematically aligned with ESRS E4 disclosure structures or EU Taxonomy activities criteria, limiting their utility for investors, banks, and insurers.

- **Align NRP indicators (monitoring) and restoration measures (activities) with ESRS and EU Taxonomy from the start.** Ecological indicators collected under NRP monitoring frameworks should be standardised and structured to be directly translatable into ESRS /CSRD corporate disclosures and the restoration measures and activities should be classified under EU Taxonomy alignment assessments, reducing fragmentation between policy implementation and financial reporting systems.
- **Complement long-term indicators with short-term proxies.** BIO-CAPITAL identifies the low temporal responsiveness of some biodiversity indicators — particularly in forest ecosystems — as a critical but underappreciated constraint. NRPs should be requested / asked to also collect leading or proxy indicators (e.g. habitat structure metrics, management-based proxies, remote sensing signals) alongside long-term ecological measures, enabling a more timely demonstration of restoration progress to financial stakeholders.
- **Promote landscape-level aggregation structures.** Given the high transaction costs and fragmented land ownership documented in BIO-CAPITAL, NRPs should actively support aggregation platforms and landscape-level financing models that allow small-scale restoration projects to be bundled into investment-ready portfolios.

II. Structure NRPs to catalyse investable biodiversity finance pipelines

BIO-CAPITAL research (D2.2) finds that biodiversity finance instruments — including payments for ecosystem services, biodiversity bonds, nature credits, and insurance mechanisms — are increasingly available but remain confined to fragmented pilots. The primary barriers are not a lack of instruments, but the absence of harmonised methodologies, trusted monitoring systems, and risk-sharing structures capable of attracting institutional capital at scale. In addition, recent experience in the EU green bond market shows that when there are clear regulatory standards and frameworks the market uptake grows significantly, which reiterates the need for clear guidance.
National Restoration Plans are well-positioned to address these barriers at the national level.

- **Design restoration measures as aggregable units.** NRPs should structure restoration interventions so that individual projects — particularly those involving fragmented land ownership in agricultural and forest landscapes — can be systematically bundled into diversified, multi-benefit portfolios combining biodiversity, climate, and social outcomes. This requires standardised project templates and, where possible, landscape-level governance frameworks from the outset.
- **Deploy public finance as catalytic risk capital.** D2.2 identifies risk-return misalignment as a persistent barrier across investor segments. NRPs should explicitly integrate blended finance mechanisms — including guarantee funds, concessional lending, and first-loss public capital — to reduce perceived risk and unlock private co-investment. EU funds (LIFE, EAFRD, ERDF) should be deployed strategically for this purpose rather than as standalone subsidies.
- **Build technical capacity for smaller actors.** The analysis identifies limited technical capacity among SMEs, municipalities, and regional actors as a structural bottleneck to participation in biodiversity

finance markets. NRPs should include provisions for dedicated technical assistance, enabling these actors to develop investment-ready project documentation and engage with certification and MRV requirements as the EU's nature credit framework matures.

III. Build NRP data infrastructure to open, interoperable standards from the outset

BIO-CAPITAL geospatial research finds that the current data landscape for biodiversity monitoring is not constrained by a lack of available data, but by fragmentation and the absence of interoperability. An assessment of datasets relevant to BIO-CAPITAL use case sites — spanning global open-access sources such as Sentinel and Landsat through to commercially restricted and project-specific layers — reveals that these datasets are governed by divergent access conditions, licensing regimes, and spatial coverage, and require substantial harmonisation effort before joint analysis is possible. Critically, the research confirms that interoperability is not an inherent feature of existing biodiversity data infrastructures, but must be actively constructed. Where it is not built in from the start, the scalability, comparability, and long-term usability of monitoring data are fundamentally compromised. For national authorities, this finding carries a direct implication for NRP design.

- **Adopt open, standardised data architectures for NRP monitoring systems.** Monitoring frameworks established under NRPs should from the outset conform to open, machine-readable standards — including spatiotemporal metadata standards such as STAC — and be structured for interoperability with existing EU data infrastructures (BISE, Copernicus, INSPIRE, ESAP). Decisions about data formats, licensing, and access conditions made early in NRP implementation will determine whether the resulting datasets can be used comparably across Member States, integrated into EU Taxonomy assessments, and made accessible to financial actors. Retrofitting interoperability after the fact is substantially more costly and often incomplete.
- **Treat geospatial monitoring data as shared public infrastructure.** Given the licensing fragmentation documented by BIO-CAPITAL, NRPs should where possible mandate the collection and publication of biodiversity monitoring data under open licensing conditions, ensuring that data generated through public restoration programmes is accessible to researchers, regulators, and financial institutions without restrictive access barriers.
- In this context, the EU could **establish a unified Environmental Transparency Portal** that connects Copernicus geospatial monitoring data (including other third party open available geospatial data) with the forthcoming EU certification framework for nature credits, while also integrating financial and ESG data available through the European Single Access Point (ESAP). This combined architecture would close critical data gaps by linking real time ecological evidence with financial disclosures, ESG ratings, and instrument level information. Such interoperability would create a transparent, science-based foundation for verifying biodiversity outcomes, reducing transaction costs, and strengthening the credibility of nature credit markets. Embedding satellite derived indicators, harmonised biodiversity metrics, and automated MRV within a single platform would support MS, SMEs, and project developers with accessible, standardised evidence for compliance and investment mobilisation. By aligning ecological data, financial reporting, and certification processes, the EU can build a robust, trusted infrastructure that accelerates capital flows toward nature positive activities and enhances resilience against political or market volatility.

5. Conclusion

BIO-CAPITAL's research consistently points to a structural challenge: the gap between Europe's biodiversity ambitions and the finance flows needed to realise them is not primarily a gap in policy intent or instrument availability, but in the operational infrastructure connecting ecological outcomes to financial decision-making. Monitoring data is not structured for financial use. Geospatial datasets are fragmented and non-interoperable. Restoration measures are rarely defined with the specificity that investors and lenders require. And the risk-sharing mechanisms needed to attract private capital at scale remain underdeveloped. The recommendations presented address these gaps directly. They are grounded in empirical research conducted across BIO-CAPITAL's project deliverables spanning policy analysis, financial instrument assessment, investor segmentation, geospatial data cataloguing, and investment architecture design. Taken together, they outline a coherent approach to NRP design that goes beyond ecological restoration targets to address the financial infrastructure on which private capital mobilisation depends. The submission deadline of 1 September 2026 leaves limited time for NRP development. Decisions about monitoring system design, data standards, and project structure made in the coming months will determine whether NRPs generate the interoperable, investment-ready foundations that biodiversity finance markets require — or reproduce the fragmentation that BIO-CAPITAL research identifies as the primary barrier to progress.

About the BIO-CAPITAL project

Biodiversity protection and restoration are critical for maintaining ecological balance and ensuring the planet's sustainability. In the absence of sustainable management and protection of natural resources, the negative impacts of climate change and other environmental issues will only increase. Private investment can be a critical tool with the potential to play a transformative role in financing conservation and restoration efforts, as public financing alone may be insufficient to address the scale of these challenges.

By activating innovative sustainable finance solutions and incorporating technological advances within the field of geospatial analytics, private investment can be leveraged in a way that benefits the environment and secures investors' confidence. BIO-CAPITAL is going to implement an interdisciplinary research and innovation endeavour by combining actions in the three fields of (i) biodiversity protection and restoration, (ii) biodiversity-friendly financing mechanisms and (iii) advanced space technology.

BIO-CAPITAL is funded by the European Union and co-funded by UK Research and Innovation (UKRI).

Disclaimer: This publication has been funded by the European Union under grant agreement No. 101135150. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the granting authority. Neither the European Union nor the granting authority can be held responsible for them.

www.bio-capital.eu