University of Exeter
Environment and Sustainability Institute

EXCEL EXETER CENTRE FOR ENVIRONMENTAL LAW

Unpacking the UK Nature Markets Framework From a Regulatory Perspective

Project Team[1]
Dr Tiago de Melo Cartaxo, University of Exeter (t.m.cartaxo@exeter.ac.uk)
Katharina Neumann, University of Oxford
Dr Pedro Henrique Batista de Barros, University of Exeter
Jena Boucat, University of Exeter

Executive summary

This policy paper analyses the UK Nature Markets Framework, designed to attract private investment for nature recovery, with an ambitious target of over £1 billion annually by 2030. While acknowledging the crucial role of market-based instruments in addressing nature degradation and financing gaps, the paper identifies significant challenges. These include the inherent complexity of valuing and quantifying biodiversity, potential market failures in existing schemes like Biodiversity Net Gain, and a lack of robust regulatory oversight. The paper recommends establishing a centralised, independent regulator, developing unified, science-based metrics with mandatory third-party verification, and introducing regulation for corporate biodiversity impact disclosure. Stronger governance and clear, enforceable standards are deemed essential to ensure these markets deliver genuine ecological benefits and foster public trust, moving beyond current limitations.

1. Introduction

Nature is deteriorating at an unprecedented rate, eroding the ecosystems and biodiversity that sustain food systems, water security, climate regulation, and ultimately, human wellbeing (Dasgupta, 2021). Reflecting this scenario, the 2024 Global Risks Report of the World Economic Forum ranked biodiversity loss and ecosystem collapse among the top two risks to global stability over the coming decade, alongside extreme weather events and climate change (WEF, 2025). Approximately 75 per cent of global land has been 'significantly altered' by human development, largely driven by land-use change for infrastructure and agricultural production. These processes are predicted to continue, with nearly a million species thought to be at risk of extinction in the coming decades if no remedial action is taken (IPBES 2019). Halting land conversion and agricultural production to the extent

[1] The authors would like to express their sincere gratitude to the University of Exeter's Research and Impact Strategy and the Environment and Sustainability Institute (ESI) for the instrumental support in the completion of this research. We also extend our heartfelt thanks to the Land, Environment, Economics, and Policy Institute (LEEP), also at the University of Exeter, particularly to Dr Ben Balmford and Professor Brett Day, for the invaluable discussions and insights that substantially enriched this study.

required to address biodiversity loss may mean that it is impossible to meet many of the UN Sustainable Development Goals (United Nations, 2018; IPBES, 2019).

While traditional public responses, such as regulation, subsidies, expansion of protected areas, and public investment in conservation, play a critical role, they remain insufficient to achieve the scale and speed of nature recovery required. Private capital may therefore help complement these efforts and address existing financing gaps (Wauchope et al., 2024; zu Ermgassen et al., 2020). The engagement of private finance is not solely based on normative considerations of who should pay but can also be justified by benefits received (e.g., water companies benefiting from clean water) or by the responsibility to address damages caused in the past, such as emissions that have increased atmospheric carbon stocks. Recognising this, both the Paris Agreement from 2015 and the Kunming–Montreal Global Biodiversity Framework from 2022 emphasise increased private sector engagement and acknowledge that efforts to combat climate change and reverse biodiversity loss require financial flows beyond public budgets (Paris Agreement Article 6(4)(b) and 6(8)(b); Kunming–Montreal Global Biodiversity Framework Target 19).

The UK Government published a policy framework to guide the operation of Nature Markets.

In this context, environmental credit markets have emerged as a promising institutional mechanism for internalising externalities, such as environmental damage, by providing options for firms to offset or compensate for their impacts (Needham et al., 2019; Damiens et al., 2021; Wauchope et al., 2024; zu Ermgassen et al., 2025). While a key objective of these markets is to address externalities, their broader aim is to facilitate increased funding for conservation and nature recovery efforts. This distinction is important, as it separates the goal of raising funds from the challenge of ensuring that private firms' costs accurately reflect the social costs of their decisions. By internalising externalities through the price system and leveraging market mechanisms, these markets offer a potentially efficient pathway to mobilise private investment in nature recovery (Gómez-Baggethun and Muradian, 2015). The creation of tradable credit claims linked to nature-based outcomes in well-functioning nature credit markets can yield two key benefits: mobilising private finance for ecological recovery and reducing the financial cost of conservation (Needham et al., 2019).

In March 2023, the UK Government published a policy framework (NMFw) to guide the operation of Nature Markets, which is supposed to respond to this issue annually.[2] The framework indicates that nature markets enable private investment in nature by creating units or credits that can be bought and sold. These markets enable businesses to invest with farmers and other land, water, and coastal managers to enhance the capacity of natural, farmed, freshwater, and marine habitats to provide carbon sequestration, nature recovery, clean water, and other benefits (2023, NMFw p.6). While this applies to voluntary markets, it is important to distinguish between benefits valued for their environmental or reputational image – such as carbon offsetting – and those that yield direct, tangible benefits, like water quality improvements paid for by

[2] 'Nature Markets: A framework for scaling up private investment in nature recovery and sustainable farming' https://assets.publishing.service.gov.uk/media/642542ae60a35e000c0cb148/nature-markets.pdf accessed 4 December 2025.

water companies. Benefits that are dispersed among many actors often face significant transaction costs, limiting the ability of markets to function efficiently in such contexts (Coase, 1960). Markets could potentially aid if they can aggregate demand from multiple buyers, but this relies on mechanisms to prevent free riding (Smith & Day, 2018).

To ensure the integrity of the markets, the framework establishes core principles for their operations, including additionality, no double counting, robust quantification, delivery of lasting benefits, transparency, and verification (2023, NMFw p.13-5). In March 2024, the Nature Markets Framework progress update established the government's goal to increase private investment in nature recovery in England to at least over £1 billion per year by 2030, as well as engage the British Standards Institution (BSI), to expedite a pipeline of investment standards for nature markets.[3] In 2025, the British Standards Institution (BSI) launched a standard designed to bring greater confidence and consistency to nature markets in the UK. The BSI Overarching Principles Standard, part of the Nature Investment Standards, provides voluntary guidelines to improve transparency, governance, and environmental integrity in nature markets, aiming to support farmers, landowners, investors, and buyers. By enhancing the credibility of traded credits and minimising risks such as greenwashing – where companies make misleading claims about environmental benefits while using non-additional credits – it can help ensure that market claims are credible and that investments genuinely contribute to positive outcomes. This framework aims to serve as a mechanism that makes decision-making more efficient for farmers, landowners, investors, and buyers alike. By promoting sustainable land management practices such as carbon sequestration, biodiversity enhancement, water quality improvements, and flood mitigation, nature markets not only generate income for these stakeholders but also optimise resource allocation and environmental benefits (Defra 2025).

The degradation of nature is a classic case of market failure.

The actuality of this topic is only highlighted by the recent publication of an EU Roadmap towards Nature Credits (COM 2025). This paper brings together legal-political and economic perspectives to examine this emerging institutional landscape of nature credit markets in the UK. By combining regulatory analysis with economic theory on market-based instruments and environmental externalities, this study aimed to provide policy and regulatory certainty through a more integrated understanding of how governance frameworks and market designing can jointly support the simultaneous delivery of efficiency and ecological outcomes. This interdisciplinary lens allows us to interrogate not only the legal architecture underpinning these markets but also their capacity to attract credible private investment and deliver on public environmental objectives.

[3] 'Nature Markets Framework progress update March 2024' https://www.gov.uk/government/publications/nature-markets-framework-progress-update-march-2024/nature-markets-framework-progress-update-march-2024 accessed 4 December 2025.

2. Background

The degradation of nature is a classic case of market failure, which hinders private incentives to invest in nature recovery (Dasgupta, 2021). As a public good, biodiversity and ecosystem functions, for example, are often non-rival and non-excludable, generating positive externalities that are diffuse across space and time. Because their benefits are not fully captured by market participants, their economic value remains largely invisible in prices and is systematically underrepresented in formal private decision-making (Gómez-Baggethun and Muradian, 2015; Knight-Lenihan, 2020; zu Ermgassen et al., 2025). This leads to systematic overuse and underinvestment, eroding the ecological foundation on which all other forms of capital depend, compromising long-term sustainable development (Dasgupta, 2021; Pearce et al., 1996). In this context, environmental credit markets have emerged as a promising institutional innovation that aims to reconcile development with environmental conservation (Needham et al., 2019; Damiens et al., 2021; Wauchope et al., 2024; zu Ermgassen et al., 2025). By internalising externalities into the price system and harnessing market forces, they offer a potentially efficient way to attract private investments into nature recovery, while helping to avoid further environmental degradation (Gómez-Baggethun and Muradian, 2015). The creation of tradable credit claims to nature-based outcomes, such as carbon sequestration, biodiversity net gain, or water quality improvements, is crucial because these markets primarily focus on preventing further harm rather than solely promoting recovery. Well-functioning nature credit markets can yield two key outcomes: they mobilise private finance for ecological recovery while reducing the economic cost of conservation (Needham et al., 2019). Yet achieving efficient and competitive trade in nature credit markets requires simplifying ecological complexity into standardised, measurable units, often referred to as a "unit of nature" (Wauchope et al., 2024). For these markets to function effectively, such units must exhibit a sufficient degree of fungibility, which is essential to ensure liquidity, trust, and efficient resource allocation (Needham et al., 2019; Rampling et al., 2024). However, unlike most fungible economic goods, many components of natural systems are interdependent, embedded in complex relationships among ecological processes and their functions (Gómez-Baggethun and Muradian, 2015; Burgess et al., 2024), making it difficult to "quantify" nature in a way that accurately captures its ecological complexity. Even when alternative metrics are allowed, ecosystem changes are often treated as interchangeable, overlooking the complexities of true biodiversity outcomes, which are more challenging to quantify accurately. While different values for various sites can often be approximated using models like ORVAL – Outdoor Recreation Valuation[4] and NEV – Natural Environment Valuation,[5] significant uncertainty remains regarding the costs of biodiversity loss, primarily due to reliance on potentially unreliable stated preference methods (Wauchope et al., 2024). For example, location itself matters, sites with greater ecological connectivity may hold

Many components of natural systems are interdependent, embedded in complex relationships.

[4] Outdoor Recreation Valuation Tool (ORVal: Version 2.0) https://leep.exeter.ac.uk/orval/ accessed 4 December 2025.
[5] NEVO - the Natural Environment Valuation Online Tool https://www.leep.exeter.ac.uk/nevo/ accessed 4 December 2025.

more value than isolated ones, though the ability to quantify this value accurately remains a challenge and is not exclusive to market mechanisms (Salzman and Ruhl, 2000).

3. Methodology

The goal of this project is to map the UK nature markets framework by analysing existing regulations and how they align with the 2023 Nature Markets Framework. To conduct this research, we employed a targeted methodology. We began by identifying six key terms central to our analysis: Debt-for-Nature Swap, Nature Capital Accounting, Nature Repair Market, Carbon Farming, Biodiversity Trading, and Biodiversity Net Gain. Using these keywords, we searched for relevant legal-regulatory literature indexed under them. Our search was limited to articles published within the last ten years, available on Scopus, and written in English. This initial search yielded approximately 90 articles. Each of these was reviewed in greater detail to assess its relevance to our study, resulting in around half being included in the final literature review.

In parallel with the legal-regulatory review, we conducted a complementary analysis that evaluated nature credit markets from an economics perspective. To guide this strand, we followed the same approach and identified six key concepts central to the economic literature: nature markets, environmental credit markets, additionality, environmental public goods and externalities, unit of nature, and environmental governance. The initial search returned around 75 articles, of which approximately half were analysed more deeply based on their relevance to core economic issues. This economic lens complements the legal perspective by assessing whether the UK Nature Markets Framework can deliver both regulatory coherence and efficient, credible conservation outcomes.

4. Literature review

Nature markets may be voluntary and therefore driven by companies wanting to meet environmental and climate targets or goals, or to invest in projects that will bring them direct business benefits. However, Nature Markets can also be driven by regulatory obligations requiring companies to deliver certain environmental improvements or achieve targets. Several of such markets already exist in the UK, and they will therefore become part of the 2023 framework. The two most mature nature markets in the UK currently are markets that deliver carbon sequestration from new woodland creation and emissions reductions through the restoration of peatland. They are voluntary markets provided within the UK Woodland Carbon Code and UK Peatland Code. Further, several voluntary markets have been established by water utilities in some catchments as a mechanism to finance natural solutions to improve water quality and reduce flood risk, with support from environmental regulators. Lastly, a regulatory-driven market has been established in England through the Environment Act 202. It requires developers in England to compensate for the biodiversity impacts of new developments that they cannot improve on-site and deliver biodiversity net gain through the purchase of biodiversity units.

The Effectiveness of Biodiversity Net Gain (BNG) in Achieving Biodiversity Goals

Generally, any form of conservation policy is significantly more beneficial to biodiversity than unrestricted development (Simpson et al, 2021). Globally, there is a growing movement towards conservation policies that focus on a net gain in biodiversity. Net gain requires actions that ensure recreated or restored habitats exceed those lost in terms of potential biodiversity outcomes (i.e. gains outweighing losses in some agreed metric) (CIEEM, CIRIA, and IEMA 2016). Simmonds et al (2021) suggest that successful net gain policies require compensation for residual losses through absolute, demonstrably feasible gains that are explicitly scaled to achieve specific biodiversity targets. In the United Kingdom, BNG, a multiple seller-buyer market, has been mandatory since 2024 for all developments in England consented under the Town and Country Planning Act 1990. The market has then emerged to meet this demand. These developers need to secure a minimum 10% net increase in biodiversity units (Fraser et al., 2024, p.5). Biodiversity units can be delivered on- or off-site to meet a project's BNG requirement. BNG therefore creates a market where biodiversity units can be bought and sold to direct investment in nature (Fraser et al., 2024, p.6).

Research has highlighted multiple challenges that hinder the realisation of the policy's intended ecological outcomes. While the actual scale of the offset market has fallen short of government projections, this in itself isn't problematic if on-site solutions prove more efficient. The more significant difficulties, however, stem from the documented 'gaming' of on-site credits and a fundamental lack of robust market design, which introduces considerable risk for participants (zu Ermgassen, 2022. p. 38). Furthermore, the policy's effectiveness is jeopardised by the subjective nature of habitat classification and condition assessments, leading to notable discrepancies even among expert evaluations, a challenge exacerbated by recent policy uncertainty within the planning framework. This raises particular concerns given that local planning authorities often lack the specialised expertise required to critically assess the reports prepared by consultants on behalf of project proponents (Rampling et al. 2023, p.4). Studies have revealed significant gaps between approved plans and actual implementation (Thornhill et al.; 2025). Additionally, while biodiversity improves overall, it comes at the cost of losing a significant amount of green space (Zu Ermgassen et al., 2021). Most problematically, Rampling et al (2023, p.7) point out that 27% of all biodiversity units fall into governance gaps that expose them to a high risk of noncompliance because they were associated with better-condition habitats delivered on-site that were unlikely to be monitored or enforced. Zu Ermgassen et al. (2021) also found that biodiversity units delivered on-site fall within a governance gap. However, Sullivan and Hannis (2015) show that an Analysis of submissions to the UK Parliament's Environmental Audit Committee on biodiversity offsetting policy reveals deep, value-driven disagreements among actors, suggesting that ethical, political, and ideological divides, not technical issues, undermine the prospects for resolving these conflicts through consultation.

However, Rampling et al. (2023) also suggest that England's BNG policy addresses some of the shortcomings which policies in other countries display. They highlight that a primary factor contributing to poor results in Australian offset policies is the dependence on avoided-loss offsets. These offsets rely on oversimplified and

frequently inaccurate assumptions regarding the extent of land clearance that would have happened without the offsets, resulting in a consistent failure to achieve additionality (see also Gibbons et al, 2016; Zu Ermgassen et al, 2023). This issue is aggravated by a lack of regulation on certification bodies, a problem akin to those observed in financial crash dynamics. Implementing biodiversity improvements based on a stable baseline allows the English system to better ensure that gains are additional, mirroring the effective approach used in the US wetland compensation scheme (Rampling et al., 2023, p. 4). Nonetheless, even within the US, research indicates that some programmes, like the Conservation Reserve Programme, can still fall short of full additionality despite their often more straightforward implementation, highlighting the persistent complexity of achieving this goal (Aspelund & Russo, 2025). Conversely, persistent underfunding of crucial implementing bodies, namely local authorities, raises the risk of repeating failures in compliance, as observed in wetland compensation programs in Australia, France, and North America (see also Bezombes et al., 2019; Theis et al., 2020).

The Example of Catchment Markets

Currently, there are two operating catchment markets in the UK. The Bristol Avon Catchment Market (BACM) and the Somerset Catchment Market (SCM) – with other markets still in development in Solent and Cornwall – are environmental services platforms designed to facilitate efficient trade and accelerate nature restoration through the trading of verified credits from projects such as woodlands, wetlands, grasslands, and arable reversion. Landholders, including farmers and landowners, offer these nature-based solutions, while buyers such as developers or businesses purchase credits to meet objectives like biodiversity gain or nutrient mitigation, including phosphorus reduction in South Somerset. All three markets are governed by what is named 'Environmental Markets Board' and operated by EnTrade, which focuses on ensuring transparency, fairness, and compliance with Market Rules. While EnTrade's operational role is positive and relevant, more independence, potentially through a single government regulatory body across all markets, would be beneficial.

Projects are accredited against approved standards and must go beyond existing legal obligations. Maintenance periods vary by market type: for Biodiversity Net Gain (BNG), projects must be maintained for at least 30 years. In nutrient markets, the duration is more nuanced, with bridging credit projects typically lasting 1-5 years during the establishment phase of ongoing solutions, which themselves are then maintained for 80 years. Agreements within the market must all follow these Nature-Based Project Standard Terms and Conditions which are generally well-structured and provide a solid framework for implementing nature-based projects. Further, buyers must demonstrate credible environmental commitments, such as aligning with net-zero targets through initiatives like the Science-Based Targets Initiative. Transactions take place in structured Market Rounds, where supply and demand are matched using what is named the 'Lindsay Mechanism' developed by the University of Exeter to ensure fair pricing and cost distribution (Lindsay, 2018). A key aim is to facilitate efficient trade, which is achieved through the incentives that the Lindsay mechanism creates for bidding at cost/value. SCM was developed in collaboration with South Somerset District Council, Natural England, and the Environment Agency, and includes specific governance to prevent anti-competitive behaviour. BACM is jointly delivered by Avon Wildlife Trust, Wiltshire Wildlife Trust, and EnTrade, with

support from the UK Government's Green Recovery Challenge Fund. All three markets aim to align economic incentives with long-term ecological outcomes.[6]

The Role of Regulation in Ensuring the Integrity of Nature Markets

Nature markets encompass both carbon and biodiversity markets. Biodiversity markets, however, are inherently more complex than carbon markets due to the vast diversity of species, the wide-ranging habitat and ecological requirements, and the often transient or localised presence of certain taxa, including threatened and endangered species. For biodiversity markets to function effectively, a clearly defined and consistently applied operational definition of biodiversity is essential. Antonelli et al. (2024) emphasise the importance of balancing "technical rigour" with "practicability" in the quantification processes of environmental metrics, advocating for specific metrics as promising options that effectively address this balance, offering a framework that is both scientifically robust and practically applicable (Eyres et al., 2025). Key questions must be addressed, such as how to evaluate the relative value of different species and how to implement robust mechanisms for market monitoring and verification for the supply side (and for the demand side under taxes). These scholars argue that well-designed biodiversity markets should not replicate the structure and operation of current carbon-credit markets. For biodiversity-credit markets to be effective and trustworthy, they need clear objectives, verifiable measurements based on robust science, independent verification, and public data availability. Effective markets must also ensure the rights and involvement of Indigenous Peoples and local communities are protected and recognised from the project design stage. Biodiversity credits differ significantly from carbon credits because biodiversity damage is highly location-specific and biodiversity can be far more complex to measure than carbon emissions. Learning from the failures of carbon markets, such as a lack of transparency and insufficient community engagement, is vital for biodiversity markets to avoid these pitfalls and effectively channel funds towards conservation and restoration (Antonelli et al., 2024). Defining a generalisable, standardised 'unit of nature' faces fundamental challenges because biodiversity is complex, multi-faceted, and its value is inherently place-based, making it difficult to reduce to a single, fungible metric. Further challenges arise in the quantification and measurement process, involving difficult decisions on combining diverse metrics, defining target ecological states, and accurately detecting changes amidst natural fluctuations and measurement errors, risking the quantification of noise. These difficulties introduce deep uncertainty into nature markets like biodiversity credits, questioning whether credits accurately represent real, additional gains and posing risks if used for offsetting negative impacts, potentially leading to a net loss of biodiversity, especially

Well-designed biodiversity markets should not replicate the structure and operation of current carbon-credit markets.

[6] See Bristol Avon Catchment Market, 'Overview: how the market works and how to participate' https://www.bristolavoncatchmentmarket.uk/market-overview#Marketgovernance; accessed 4 December 2025; Somerset Catchment Market https://somersetcatchmentmarket.uk/ accessed 4 December 2025.

if the metric poorly reflects biodiversity in a systematic way, and/or there is an overestimation of additionality (Wauchope et al., 2024).

Existing Nature Market Laws – the Example of Australia

The Australian nature markets law is structured around legislative frameworks that protect, manage, and restore ecosystems through incentive schemes. A primary component is the Australian Carbon Credit Unit (ACCU) Scheme, established under the Carbon Farming Act 2011, which allows projects that reduce greenhouse gas emissions to generate tradeable ACCUs. A notable success within this scheme for Indigenous land managers in northern Australia is the Savanna Fire Management (SFM) method. More recently, the Nature Repair Act 2023 was enacted to create a voluntary national biodiversity market aimed at attracting private investment for biodiversity conservation and restoration projects by enabling landholders, including Aboriginal and Torres Strait Islander peoples, to trade biodiversity credits. Both carbon and nature repair projects require registration with a regulator and adherence to specific methodologies, which crucially necessitate the consent of all eligible interest holders. Indigenous peoples hold significant legal rights or the power to veto projects over a large portion of the Australian landmass. While historically funded mainly by the government, these schemes are increasingly seeking private investment, currently focusing on remediating degraded lands and seas, though methods for maintaining intact ecosystems and developing markets like Blue Carbon are also being explored or developed (Russell-Smith et al., 2024).

Existing Nature Market Laws – the Example of US Habitat Banking

The US Habitat Banking system is a well-established, legally operational market-based mechanism underpinned by federal environmental laws such as the Clean Water Act and the Endangered Species Act. Habitat banks, also known as mitigation or conservation banks, are private or public lands managed to produce ecological credits. Developers who impact protected habitats or species can purchase these credits to meet their legal mitigation obligations. Credits are approved and regulated by federal agencies like the U.S. Army Corps of Engineers or the U.S. Fish and Wildlife Service, and projects must meet stringent baseline assessments, performance standards, and long-term monitoring requirements. The system is compliance-driven, with a mature legal and institutional framework and decades of experience (Santos et al., 215). While the banking network in the United States is one of the most developed on a global level, gaps and priority areas can be clearly identified to strengthen the current network and its role in preserving freshwater habitat and diversity (Theis et al., 2022).

The UK framework sets out a series of ambitious targets, including protecting at least 30% of land and sea by 2030.

5. The State of the Art

The UK Policy Framework

In March 2023, the conservative government established a public initiative designed to unlock private investment in nature recovery and sustainable farming. Central to

this approach is the establishment of a high-integrity nature market across the UK, where environmental benefits like carbon sequestration, biodiversity, and clean water can be bought and sold. These markets are intended to complement public funding by providing landowners and farmers with new opportunities to access additional income streams. The framework sets out a series of ambitious targets, including protecting at least 30% of land and sea by 2030, reducing pollution to levels that do not harm biodiversity, enhancing sustainability across agriculture, aquaculture, fisheries, and forestry sectors, and ensuring the legal and sustainable use of wild species. A cornerstone of the policy is the legally binding target of £500 million in annual private investment, signalling a serious financial and political commitment from the UK government. Should this policy be a success, this framework could catalyse a shift in how nature is valued. The framework highlights that high-integrity markets will be established using science-based standards, independent verification, and full transparency, all of which are backed by the British Standards Institution. These safeguards are designed to make sure environmental benefits like carbon or biodiversity credits are genuine and additional, not just marketing tools – thus reducing the potential risk of environmental misrepresentation, which is commonly associated with nature markets and offset projects. If enforced properly, this approach may strengthen investor confidence and deliver real ecological gains – depending on the drivers of demand –, but without strict oversight, risks are that rapid market growth could outpace integrity checks.

The March 2024 progress update on the Nature Markets Framework highlights key developments in the UK's strategy to scale up private investment in environmental restoration. It confirms steady progress toward the government's ambition to generate over £1 billion annually in private investment for nature recovery in England by 2030. The progress update also announces the launch of a collaborative programme with the British Standards Institution (BSI) to develop UK-wide standards for nature investment. However, a foreseeable concern lies in the lack of well-defined governance structures, which creates compliance uncertainty and exposes the market to potential enforcement gaps. Without clear regulatory oversight and institutional accountability, even high-integrity standards may struggle to translate into consistent, on-the-ground impact.

Operation of the Current Framework

With regard to effectiveness of the government framework not much information exists yet. Most information can be found in relation to BNG. For BNG, the recent Government's 'Biodiversity net gain statutory credits: annual report 2024 to 2025' indicates that £206,180 was generated from these credit sales in the first year. Knight Frank's Rural Update (2025) suggests a higher number, reaching £247,416, with the funds ring-fenced for habitat enhancement in England, although investment is pending higher revenue. The report states that the level of receipts from statutory credits is relatively low due to the early stage of the policy's implementation. However, it also suggests that Biodiversity Net Gain (BNG) is operating as expected. This is because statutory credits are being used for their intended purpose as a backstop for the market. Purchasing statutory biodiversity credits from the government is intended to be a last resort for developers who are unable to meet BNG requirements using on-site measures or by acquiring off-site biodiversity units. Developers must prove why

they cannot meet BNG through these other options before buying statutory credits.[7] Further, research finds 75% of planning applications are claiming an exemption from BNG.[8] This is supported by general economic evidence. Recent empirical evidence reinforces this concern: across early implementations, markets have frequently failed to deliver meaningful ecological outcomes, highlighting structural deficiencies that must be addressed to enhance their effectiveness and trustworthiness (zu Ermgassen et al., 2021; West et al., 2023).

Looking at the example of the Bristol Avon Catchment Market Nature-Based Project, its agreement is generally well-designed, offering a clear structure for project delivery. The terms and conditions establish a robust procedural framework centred on compliance, monitoring, and the use of biodiversity metrics. However, they are not clear on ensuring genuine environmental benefits, as performance is assessed against predetermined specifications rather than actual ecological impact, with no substantive protections against poorly designed projects and oversight that is primarily administrative and financial in nature. For lasting impact, the agreements would need to shift towards tracking and responding to actual ecological results over time. This is where specific policy or even regulatory provisions could play a relevant role, especially focusing on a quantification metric or calculation, which could ensure that projects -at least on average -deliver their expected gains.

A central regulatory authority and a public registry could improve transparency and bolster investor confidence.

The regulatory approaches of other countries to nature markets highlight key gaps in the UK framework, although they cannot be used as direct comparisons, as the legal cultures in the three countries are not the same. Notably, both the United States and Australia have established centralised, independent regulators to oversee and organise these markets, an institutional feature currently absent in the UK. This raises important questions about whether a similar regulatory body could enhance oversight, particularly by verifying the self-declared environmental damages of buyers (a necessary step, for instance, for tax compliance) and by ensuring the actual environmental gains on the supply side through meticulous contract compliance. Such comprehensive verification is crucial for guaranteeing that nature markets in England deliver their intended environmental benefits, a complexity introduced by the existence of a supply-side mechanism. Unlike conventional markets, nature markets involve not only economic but also ecological risks, potentially justifying more robust regulation. If a central regulatory authority is deemed necessary, further consideration must be given to which institution should assume this role – whether the Financial Conduct Authority, Natural England, or a specific new body. Additionally, a public registry, as mandated under US and Australian law, could improve transparency and bolster investor confidence. Aligning the UK's nature markets with national environmental objectives and international commitments, as

7 See https://www.gov.uk/government/publications/biodiversity-net-gain-statutory-credits-annual-report-2024-to-2025/biodiversity-net-gain-statutory-credits-annual-report-2024-to-2025 accessed 4 December 2025.
8 See https://www.theplanner.co.uk/2025/02/10/research-biodiversity-net-gain-fails-deliver-first-year?utm_source=related-content-bullet-list accessed 4 December 2025.

seen in Australia, would also enhance the coherence and effectiveness of environmental governance.

Many scholars have emphasised the need to establish strong institutions through robust regulation and governance frameworks to support nature credit markets (Moilanen et al., 2009; Wainger et al., 2010; zu Ermgassen et al., 2021; Antonelli et al., 2024). Arguably, this need results mostly from the fact that credit markets are plagued by adverse selection and low-quality projects. This stems from the difficulty of accurately assessing additionality for carbon projects and the challenge of capturing ecological complexity for biodiversity in a single, robust metric, often leading to reliance on weak or unverifiable proxies (Swinfield et al., 2024). The key objective in both these cases is to ensure that the estimation of additionality and biodiversity benefits is accurate 'on average,' thereby preventing systematic bias. Scholars argue that while diverse ecological goals are reflected through multiple, inherently incomplete underlying indicators, these are often integrated into a single metric for quantification. This process, however, raises transaction costs and demands extensive data, monitoring, and reporting (Mace et al., 2012; Burgess et al., 2024; Gibbons et al., 2016). These challenges, compounded by monitoring limitations and strategic "gaming," undermine additionality and allow actors to meet formal requirements without delivering meaningful or durable conservation outcomes (Wauchope et al., 2024). As a result, institutional structures are essential not only to ensure ecological integrity but also to keep transaction costs manageable (Vaissière and Levrel, 2015), thereby supporting the long-term demand necessary to attract and retain private investment and and sustaining the flow of private finance into these markets for achieving their intended environmental objectives (Wauchope et al., 2024). Even the UK Government, home to one of the most ambitious biodiversity net gain policies, has recognised this necessity. As noted by the UK Parliament's Environmental Audit Committee: "the necessary level of demand to achieve Government targets cannot be delivered through voluntary schemes alone," and "regulation is required that inhibits the production of poor-quality credits.".

Lastly, there is increasing recognition that companies must assess and disclose their biodiversity-related risks. This shift has spurred initiatives such as the TNFD (Taskforce on Nature-related Financial Disclosures), which offers voluntary guidance and recommendations for nature-related financial disclosures. The UK's 2023 Green Finance Strategy endorses alignment with the TNFD and reaffirms the country's commitment under the Global Biodiversity Framework to ensure that large companies regularly monitor and disclose their risks, dependencies, and impacts on nature. However, Karolyi and Tobin-de la Puente (2023) argue that voluntary measures may not be sufficient. Regulation, they suggest, could be essential to closing the biodiversity financing gap and steering private capital toward nature-positive outcomes.

Outlook – The new EU Roadmap towards Nature Credits

During the writing of this paper, the EU published a Road Map on Nature Credits (COM 2025). Like the UK framework, it seeks to encourage private investment in activities that safeguard and restore nature. While the UK framework only defines nature credits as 'a quantified amount of an ecosystem service that can be sold in the market' (NMFw 2023), the EU Roadmap explicitly indicates that such a unit needs to be 'nature-positive,' which means that it should accurately reflect biodiversity The EU

system is meant to operate on a two-step model: certification assures high-quality, nature-positive actions, followed by crediting, which monetises the demonstrated impact. It recognises that to ensure credibility and prevent greenwashing, strict criteria, transparency, and independent verification are essential, drawing lessons from carbon markets. The roadmap outlines key steps: establishing an EU expert group to develop robust methodologies and governance frameworks, fostering market readiness by evaluating supply and demand, and potentially providing public seed finance to kick-start initiatives. It will be interesting to observe how this framework evolves in parallel with the UK framework.

6. Policy Recommendations

The foundational analysis of the literature with regard to Nature Markets has returned the following policy recommendations, to be taken into consideration by DEFRA:

1. **Develop a Nature Markets Policy Framework progress update for 2025**, and each year, to understand the evolution of the system and the urgent further actions needed, from a policy or even regulatory perspective.
2. **Develop a unified, science-based metric framework for nature-based credits** and establish mandatory third-party verification and auditing processes to ensure consistent application and ongoing monitoring of outcomes. This framework should include clearly defined rules for assessing habitat equivalence and guiding compensatory exchanges in biodiversity offsetting. These rules must be grounded in ecological science and aligned with public preferences, as these are reflected in national conservation priorities. Rather than imposing strict qualitative limits on substitutability, the framework's metric should accurately quantify biodiversity value, ensuring that ecologically superior or irreplaceable habitats are assigned a significantly higher value to determine appropriate compensation levels for any proposed exchange. This approach ensures that the metric effectively disincentivises the substitution of ecologically distinct or non-interchangeable ecosystems, and that credits reflect real, measurable, and additional environmental benefits.
3. **Establish a centralised, independent regulator to effectively oversee, coordinate, and ensure the transparency and integrity** of the UK Nature Markets Framework across the country.
4. **Establish rigorous standards for assessing and verifying additionality in nature-based credit schemes** by mandating the use of causal inference methodologies, particularly for ex post assessment. Beyond routine project-level verification for contract compliance, rigorous ex post analyses on a random subset of projects are necessary to enhance the accuracy of the overarching metrics and ensure they are 'right on average.' These analyses should follow pre-registered strategies, incorporate counterfactual baselines, and ensure transparent data

reporting. With an approach that aims for predictions accurate 'on average,' the challenge shifts from mitigating degradation due to fundamental uncertainty in future recovery to efficiently allocating residual risk. This is critical to prevent inflated project costs stemming from individual risk aversion, instead favouring mechanisms where projects can collectively mitigate risks. To ensure long-term integrity, a robust system of monitoring should be implemented. While all projects must adhere to robust statistical standards and have adaptive correction mechanisms, continuous monitoring could be applied to a randomly selected subset of projects to verify persistence over time, acknowledging the high costs associated with comprehensive oversight (as seen in analogous fields like tax compliance).

5. **Establish clear guidelines and enforceable requirements for long-term monitoring and reporting** of nature-based projects. Measurement should be conducted before, during, and after implementation, with project-level compliance specifically assessed against stipulated behaviour and management practice requirements, to establish ecological baselines, track progress, and verify outcomes over time. These requirements should include minimum data standards, frequency of reporting, publicly accessible registries, and penalties for non-compliance. Transparent and consistent monitoring frameworks are essential to ensure the persistence of ecological outcomes and to build trust among market participants.
6. **Introduce regulation requiring companies to assess, disclose, and address their biodiversity impacts.** This measure, while distinct from nature markets themselves, would significantly propel demand for nature-based credits if companies are permitted to include offsets and similar instruments in their declarations to meet these new obligations. Corporate actors should be legally mandated to conduct biodiversity risk assessments, report transparently on their impacts on nature, and outline mitigation or compensation strategies. While understanding dependencies on nature is valuable for investors and internal risk management, the core mandate in this context should focus on the damages for which companies are directly responsible. This requirement should be harmonised with emerging international frameworks such as the Taskforce on Nature-related Financial Disclosures (TNFD), helping align private sector behaviour with national biodiversity goals and global environmental commitments.

7. Conclusions

The key findings from the literature review indicate a significant gap in academic and policy research on the Nature Market Framework. Despite widespread economic recognition of market-based instruments as essential tools for achieving climate and biodiversity goals, there is a notable lack of literature specifically addressing the private nature markets operating under this framework. Most existing studies and reports focus primarily on the public BNG scheme – which is now also included in

national regulation –, with minimal analysis of how current private initiatives align with or are influenced by the 2023 policy framework. Limited evidence exists with regard to the effectiveness of BNG schemes as well, but it suggests that most project developers are trying to get exemptions in order to avoid mitigation costs under the scheme. Importantly, there is also little research connecting existing environmental policies and private market mechanisms to the Nature Market Framework, which would be crucial for understanding how the framework could inform and guide future regulation and governance of these emerging markets.

There is a notable lack of literature specifically addressing the private nature markets operating under this framework.

Further research is needed to explore how the Nature Market Framework can be made more relevant and effective for the regulation of existing private nature markets, particularly in supporting its stated aim of enhancing nature recovery. At present, there is a lack of evidence assessing whether the framework is capable of delivering on this ambition in practice. Addressing this gap would involve examining what institutional, regulatory, or operational components the framework requires in order to fulfil its objectives and meaningfully steer the development of 'high-integrity' nature markets. This would also be crucial to guiding these markets towards their intended purpose – enhancing nature conservation. An engagement with stakeholders is essential for this.

Similarly, more fundamental questions must be addressed, such as whether the core issue lies in the structure of the market itself or in the regulation of the specific commodities being traded. This is particularly relevant for nature-based credits, which involve complex ecological processes and require precise, reliable metrics for validation. It raises the critical question of whether improving environmental outcomes depends on tighter regulation of the market mechanisms, the commodities and methodologies underpinning these credits. Ultimately, the part of the success of these markets may rest on transforming regulatory intent into demonstrable – not only economic but especially – ecological impact.

References

Antonelli A, Rueda X, Calcagno R, Kalunda PN (2024) How biodiversity credits could help to conserve and restore nature. *Nature* 634(8036), 1045–1049. https://doi.org/10.1038/d41586-024-03475-2

Bezombes, L., Kerbiriou, C., & Spiegelberger, T. (2019) Do biodiversity off-sets achieve No Net Loss? An evaluation of offsets in a French department. *Biological Conservation* 231, 24–29: https://doi.org/10.1016/j.biocon.2019.01.004

Burgess ND, Ali N, Bedford J et al. (2024) Global Metrics for Terrestrial Biodiversity. *Annual Review of Environment and Resources* 49(1), 673–709. https://doi.org/10.1146/annurev-environ-121522-045106

COM (2025) Nature Credits Roadmap to reward nature-positive action and boost private finance: https://ec.europa.eu/commission/presscorner/detail/en/ip_25_1679

Damiens FLP, Porter L, Gordon A (2020) The politics of biodiversity offsetting across time and institutional scales. *Nature Sustainability* 4. https://doi.org/10.1038/s41893-020-00636-9

Fraser S, Born K, Hobbs M, Steele L, Westerman N (2024) Putting nature at the heart of infrastructure using biodiversity net gain – key insights. *Proceedings of the Institution of Civil Engineers - Civil Engineering* 177(6), 1–38. https://doi.org/10.1680/jcien.24.00971

Gibbons P, Evans MC, Maron M et al. (2016) A Loss-Gain Calculator for Biodiversity Offsets and the Circumstances in Which No Net Loss Is Feasible. *Conservation Letters* 9(4), 252–259. https://doi.org/10.1111/conl.12206

Gómez-Baggethun E, Muradian R (2015) In markets we trust? Setting the boundaries of Market-Based Instruments in ecosystem services governance. *Ecological Economics* 117, 217–224. https://doi.org/10.1016j.ecolecon.2015.03.016

HM Government (2023) Mobilising green investment: 2023 Green Finance Strategy. *HM Treasury, Department for Energy Security and Net Zero, and Department for Environment, Food and Rural Affairs*: https://assets.publishing.service.gov.uk/media/643583fb877741001368d815/mobilising-green-investment-2023-green-finance-strategy.pdf

HM Government (2023) Nature markets: A framework for scaling up private investment in nature recovery and sustainable farming. https://assets.publishing.service.gov.uk/media/642542ae60a35e000c0cb148/nature-markets.pdf

HM Government (2021) Final Report - The Economics of Biodiversity: The Dasgupta Review. *HM Treasury, Department for Energy Security and Net Zero, and Department for Environment, Food and Rural Affairs: https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review*

IPBES (2019) Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondízio, H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.): https://doi.org/10.5281/zenodo.3553579

Karolyi, G. A., & Tobin-de la Puente, J. (2023) Biodiversity finance: A call for research into financing nature. *Financial Management 52*(2), 231–251. https://doi.org/10.1111/fima.12417

Knight Frank (2025) The Rural Update: The government knocks farmers again. https://www.knightfrank.com/wealthreport/2025-03-18-the-rural-update-the-government-knocks-farmers-again accessed 4 December 2025

Knight-Lenihan S (2020) Achieving biodiversity net gain in a neoliberal economy: The case of England. *Ambio* 49(12), 2052–2060. https://doi.org/10.1007/s13280-020-01337-5

Mace GM, Norris K, Fitter AH (2012) Biodiversity and ecosystem services: a multilayered relationship. *Trends in Ecology & Evolution* 27(1), 19–26. https://doi.org/10.1016/j.tree.2011.08.006

Moilanen A, van Teeffelen AJA, Ben-Haim Y, Ferrier S (2009) How Much Compensation is Enough? A Framework for Incorporating Uncertainty and Time Discounting When Calculating Offset Ratios for Impacted Habitat. *Restoration Ecology* 17(4), 470–478. https://doi.org/10.1111/j.1526-100x.2008.00382.x

Needham K, Vries FP, Armsworth PR, Hanley N (2019) Designing markets for biodiversity offsets: Lessons from tradable pollution permits. *Journal of Applied Ecology* 56(6), 1429–1435. https://doi.org/10.1111/1365-2664.13372

Rampling EE, zu Ermgassen S, Hawkins I, Bull JW (2023) Achieving biodiversity net gain by addressing governance gaps underpinning ecological compensation policies. *Conservation Biology* 38(2). https://doi.org/10.1111/cobi.14198

Russell-Smith J, Holmes J, Lewis B, Brisbin J, Sangha KK (2024) Evolving nature-based solutions for Australia's Indigenous estate in 2024 – opportunities and challenges. *The Rangeland Journal* 46(4). https://doi.org/10.1071/rj24019

Salzman J, Ruhl JB (2000) Currencies and the Commodification of Environmental Law. *Stanford Law Review* 53(3), 607. https://doi.org/10.2307/1229470

Theis, S., Castellanos-Acuña, D., Hamann, A., & Poesch, M. (2022) Exploring the potential of habitat banking in preserving freshwater biodiversity and imperiled species. Biological Conservation 273, 109700: https://doi.org/10.1016/j.biocon.2022.109700

Theis, S., Ruppert, J. L. W., Roberts, K. N., Minns, C. K., Koops, M., & Poesch, M. S. (2020) Compliance with and ecosystem function of biodiversity offsets in North American and European freshwaters. *Conservation Biology* 34, 41–53: https://doi.org/10.1111/cobi.13343

Santos, R, Schröter-Schlaack, C, Antunes, P, Ring, I, Clemente, P. (2015) Reviewing the role of habitat banking and tradable development rights in the conservation policy mix *Environmental Conservation* 42(4) 294–305: https://doi.org/10.1017/S0376892915000089

Simmonds JS, Hase A, Quétier F et al. (2022) Aligning ecological compensation policies with the Post-2020 Global Biodiversity Framework to achieve real net gain in biodiversity. *Conservation Science and Practice* 4(3). https://doi.org/10.1111/csp2.12634

Simpson K, Hanley N, Armsworth P et al. (2021) Incentivising biodiversity net gain with an offset market. *Q Open* 1(1). https://doi.org/10.1093/qopen/qoab004

Swinfield T, Shrikanth S, Bull JW et al. (2024) Nature-based credit markets at a crossroads. *Nature Sustainability* 7(10). https://doi.org/10.1038/s41893-024-01403-w

Taskforce on Nature-related Financial Disclosures (TNFD) (2023). Recommendations of the Taskforce on Nature-related Financial Disclosures: https://tnfd.global/wp-content/uploads/2023/08/Recommendations_of_the_Taskforce_on_Nature-related_Financial_Disclosures_September_2023.pdf?v=1695118661

Thornhill I, Gilchrist A, Searle B, Koksal C, Sampson D (2025) Using past planning practice to inform biodiversity net gain in residential developments. *Ecological Solutions and Evidence* 6(1). https://doi.org/10.1002/2688-8319.70021

United Nations (2018) The Sustainable Development Goals Report 2018: https://www.un.org/en/desa/sustainable-development-goals-report-2018

Vaissière A-C, Levrel H (2015) Biodiversity offset markets: What are they really? An empirical approach to wetland mitigation banking. *Ecological Economics* 110, 81–88. https://doi.org/10.1016/j.ecolecon.2015.01.002

Wainger LA, King DM, Mack RN et al. (2010) Can the concept of ecosystem services be practically applied to improve natural resource management decisions? *Ecological Economics* 69(5), 978–987. https://doi.org/10.1016/j.ecolecon.2009.12.011

Wauchope HS, Sophus J, Carter H et al. (2024) What is a unit of nature? Measurement challenges in the emerging biodiversity credit market. *Proceedings of the Royal Society B Biological Sciences* 291(2036). https://doi.org/10.1098/rspb.2024.2353

West, T. A. P., Maron, M., Soh, W. L., Beger, M., Malhi, Y., Anderegg, W. R. L., Griscom, B. W., Potts, M. D., Scholes, R. J., Sills, E. O., Ezzine-de Blas, D., and Ferraro, P. J. (2023). Action needed to make carbon offsets from forest conservation work for climate change mitigation. *Science*, 381:873–877. https://doi.org/10.1126/science.ade3535

World Economic Forum (2025) The Global Risks Report 2025. https://www.weforum.org/publications/global-risks-report-2025/

zu Ermgassen SOSE, Marsh S, Ryland K et al. (2021) Exploring the ecological outcomes of mandatory biodiversity net gain using evidence from early-adopter jurisdictions in England. *Conservation Letters* 14(6). https://doi.org/10.1111/conl.12820