LSE Grantham Research Institute on Climate Change and the Environment

Earth Capital Nexus

Submission to Bank of England consultation CP10/25 — Enhancing banks' and insurers' approaches to managing climate-related risks — Update to SS3/19

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About this submission

This report consists of a submission by the Earth Capital Nexus initiative, hosted by the Grantham Research Institute, made in response to the open consultation by the Bank of England CP10/25 — Enhancing banks' and insurers' approaches to managing climate-related risks — Update to SS3/19. See details of the consultation here: https://www.bankofengland.co.uk/prudential-regulation/publication/2025/april/enhancingbanks-and-insurers-approaches-to-managing-climate-related-risks-consultation-paper

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Introduction

We welcome the publication of CP10/25 and commend the Prudential Regulation Authority (PRA) for its continued leadership in integrating climate-related financial risks into supervisory expectations. The consultation demonstrates clear progress in embedding forward-looking, qualitative and quantitative approaches to risk identification, governance and scenario analysis. We strongly support the PRA's focus on proportionality, materiality and the use of scenario analysis to improve financial resilience. In particular, the recognition of climate risk as systemic, uncertain and non-linear is closely aligned with the findings of our own research.[1] This consultation represents an important step forward in safeguarding the stability and competitiveness of the UK financial system in the face of accelerating environmental change.

We focus our response on the sections of the consultation paper on climate scenario analysis (Chapter 3) but also address more cross-cutting issues. Our response is organised into the following sections:

1. Reframing physical risks as immediate and potentially systemic
2. Scenario analysis: capacity, gaps and principles
3. Ensuring firms incorporate all material climate-related risks
4. Providing clarity on timescales: addressing short-term volatility versus long-term structural changes
5. Nature-related risks under the PRA's primary and secondary objectives.

By integrating these enhancements, the PRA would help firms move beyond static, compliance-focused scenario exercises to a dynamic, decision-useful climate risk framework. This will better align with emerging scientific understanding, global regulatory momentum and the real systemic risks facing the UK financial system.

The final section concludes with recommendations for how the PRA and Financial Conduct Authority (FCA) could better support the UK financial sector to build capability and ensure resilience.

1. Reframing physical risks as immediate and potentially systemic

We support the PRA's recognition of climate risk complexity but recommend greater emphasis on the short- and medium-term materiality of certain physical climate risks. The document presents physical risks as medium- to long-term, for example: 'Box A: Physical risk arises from the medium to long term effect of climate change.' There is no clear recognition that acute physical risks are already materialising, nor acknowledgement of recent climate-related shocks in the UK or globally. This current framing may cause firms to deprioritise near-term physical exposures, creating a dangerous prudential blind spot. Research by leading climate centres, including the UK Met Office, shows that acute and chronic physical climate impacts are already materialising, with growing frequency, intensity and financial consequences — many of which are within existing risk horizons for credit, insurance and investment. In the past two years alone, the UK has faced

[1] For example: on compound risks: https://www.ngfs.net/en/publications-and-statistics/publications/ngfs-climate-scenarios-central-banks-and-supervisors-phase-v; on non-linearities and feedbacks: https://www.sciencedirect.com/science/article/pii/S259033222100539X

record-breaking heatwaves that triggered power outages and health crises, flash floods causing extensive property and infrastructure damage, and coastal erosion and subsidence threatening housing markets in East Anglia and Cornwall. Across Europe, the 2022 and 2023 droughts led to agricultural yield losses, shipping disruptions on the Rhine and Danube, and water restrictions in France and Spain. In the US, Hurricane Ian (2022) became one of the costliest disasters on record (~US$113 billion), and the increasing frequency of wildfires (e.g. California, 2023, 2024) has created cascading insurance market stress. Globally, the world has seen major trade interruptions due to droughts impacting the Panama Canal and supply chain and price shocks linked with growing extreme weather severity.

The impacts of physical climate change on prices and inflation were recently highlighted in speeches by Sarah Breeden[2] and James Talbot,[3] yet such impacts were not mentioned in the consultation paper. As described by Sarah Breeden, historical experience suggests that severe weather events can generate price increases of over 30% in global agricultural commodity prices and as an economy that imports a high proportion of its food — around 40% — UK inflation is highly susceptible to such changes. Our research has similarly shown that supply chain risks are critical for the UK (Ranger et al., 2025). These impacts extend well beyond food to, for example, critical minerals and semiconductors.

These are not hypothetical future risks — they are contemporary financial realities, and their frequency is expected to increase. Treating physical risk as distant may lead firms to underinvest in resilience, misprice loans and insurance, or misjudge real estate exposures. To align with the real-world risk landscape, CP10/25 should be revised to reflect that physical risks are already relevant to current supervisory time horizons and consequently near-term scenario testing and risk governance responses.

Incorporating language that reflects immediate and escalating risk exposure would help ensure that firms build resilience across all supervisory timeframes.

We also note that litigation risk is barely mentioned in CP10/25, despite this being a growing concern for many UK financial institutions.

2. Scenario analysis: capacity, gaps and principles

The PRA is right to highlight that banks and insurers face limitations in their current capacity to conduct sophisticated climate scenario analysis, particularly in aligning such analysis with strategic decision-making. We welcome the PRA's intention to strengthen scenario use and integration, and agree that embedding proportional, forward-looking scenario analysis is essential to effective risk management.

The 2023 Climate Financial Risk Forum and UK Centre for Greening Finance & Investment (CGFI-CFRF) report ('Learning from the 2021/22 Climate Biennial Exploratory Scenario (CBES) Exercise in the UK'), led by Professor Ranger, provides strong empirical support for this direction (Ranger et al., 2023a). It identifies significant challenges encountered by firms during the CBES exercise, including limited internal modelling capacity, data gaps, and difficulties in downscaling scenarios to reflect firm-specific risks. Importantly, the study found that many firms felt that the CBES scenarios did not capture all material risks, particularly those relating to complex, non-linear and cascading events. Participants expressed concern that key physical and macro-financial risk pathways were simplified, leaving out plausible but disruptive compound shocks — such as concurrent extreme weather and commodity price volatility, or abrupt transition coupled with global financial stress. Our broader work reinforces the view that failing to account for

[2] https://www.bankofengland.co.uk/speech/2025/july/sarah-breeden-speech-at-the-annual-chapman-barrigan-lecture-series

[3] https://greencentralbanking.com/2025/05/15/climate-risk-is-increasingly-relevant-for-monetary-policy-boe-director-says/

compounding and cascading risks, potential abrupt shifts, and near-term tipping points can lead to a systemic underestimation of financial vulnerability. These limitations restricted the ability of firms to use CBES-style scenarios for decision-making.

The expectations laid out in the consultation paper go towards addressing some of these issues, but only if implemented appropriately. For example, we support the stated expectation that firms incorporate material physical and transition risks that reflect real-world dynamics — including cascading and compound shocks — even when these cannot be fully quantified, and the use of narrative-driven or exploratory approaches alongside quantitative models to test resilience under uncertainty.

A challenge is that CP10/25, in trying to avoid being overly prescriptive, lacks sufficient guidance and clarity on expectations of firms and leaves significant ambiguity about the appropriate approach to addressing the challenges. Rather than catalysing innovation in methods, this could instead result in paralysis. To address this challenge, we recommend that the PRA lay out a set of clear principles and minimum requirements for scenarios used by firms for climate scenario analysis. Table 1 gives a preliminary set of principles that could be built upon by the PRA as an example.

Table 1. Principles for scenario analysis

Comprehensiveness	Capture the full range of probable and credible outcomes • Includes tail-risk representation for both transition and physical risks (and their combination) suitable for stress testing • Scenario set favours robustness over precision • Appropriately accounts for near-term volatility as well as longer-term structural changes of relevance to financial resilience • Incorporates a low, medium and high scenario, following the Aim-Build-Contingency (ABC) framework proposed by the CFRF adaptation working group (CFRF, 2024a). • Capture all relevant and material risk transmission channels, including second-round or indirect impacts and supply chains • Capture feedbacks with environmental degradation
Operational relevance	Methods and outputs are relevant to the firm portfolio • Scenarios account for appropriate level of granularity • Suitability for stress testing applications • Capture systemic scale impacts, such as supply chain or trade risks, of relevance to firm financial resilience • Represent sudden changes that may significantly impact credit quality and asset pricing • Capture compounding of climate risks and non-climate risks • Dynamic balance sheet modelling capacity to capture risk evolution under stress
Up to date	Be up-to-date policy, market context and established scientific evidence • Reflects credible scenarios based upon the latest science • Physical risk reflects the most material risks identified in national risk assessments for countries with material exposures. • Reflects latest government policy and risk assessments
Transparent	• Developed via a transparent process • Clear documentation of methods and assumptions
Coherent	• Coherence between short-term and long-term scenarios and coherent with other scenarios used for scenario analysis

Notes: Draft principles derived from collaborations with the Network for Greening the Financial System (NGFS), World Bank, and Bank of England on scenarios, including: https://www.ngfs.net/en/publications-and-statistics/publications/ngfs-climate-scenarios-central-banks-and-supervisors-phase-v; Ranger et al. (2022); and Baer et al. (2023).

The PRA could also consider tiered expectations, with global systemically important banks (GSIBs) and relevant other systemically important institutions (O-SIIs) having higher expectations reflecting their exposure to systemic climate risks. For example, clear expectations around assessment of complex, cascading and compounding risks and explicit expectations on the consideration of global systemic risks. The Bank could publish case studies or scenario archetypes to illustrate each level (similar to the European Central Bank's Climate Risk Stress Test guidance). For all firms, the PRA could define some clear minimum standards, for example:

- Physical risks: Firms should have due regard to the UK Climate Change Risk Assessment (CCRA) in their identification of material physical climate risks, and similar national risk assessments for other jurisdictions where they have material exposure.

- General:

    a. Firms should be required to include at least one severe but plausible tail-risk scenario, that is up to date and based on the latest evidence, and involving compounding risk

    b. Firms should disclose limitations in modelling assumptions.

Noting the need to take due regard of national climate risk assessments is important. Based upon the 2023 CGFI-CFRF report findings (Ranger et al., 2023a), many financial institutions were considering a much narrower range of climate risks than those identified in the UK CCRA. Typically, firms considered direct physical risks that are relatively easy to capture based on current models (e.g. floods and storms) and did not capture those risks of greatest concern in the UK CCRA, such as global supply chain impacts and disruptions to infrastructure services such as power and water.

Principles and minimum standards could be developed in collaboration with the CFRF, with support of leading academic experts.

3. Ensuring firms incorporate all material climate-related risks

We support the PRA's expectation that firms should identify and assess all material climate-related financial risks as part of their internal risk management frameworks. However, we encourage the PRA to provide clearer guidance on what constitutes a 'material' risk in this context — especially given the complex, systemic and non-linear nature of many climate-related risks and the evolving nature of capabilities in this area.

We also encourage the PRA to set clearer expectations concerning the assessment of potential global systemic risks, particularly to systemically important firms.

Based on our experience, the following enhancements would help ensure a more robust and forward-looking materiality assessment across the UK financial sector:

A. **Capture tail-risks and compounding and cascading physical risks.** Our research on physical climate risks highlights that firms frequently underestimate the potential for tail-risks and compound and cascading hazards — where multiple shocks occur simultaneously or sequentially, amplifying financial impacts. For example, a coastal flood event coinciding

with infrastructure disruption or a heatwave during energy supply stress can lead to disproportionately large losses. These types of risks are not well captured in traditional single-hazard models. We therefore recommend that supervisory expectations explicitly require firms to identify material exposures to both acute and chronic hazards, including scenarios involving:

a. More extreme 'stress' scenarios

b. Multiple concurrent events (e.g. flood and storm)

c. Cascading failures (e.g. drought leading to food price spikes)

d. Temporally linked events across timeframes (e.g. physical damage followed by reinsurance withdrawal).

Such guidance would reflect the evolving scientific consensus and align with real-world complexity.

B. **Integrate nature-related feedback on climate financial risks.** The materiality of nature-related risks — including biodiversity loss, soil degradation and freshwater scarcity — is increasingly supported by both empirical and supervisory evidence. Our own research with the Green Finance Institute (GFI), HM Treasury, the FCA and the Department for Environment, Food and Rural Affairs demonstrates that environmental degradation severely amplifies climate-related risks, potentially doubling the scale of physical climate risks in the UK (Ranger et al., 2024). Ignoring these risks within CP10/25 is therefore a considerable regulatory blind spot that could lead firms to underestimate the scale of physical climate risks. The importance of nature-related risks is also noted by the CFRF (CFRF, 2024b). Building on the 'Green Scorpion' risk framework developed with the NGFS (Ranger et al., 2023b), we recommend that the PRA clarify that nature-related risks should be considered part of the climate materiality assessment where relevant. Firms should be encouraged to adopt a hazard–receptor–exposure framework (ibid.) to identify nature-linked financial risks, particularly in sectors with high dependencies on ecosystem services (e.g. agriculture, water utilities, real estate and manufacturing). This would support convergence with emerging frameworks such as the Taskforce on Nature-related Financial Disclosures (TNFD) and maintain consistency with the PRA's primary and secondary objectives.

C. **Represent the potential for much higher transition risks linked to abrupt changes in policy, policy fragmentation across countries, and disorderly energy transitions.** Current scenarios do not capture the higher risk of a disorderly transition that now seems more plausible given that global emissions have yet to peak and recent geopolitical events. Increased policy fragmentation across countries will impact the scale and speed of regulatory support for net zero emissions globally (Baer et al. 2023). NGFS scenarios are unable to capture country or local factors that could have significant implications for sectoral risks in a particular country, for example, the extent of the roll-out of electric vehicle (EV) infrastructure or building efficiency measures. Users in emerging markets and developing economies (EMDEs) have noted that this issue is particularly challenging for the EMDE transition scenarios. The scenarios also do not capture financial sector feedbacks that may amplify transition risks.

D. **Capture macro-financial transmission channels.** Our research also emphasises that indirect channels of financial transmission — through supply chains, sovereign exposures, global commodity markets and sectoral interlinkages — can create significant systemic vulnerabilities. We suggest the PRA encourage firms to:

a. Map dependencies across sectors and geographies that could propagate shocks (e.g. nature risk in Brazil affecting UK commodity traders)

b. Assess second- and third-order effects that may not appear material at the individual asset level but are highly material in aggregate

c. Capture propagation mechanisms of both climate and nature shocks.

We note that none of these processes are fully captured within the current NGFS scenarios, hence overreliance on those scenarios could itself create substantial risks.

Setting clearer expectations and guidance in these areas aligns with the PRA's role in ensuring financial system resilience to low-frequency, high-impact events.

4. Providing clarity on timescales: addressing short-term volatility versus long-term structural changes

A challenge seen within the UK (and global) financial system is that financial institutions often overweight short-term policy and market signals and underweight the structural long-term trajectory, even though the latter is more likely to shape asset value and business model viability over time. This effect is particularly evident right now, with many firms changing their approaches based on short-term market and political cycles. In the case of climate change, this mismatch can increase transition risks, lead to mispriced capital, and ultimately result in stranded assets or disorderly transitions. The Bank of England should set concrete expectations and supervisory actions to address this short-termism and prevent volatility that could undermine financial stability. This includes mandating consideration of long-term credible scenarios into capital planning. The PRA should consider mandating scenario use cases that simulate orderly and disorderly net zero pathways, including late and abrupt policy action (e.g. delayed carbon pricing), to stress test capital buffers and business models over 10–20 years.

This could include mandating use of at least one forward-looking scenario extending beyond the current business and policy/election cycle, for example, 15+ years, for the most exposed sectors. This creates accountability for recognising emerging risks today that may materialise as capital loss later — even if short-term policy signals appear weak or inconsistent. Longer horizons help prevent underweighting structural risks like carbon lock-in, asset stranding or cumulative policy tightening.

Firms could also be encouraged to assess and report material misalignments between near-term investment and lending pipelines, and their own long-term risk assumptions and scenarios. Shining a light on internal inconsistencies can build discipline, improve governance and allow the PRA to monitor systemic under-pricing of long-term risk.

5. Nature-related risks under the PRA's primary and secondary objectives

In fulfilling its primary objective to promote the safety and soundness of PRA-regulated firms, the Bank of England must ensure that firms are resilient to all material sources of financial risk. Substantial research in the UK and internationally — including the NGFS 'Green Scorpion' report and the UK's first nature-related financial risk assessment — provides compelling evidence that nature-related risks pose clear and material threats to financial and macroeconomic stability. As

such, the exclusion of nature-related financial risks from CP10/25 represents a significant blind spot.

The UK Nature-Related Financial Risk Assessment (Ranger et al., 2024), produced with the GFI, identifies multiple nature-related threats that are already financially material within UK borders. These include rising water scarcity in southeast England, soil degradation in key agricultural zones, and urban heat traps and pollution. The report highlights direct and indirect transmission channels through which these risks could affect UK financial institutions — particularly via manufacturing sectors, food systems, insurance, labour and regional lending exposures.

In parallel, the Green Scorpion framework (Ranger et al., 2023b), published as an NGFS paper, identifies broader nature-related hazard-receptor channels — such as water scarcity, land degradation and ecosystem collapse — that are globally macro-critical — impacting multiple critical supply chains and macroeconomic stability in many states. Our analysis estimates that nature-related gross domestic product shocks could range from 9% to 18%, depending on the sector and geography — well within the range that would materially impair the solvency or profitability of financial institutions. Research reinforces that nature-related financial risks can be just as macro-critical as climate risks — whether through pollution, water scarcity, land degradation or ecosystem collapse.

These risks are often non-linear, compounding, and globally systemic. For example, loss of ecosystem services in global breadbaskets could simultaneously impact agricultural yields, commodity prices, sovereign risk ratings and global food inflation.

Importantly, the NGFS and UK work also shows that nature risks can amplify climate risks, increasing the probability and severity of physical climate shocks and reducing the effectiveness of adaptation measures. For instance, land-use change increases the risk of flash flooding, while removal of vegetation in cities can amplify urban heating and pollution, and soil degradation accelerates crop losses from climate change. These interdependencies mean that nature-related risks are not merely adjacent to climate risks — they are integral to understanding systemic exposure.

The PRA's own objective to ensure firm soundness requires that risk management frameworks address this fuller picture. The GFI/Ranger et al. (2024) assessment shows that UK financial institutions are already exposed to nature-related risks that are measurable, foreseeable and intensifying. As such, updating CP10/25 to reflect expectations for the identification, assessment and management of nature-related risks would enhance prudential outcomes without expanding the PRA's remit.

In reference to the PRA's secondary objective: competitiveness and growth, paragraph 3.12 of CP10/25 notes that enhancing climate risk management will help position the UK financial sector as both resilient and competitive. The same logic applies — arguably more urgently — to nature-related risks, which represent a growing category of financially material exposures across key sectors.

Jurisdictions such as the EU, France, Brazil and Singapore are now moving to explicitly integrating nature-related financial risks into supervisory regimes. For example, the European Central Bank has identified nature as a material prudential issue, while France's ACPR (Prudential Supervision and Resolution Authority) has run nature-inclusive stress testing pilots. Brazil's central bank is beginning to link nature-related risks to capital adequacy assessments, and Singapore's MAS (Monetary Authority of Singapore) is working towards embedding nature risks into scenario planning. In contrast, the UK has not yet issued supervisory guidance on nature risk integration — despite the fact that domestic exposures to ecosystem degradation, water scarcity, and land use pressures are already financially material (as shown in the UK Nature-Related Financial Risk Assessment, Ranger et al., 2024).

Incorporating nature-related risk expectations into CP10/25 would help prevent UK-regulated firms from falling behind peers in terms of preparedness and transparency. More importantly, it would strengthen the resilience of the UK financial system, in line with paragraph 3.12's stated

ambition, while enhancing its reputation as a hub for sustainable finance innovation. This is not only prudent — but also economically strategic and essential for the UK's competitiveness and systemic resilience.

In reference to CP10/25, paragraph 4.3 — market failures, information asymmetries, and the 'tragedy of the horizon' — just as climate change creates complex, uncertain and systemic risks that markets alone are unlikely to address, nature degradation presents a parallel — and compounding — set of risks that suffer from similar structural blind spots. Paragraph 4.3 of CP10/25 identifies the core rationale for regulatory intervention: that climate-related risks are subject to market failures, information asymmetries and long time horizons that make them hard to manage within traditional financial decision cycles. This rationale applies equally — and urgently — to nature-related financial risks.

According to the UK Nature-Related Financial Risk Assessment (Ranger et al., 2024), nature risks are not only mispriced and under-recognised, they are also subject to a 'tragedy of the horizon' and a 'tragedy of scale'. The former arises because nature degradation plays out over timescales that are often longer than business planning or financial modelling cycles — leading to underinvestment in resilience, mispricing of risk, and systemic exposure. The 'tragedy of scale' occurs because nature degradation often originates from cumulative small actions (e.g. land-use change, overextraction, deforestation) that seem immaterial in isolation but aggregate into macro-critical risks that affect entire economic systems. This combination of long-term dynamics and decentralised externalities leads to a fundamental misalignment between financial incentives and systemic risk mitigation.

As with climate, market forces alone will not lead to timely or adequate action, especially given the pervasive information gaps, short-termism and absence of pricing mechanisms for ecosystem value. The PRA has already acknowledged these issues in the context of climate change. To maintain coherence and completeness in its regulatory approach — and to avoid a major emerging blind spot — the PRA should extend the rationale in paragraph 4.3 to include nature-related risks as a core element of systemic risk oversight. Doing so would strengthen both the resilience and international credibility of the UK financial system.

Concluding thoughts: how the PRA can help build firm capability and resilience

Finally, while beyond the scope of this consultation, we conclude that the PRA could and should do more to support firms in building capability.

Firms report that scenario development is time-consuming and inconsistent, with difficulty in aligning shocks to exposures. As seen in the CBES, some resorted to internal assumptions that made outputs incomparable. Many firms — especially smaller ones — lack in-house modelling capability to create and apply custom scenarios, as revealed in CGFI-CFRF's 'Learning from CBES' report (Ranger et al., 2023a).

To build capability and strengthen supervision, the PRA could publish standardised climate and nature-related 'shock components', including for example:

- Physical shocks (e.g. 1-in-200-year flood in major UK urban centre; 5-year European drought)
- Transition shocks (e.g. disorderly carbon pricing, policy whiplash)
- Integrated climate-nature shocks (e.g. water supply decline, deforestation-linked trade shocks).

These could be modular, so firms can build composite compound scenarios from Bank of England-endorsed components while retaining flexibility to tailor to portfolios.

The Bank of England and FCA could support a Central Scenario Facility, similar to the NGFS Climate Scenarios Hub, which would:

- Host open-access 'plug-and-play' scenarios for UK institutions, including acute, compound and nature-linked pathways
- Offer datasets aligned with Bank of England expectations (e.g. asset-level hazard exposures, transition policy shocks, nature risk indicators)
- Provide templates for regulatory submissions and internal decision-use.

Such a facility would standardise methodology, reduce burden, and raise the floor of capability across the industry. It could operate in collaboration with leading scientific and research institutions in the UK to ensure the highest technical standards, but also operate in close collaboration with the CFRF.

To support the design and implementation of such a facility, the PRA and FCA should establish an Independent Scientific and Technical Advisory Group (STAG). The STAG could advise on the scenario products but also put inputs into supervisory principles.

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