



TOPICS:

ESG Risk

SOURCE:

De Nederlandsche Bank

DNB: From Nature Shocks to Financial Stability Incorporating Nature Physical Risks – in Particular Water-Related Risks – into Banks' Credit Risk Models and Insurers' Market Risk Models

- The paper addresses a critical gap in current regulatory practice: while authorities increasingly recognize **nature-related risks** as financially material, there is no standardized method to quantify their transmission into credit and market risk. To address this, the authors align their framework with the NGFS structure linking **nature, the economy and the financial system**.
- The methodology begins by calibrating **a nature shock** using proxy macroeconomic scenarios, assuming an indicative **10% decline in EU production**. This aggregate shock is then distributed across sectors and countries based on their **vulnerability to ecosystem degradation**, defined as a function of dependence on nature (e.g., water supply) and the extent of environmental degradation.
- At the micro level, the framework adapts the **Merton structural credit risk model** to incorporate nature-related vulnerability. Environmental shocks reduce firms' production and asset values, increasing **probabilities of default (PDs)**. These PD shifts are the primary transmission channel into the financial system,

- affecting both **banks' credit risk exposures** and **insurers' market portfolios** (debt and equity holdings).
- The results indicate significant and uneven impacts. For an EU-wide shock, **country-level production losses vary materially** (e.g., approximately **-6% to -15%**), reflecting differing sectoral and geographic dependencies on water-related ecosystem services. Financial impacts are also substantial: asset valuations decline (around **5% at EU level**), while banks and insurers experience notable stress in **CET1 and Solvency Capital Requirement (SCR) ratios**, respectively.
- From a regulatory perspective, the framework provides **granular, decision-useful metrics** - including sectoral vulnerabilities, firm-level default risk and prudential capital impacts. While reliant on proxy scenarios and subject to data limitations, it represents a meaningful advancement toward integrating **nature-related risks into supervisory stress testing and prudential frameworks**, supporting enhanced risk identification and systemic resilience analysis.

