How Institutional Models Shape Inclusion and Collaboration in Biodiversity Markets

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Abstract

Biodiversity markets are increasingly promoted as instruments to close the biodiversity finance gap, yet their implications for social inclusivity and collaborative governance remain poorly understood. England's new Biodiversity Net Gain (BNG) policy provides a critical case. While previous studies have examined its ecological outcomes, few have explored how different institutional models of habitat banking shape who participates in the market and how collaboration unfolds at the landscape scale. Drawing on participatory institutional mapping and 29 interviews with landowners, conservation organisations, planning authorities, and investors in Oxfordshire, we identify and compare three models of habitat banking: (1) for-profit providers leasing land under conservation covenants; (2) institutional not-for-profits managing land; and (3) individual landowners supported by not-for-profit facilitators under legal agreement with planning authorities. We show that for-profit providers tend to foster inclusive participation through risk-sharing finance but limited local collaboration, while not-for-profits enable collaborative governance that advances strategic, landscape-scale nature recovery yet restricts participation to a narrower set of landowners. These findings demonstrate how institutional design and operational models shape both inclusivity and collaboration, with implications for reconciling individual participation and collective ecological goals in the implementation of biodiversity markets.

1. Introduction

Human activity is now recognised as a primary driver of the global climate and biodiversity crises (Díaz et al., 2019; IPBES, 2022; United Nations Department of Economic and Social Affairs, 2023). Addressing biodiversity loss requires not only regulatory reform but also substantial financial mobilisation. Mainstream conservation organisations estimate a global biodiversity finance gap of around US$700 billion annually—an influential, yet contested, figure (see e.g. Standing, 2024). This perceived shortfall has motivated the Global Biodiversity Framework and related initiatives to call for the redirection of harmful subsidies and the expansion of private finance through Market-Based Instruments (MBIs) (Deutz et al., 2020; Hackmann, 2024; M. Robertson et al., 2023).

In England, which is among the most nature-depleted countries globally (Dasgupta, 2021; DEFRA, 2023a), the government has recently introduced an off-site Biodiversity Net Gain (BNG) market as part of planning reforms aimed at supporting national nature recovery goals. Success in such markets depends on their accessibility and inclusivity, ensuring diverse actors can participate meaningfully. Yet, participation in MBIs involves more than owning or controlling land; it also depends on actors' ability to leverage institutional relationships that enable access to, and influence within, these markets (Peluso & Ribot, 2020; Whaley, 2018).

A central challenge lies in reconciling two competing logics: the individualised participation that MBIs rely upon for practical implementation, and the collective action required to deliver the ecological outcomes they are designed to facilitate (Fletcher, 2010; Holmes & Cavanagh, 2016; Küçük, 2024; Ouma et al., 2018). This tension raises critical questions about whether biodiversity markets can simultaneously promote inclusivity and the landscape-scale collaboration required for effective nature recovery. Existing research on England's BNG policy has identified governance gaps and potential ecological mismatches between market incentives and local conservation priorities (Duffus et al., 2025; Miles et al., 2025; Rampling et al., 2023; zu Ermgassen et al., 2021). However, the social and institutional dimensions of how market design and implementation shape inclusivity, meaning the accessibility of the market to various actors with a potential stake, and collaboration, meaning the opportunity for collaboration the market offers among actors at the landscape scale critical to strategic nature recovery, remain underexplored.

This paper addresses this gap by analysing how different institutional models of habitat banking within the English biodiversity market enable or constrain participation and collaborative governance. Drawing on participatory institutional mapping supported by interviews in Oxfordshire – an early adopter and leader in BNG implementation (OLNP, 2023; South Oxfordshire Distric Council & Vale of White Hourse Distict Council, 2024)– we identify and compare for-profit, not-for-profit, and landowner-led models. Building on conservation finance scholarship that distinguishes between organisational interests and objectives (Dempsey &

Bigger, 2019; Probst et al., 2025), we show that biodiversity markets function differently depending on the institutional nature of participating organisations. We conclude by discussing how these variations affect the balance between inclusive participation and strategic, landscape-scale collaboration, and their implications for the design and governance of biodiversity policy more broadly.

2. The role of state and non-state actors in market-based initiatives

Since the 1992 Rio Earth Summit, MBIs have proliferated globally as tools to address environmental crises (Irvine-Broque & Dempsey, 2023; zu Ermgassen et al., 2025). Deployed at multiple scales, these mechanisms seek to create investment-ready forms of nature (Bracking, 2015; Cusworth & Stanley, 2025). From carbon markets designed to redirect financial flows from the Global North to the South (Böhm & Siddhartha, 2009; Lane & Newell, 2016), to local biodiversity offset schemes embedded in planning systems (Bull & Strange, 2018). MBIs aim to mobilise finance and operationalise conservation as quantifiable, tradable activity. In England, as elsewhere, these arrangements have given rise to new market actors and intermediaries implementing habitat banking, raising questions about how MBIs reshape the roles of state and non-state agents in environmental governance (Gómez-Baggethun & Muradian, 2015).

Increasingly, conservation governance has been decentralised to diversify participation and attract private capital to bridge the global biodiversity finance gap (Anyango-van Zwieten et al., 2019; Deutz et al., 2020; Gonon et al., 2024; WWF, 2025). Within domestic offset markets, the state does not withdraw from environmental stewardship but rather creates policy frameworks that enable non-state actors to operate and mobilise financial stream towards the provision of environmental public goods (Brown, 2015; Fletcher, 2010; Ouma et al., 2018). This reflects a broader state–market symbiosis, wherein public policy authorises, facilitates and legitimises private financial participation in wider public goods provision (Christophers, 2023; Leyshon & Thrift, 2007).

The policy rationale for MBIs such as England's Biodiversity Net Gain (BNG) draws on Coasean economic reasoning for which "a) the use of economic incentives and b) the high leverage of the intermediary in setting the rules' is the formula to address undersupply of environmental goods" (Pascual et al., 2010, p. 1206). In this framework, markets act as incentive structures that influence individuals' use of natural resources by altering cost–benefit ratios to favour conservation (Fletcher, 2010). Individuals and organisations are thus positioned as rational economic agents capable of reconciling ecological and financial objectives (Brandt et al., 2024; see also Olson, 1965). MBIs reward actors who are simultaneously market- and environment-oriented, optimising costs and risks while developing markets for public goods (Filip, 2020; Pascual et al., 2010; see also Hayek, 1944). The state, in turn, deploys targeted incentives to correct

market failures and align self-interest with collective ecological outcomes (Baranzini, 1982; Shiraishi & Tsuru, 1989).

However, the financialisation of nature literature warns that integrating capital logics into conservation policy can have contradictory effects (Ouma et al., 2018). While economic valuation and natural capital frameworks render ecological crises visible to decision-makers (Costanza, 2006; M. M. Robertson, 2006), they can also reinforce socio-economic inequalities and undermine long-term conservation goals of critically important ecosystems (Kallis et al., 2013; Temel et al., 2018). They can lead to prioritise a short-term financial logic of capital accumulation (Büscher & Fletcher, 2015; Huff & Brock, 2017), and financial metrics and tools (M. Robertson et al., 2023), but also values (Pascual et al., 2023), often hindering the effectiveness market-based approaches to incentivise deliver for nature and people (Griffiths et al., 2019). Offsetting specifically may also displace decision-making from local communities and to private institutions (Dempsey, 2017; Kay, 2018), with limited capacity however to provide alone the finance needed to address the scale of the crisis (Kedward et al., 2023; see also Irvine-Broque & Dempsey, 2023). Offsets can steer attention away from non-market solutions to the climate and nature crises (Büscher & Fletcher, 2020; Damiens et al., 2020), undermine the role of mitigation hierarchy in planning mechanisms (Wauchope et al., 2024) and localised strategic nature recovery objectives (Clare & Krogman, 2013)

Moreover, economic incentives do not always yield intended behavioural outcomes. Conservation behaviour is embedded in social and institutional contexts and is often non-linear (Bowles, 2008; Larrosa et al., 2016; Ostrom, 2010). The logic of MBIs assumes that greater market participation by self-interested actors equates to policy success, even though this may not deliver the collective ecological benefits envisioned in the policy design (Büscher et al., 2012; Fletcher, 2010; Holmes & Cavanagh, 2016). Importantly, different types of actors – particularly for-profit and not-for-profit ones – tend to produce distinct social-ecological outcomes (Dempsey & Bigger, 2019). For example, in carbon markets, not-for-profits are significantly more likely to supply credits representing real emission reductions (Probst et al., 2025). Understanding how such institutional differences influence biodiversity markets requires closer attention to their institutional dynamics.

2.1. Institutional dynamics in market-based environmental governance

Within state-created markets**,** non-state actors function as creative, yet economically rational, agents who develop new institutional arrangements to reduce transaction costs and innovate governance practices (Battilana et al., 2009; Douglas, 1986; Faundez, 2016). These arrangements occupy a *meso* operational space (i.e., in the middle) between policy incentives and individual responses, where models of action emerge (Cleaver, 2000). In our study, these are the habitat banking models examined.

Drawing on critical institutionalism, this process can be understood as institutional *bricolage*, through which actors recombine formal and informal rules, practices, and relationships to meet evolving needs and interests (Whaley & Weatherhead, 2014). The capacity to engage in institutional bricolaging depends on actors' access to resources and social capital, shaping their ability to influence and benefit from market arrangements (Cleaver, 2012; Ribot & Peluso, 2003). As Holmes and Cavanagh (2016, p. 203) note, "market-based conservation schemes are more easily harnessed by the powerful because they possess greater economic, political or social capital." By taking bricolaging lens of analysis to conservation policy elsewhere, offsetting specifically was shown to be more politically than scientifically constructed (Jacob & Dupras, 2021).

Hence, inclusivity in biodiversity markets extends beyond formal eligibility or resource ownership; it encompasses actors' access to enabling resources such as land, capital, ecological and regulatory knowledge, and collaborative relationships (Peluso & Ribot, 2020; Ribot & Peluso, 2003; Whaley, 2018). These enablers shape the institutional pathways through which different actors participate in, and benefit from, MBIs. In practice, much "bricolage work" occurs as actors navigate between regulatory requirements and market opportunities, producing practical governance arrangements that blend compliance with actors' interest maximisation (Cleaver, 2012; Cleaver & de Koning, 2015).

Building on these debates, this study adopts a stakeholder-centric approach focused on the supply side of the BNG market. We examine how different institutional models of habitat banking – for-profit, not-for-profit, and landowner-led – foster inclusivity and collaboration, and how these dynamics reflect broader tensions within MBIs between individual market participation and collective ecological goals for the specific case of English conservation and land management policy (Hernandez et al., 2024; Jones et al., 2023; Sander et al., 2024). By combining insights from critical institutionalism and the political economy of market-based instruments, we conceptualise biodiversity markets as socially embedded governance systems where access to resources, capital, and relationships determines who can participate and how collective ecological outcomes are pursued (Peluso & Ribot, 2020; see also Ruoso & Plant, 2021). This theoretical framing guides our examination of the institutional pathways through which different actors – state, for-profit, not-for-profit, and landowner-led – co-construct and implement biodiversity markets. Before presenting our methods and findings, we articulate the role of BNG in wider conservation and land management policy in England to situate the overall public policy objectives BNG was designed and deployed to work towards.

3. Situating Biodiversity Net Gain in the UK policy landscape

The UK – alongside the United States, Germany, and Australia – has long experimented with biodiversity offsetting as a policy tool (Sullivan & Hannis, 2015). This trajectory culminated in the introduction of the BNG framework, a regulatory mechanism intended to align development with the Global

Biodiversity Framework while generating economic opportunities for nature recovery (DEFRA, 2023b; Simmonds et al., 2022). BNG aims to mitigate biodiversity loss from housing, and from May 2026 infrastructure projects, by mandating a minimum 10% biodiversity uplift**,** measured and traded through standardised biodiversity units (HM Government, 2023; Rampling et al., 2023).

BNG operates alongside a suite of agri-environment and nature finance schemes that collectively form England's new Environmental Land Management (ELM) system, which replaces the EU's Common Agricultural Policy. These programmes – Sustainable Farming Incentive**,** Countryside Stewardship**,** and Landscape Recovery – offer complementary mechanisms for reconciling traditional agriculture with conservation objectives (Chaplin et al., 2021; Cusworth, 2020). The Sustainable Farming Incentive pays farmers to adopt more sustainable practices. Countryside Stewardship supports targeted habitat and landscape improvements, rewarding land managers for joining forces across local areas to achieve coordinated outcomes. Landscape Recovery funds bespoke, longer-term restoration projects at larger spatial scales (DEFRA, 2023a). The latter two specifically reflect a wider shift towards collaborative conservation models critical for English conservation ambitions (Jones et al., 2023).

The emphasis on spatial coordination and collaboration has deep roots in UK environmental policy. The *Making Space for Nature* report (see Lawton et al., 2010) highlighted the need for ecological connectivity and joined-up management across landscapes. These principles were later embedded in the 25-Year Environment Plan (HM Government, 2018) and the Nature Recovery Network (DEFRA, 2020a), both of which stress local cooperation as a prerequisite for effective nature recovery (see Miles et al., 2025). The stated ambition for Local Nature Recovery is to "encourage collaboration between farmers, helping them work together to improve their local environment" (DEFRA, 2020b, p. 32).

The Environment Act 2021 formalised these ambitions, mandating extensive public consultation to inform Local Nature Recovery Strategies (LNRS) and integrating them into a national ecological network (DEFRA, 2023c; Smith et al., 2022). The Act also established the statutory foundation for BNG and the creation of a biodiversity offset market (HM Government, 2023). Under this system, developers unable to meet their 10% biodiversity requirement on-site must purchase biodiversity units from habitat banks or, less commonly, from the government's statutory credit scheme (DEFRA, 2022, 2024; Hawkins et al., 2023).

Landowners seeking to create habitat banks must commit to maintaining restored land for at least 30 years, either through a Section 106 agreement with a local planning authority or a conservation covenant with a DEFRA-approved responsible body (DEFRA, 2025a). These authorities and responsible bodies oversee compliance with each site's Habitat Management and Monitoring Plan (HMMP), ensuring that the promised outcomes are delivered in reality. Once the legal agreement has been signed, providers can sell biodiversity units until their

habitat bank's capacity is reached. Demand for BNG units currently comes from both small and major developers, with Nationally Significant Infrastructure Projects joining the scheme in May 2026. Developers must use the statutory biodiversity metric to calculate liabilities and are incentivised to purchase units close to their development sites through a spatial multiplier – 1.5 or 2 for units from non-adjacent or adjacent planning authorities, respectively (DEFRA, 2024). This mechanism is designed to retain biodiversity gains within the same ecological and community context.

Overall, BNG has established a national biodiversity market underpinned by a unified metric and regulatory framework that ties private investment to public ecological goals. By situating BNG within this wider landscape of conservation policy, we can better understand how it contributes to the government's ambition for landscape-scale, collaborative nature recovery. Building on emerging ecological evaluations of BNG (e.g., Duffus et al., 2025; Marshall et al., 2024; Miles et al., 2025; zu Ermgassen et al., 2021) and against the objectives of this policy backdrop (e.g., Jones et al., 2023; Riley et al., 2018), our paper examines how habitat banking has been implemented within England's Biodiversity Net Gain market and how different institutional models shape participation in the market and collaboration among actors at the local level.

4. Methodology

4.1 The case of Oxfordshire

We selected Oxfordshire as the study area for three reasons. First, it was an early adopter of BNG, allowing participants to reflect on both pilot and statutory phases, including the institutional relations underpinning them (DEFRA, 2024; zu Ermgassen et al., 2021; see also OLNP, 2023; South Oxfordshire Distric Council & Vale of White Hourse Distict Council, 2024). Second, it hosted some of the first nationally registered habitat banks, providing concrete examples of emergent market actors and delivery models. Third, by May 2025 Oxfordshire had one of the most advanced local implementations of BNG—multiple registered habitat banks and some additional pending registration – making it a useful site to observe how institutional models operate in practice (e.g. Hawkins et al., 2023).

4.2 Participatory institutional mapping and key informant interviews

Our primary methods combined participatory institutional mapping with semi-structured key informant interviews, an approach suited to reveal how actors respond to and shape institutional processes (Ferreira et al., 2020; Underwood et al., 2019). We conducted 29 semi-structured interviews[1], recruited through snowball sampling in two rounds. The first round drew on contacts within the research team and the Oxfordshire Local Nature Partnership (our policy partner) to capture early experiences and to identify the emergent models of habitat banking in the county. Inputs from this round informed our typology of habitat banking models: (1) for-profit tenants operating under conservation covenants;

[1] Overview of engaged stakeholders and focus of their engagement for institutional mapping is provided in Appendix A.

(2) institutional not-for-profit landowners operating under S106 agreements; and (3) individual landowners supported by not-for-profit facilitators under S106.

A second round expanded the sample via referrals from the first cohort, targeting actors engaged with these models across Oxfordshire and adjacent counties to build model-specific institutional maps and compare patterns of inclusion and collaboration. Moreover, we conducted a small set of *ad hoc* national interviews with habitat bank providers operating beyond Oxfordshire to validate findings and situate local patterns within the broader national context. Interviewees represented a range of stakeholders involved in BNG implementation, including landowners, conservation organisations**,** ecological consultants**,** planning authority officers, and investors. Interview guides were tailored by stakeholder type. For landowners we explored: (i) their experience and role in habitat banking (leasing, direct provision, or ad-hoc compensation); (ii) motivations for choosing a particular model; and (iii) how BNG related to other nature-finance schemes they engage with (e.g., Countryside Stewardship, Landscape Recovery) (see Hernandez et al., 2024; Plant & Ruoso, 2023). For professionals such as planning officers, consultants, facilitators, and not-for-profit practitioners, we examined their role in in supporting the implementation of the regulation, especially off-site BNG, and attitudes towards it.

4.3 Data analysis

We transcribed interviews and analysed them in ®*NVivo* using a thematic approach that combined deductive and inductive coding (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006). First, we developed an initial coding frame from the literature on MBIs and institutional dynamics to capture anticipated themes. We then applied inductive coding to surface participants' motives, strategies, and lived institutional practices. Through iterative coding and team discussion we refined codes and clustered them into higher-order themes.

To align the analysis with our theoretical framing, we emphasised two macro themes: (1) inclusivity –namely, the accessibility of the market to various actors with a potential stake based on the identified market enablers of land, capital and knowledge, both ecological and regulatory (see Hernandez et al., 2024; Plant & Ruoso, 2023; Ruoso & Plant, 2021); and collaboration – namely, the opportunity for collaboration the market offers among actors at the landscape scale which is critical to the collective good of strategic nature recovery (see Filip, 2020; Küçük, 2024; Riley et al., 2018; Sander et al., 2024). The final coding structure and theme hierarchy are summarised in Figure 1.This mixed inductive–deductive approach enabled us to map distinct models of habitat banking, compare their institutional enablers and constraints, and assess how these models shape participation and the potential for collaborative, landscape-scale nature recovery.

Figure *1*: Thematic coding structure per thread of analysis | Style of lines of *land*, *knowledge*, *capital* and *collaboration* match the style of the arrows on the institutional maps of the different habitat banking models in figures 2-4.

5. Habitat banking under BNG in Oxfordshire

5.1. Model 1: for-profit **lease-based** under conservation covenant

As of May 2025, the lease-based for-profit model accounted for around one-third of England's registered habitat banks (28 of 85). Under this arrangement, for-profit providers lease underproductive or marginal land from landowners and enter a conservation covenant with a for-profit responsible body, to which they pay the legal and monitoring costs required to register the habitat bank. The up-front ecological and legal costs are financed primarily by institutional investors, including local government pension funds seeking to expand sustainable investment portfolios. For example, public records show that eight of twelve investors in the UK specialist asset manager Gresham House's sustainable investment fund – which finances, among others, habitat banking under BNG – are leading local authorities and the Environment Agency's pension schemes, alongside global private clients (Gresham House, 2023, 2024). Within this model, for-profit tenant providers are the sole owners of the biodiversity units, and revenues from unit sales are essential to meet the internal rate of return expected by institutional investors. As one asset manager explained:

> "We've created a model where we think this is a pretty interesting new infrastructure asset class and we're really proud of the way it's grown. We've demonstrated that we can do land deals, and the land deals are good for the landowners because it doesn't upset inheritance tax, it doesn't upset farm business, and tenancy type rules. So, we've got a structure that the landowners like because ultimately they get 30 years plus of income on land that there was effectively non-productive [...] non-food grade land and turning it into these woodlands, wetlands and grass." (Asset manager – I22).

The relationship between landowner and provider is formalised through a lease-type agreement, specifying rent payments, annual adjustments, and, where relevant, management fees for implementing the Habitat Management and Monitoring Plan (HMMP). Landowners are typically engaged during HMMP development, providing boundary and contextual knowledge to prevent conflicts with neighbouring farms and to maintain local ecological coherence. From a landowner's perspective:

> "The [for-profit provider organisation] have established a mechanism for me to access BNG and I'd be reinventing the wheel if I tried to do it. I'm not qualified in the way that they are to achieve their desktop objectives over that 30-year period. All I would be doing is I'd be paying somebody else to advise but that's not taking any of the risk." (Landowner – I21)

Therefore, mapping the four identified enablers of market participation reveals that for-profit lease-based providers internalise *knowledge*, both ecological and regulatory, including high market expertise. They however rely on private landowners to secure *land* and on institutional investors to raise the *capital* needed. This model therefore lowers entry barriers for landowners with limited resources or risk appetite, broadening participation in the BNG market. However, *collaboration* is primarily confined to business partnerships among for-profit actors, focused on efficiency and market dominance so to ensure a nation-wide scheme uptake and a competitive financial product.

Figure 2: Map of institutional relations in habitat banking model 1 (for-profit lease-based) present nationally with the highest number of habitat banks registered as of May 2025.

5.2. Model 2: **institutional** not-for-profit **owned & run** under S106

As of May 2025, the institutional not-for-profit owned and run model accounted for around nine of England's 85 registered habitat banks, making it less widespread than for-profit models. Not-for-profit providers, such as large conservation orientated non-governmental organisations, typically operate through semi-autonomous local or regional teams within larger national organisations. These providers finance their operations by leveraging networks of philanthropic lenders—including members, aligned trusts, and ethical investors—who offer loans at preferential rates and under conditions of mutual trust and value alignment, in contrast to commercial finance. This capital enables them to cover the legal, monitoring, and restoration costs associated with S106 agreements with local planning authorities and to implement the ecological work required under the HMMP. Conservation covenants are occasionally used where planning authorities face procedural or capacity delays (see Rampling et al., 2023).

In this model, revenues from biodiversity unit sales remain entirely with the not-for-profit provider. These funds are used first to repay philanthropic lenders and then to reinvest surpluses into acquiring ecologically strategic land, expanding restoration efforts, or supporting projects aligned with Local Nature Recovery Strategies (LNRS) (e.g., Oxfordshire County Council, 2024). The not-for-profit landowners themselves are fully responsible for delivering the ecological works outlined in their HMMPs, which are co-developed through strategic collaborations with other conservation not-for-profits relevant to the specific habitats at the core of the planned ecological work and the landscapes in which the habitat banks are located. Despite their experience in ecological restoration, many not-for-profit professionals described BNG as a financially risky and administratively complex venture. However, the organisational structure mitigated individual exposure, since liabilities were collective rather than personal. A not-for-profit practitioner supporting farmers in accessing a wide range of nature finance schemes commented on the different perceptions regarding risk and risk-taking

capacity between institutional landowners, and a different types of individual landowners. They noticed:

> "I do see a difference in that the estate owner is a hedge fund banker in London that owns the estate and has a farm manager, but he has a lot less risk I would say, or is a lot less worried about potentially losing a bit of money than your local smallholding farmer. [...] At the end of the day, "would I risk my house on it?" [the participant asked themself rhetorically] Probably not. And I thought that's so interesting because for some of these farmers that is what this is: they're risking their house on it." (Not-for-profit practitioner – I13).

Practitioners supporting individual farmers in diversifying income streams often advised against engaging in habitat banking independently, particularly under riskier models (e.g., under model 3 that the next section explores). For not-for-profit providers, however, participation in the market was seen as a moral and strategic imperative. Engaging in BNG was viewed as both a means of catalysing private investment towards ecologically strategic, publicly accessible nature sites and a duty to set best practice in an increasingly diverse and competitive market. These organisations framed their involvement as part of their wider mission to steer biodiversity markets towards socially inclusive and collaborative governance.

Therefore, in mapping four market *enablers* in this model, figures 3 shows how not-for-profit providers have available or newly acquired *land* of strategic current or potential ecological value, and ecological and regulatory *knowledge* internally. They leverage philanthropic relations to raise the needed up-front *capital*; collaborate with fellow situated not-for-profit conservation actors to input on their planned ecological work and with volunteers to deliver on such plans so to maximise strategic social-ecological objectives. This model fosters locally embedded collaboration and aligns habitat banking with landscape-scale conservation priorities. We observed a similar ethos of collaborative governance among another group of not-for-profit actors, namely those facilitating individual landowners to participate to habitat banking with a maximum risk-maximum return model. This category forms the basis of the final model examined in the next section.

Figure *3*: Map of institutional relations in habitat banking model 2 (institutional not-for-profit owned & run).

5.3. Model 3: **landowner owned & run** under S106 with **not-for-profit facilitation**

The landowner-led model with not-for-profit facilitation is more difficult to quantify nationally because formal registration lists only the individual landowners, the formal habitat bank providers in this model type, and not the facilitating organisations that enable their participation. In this model, individual

landowners bear both the risks and rewards of habitat banking, committing parcels of land for thirty years and becoming the legal entities in S106 agreements with planning authorities. They cover up-front legal and monitoring costs and are directly liable for delivering the ecological work required in their HMMPs. However, these HMMPs are typically designed and supported by not-for-profit facilitators working through informal collaborative networks of conservation organisations active in the same landscapes. These facilitators bring ecological and regulatory expertise to develop plans consistent with LNRS and ensure that landowners' preferences are balanced with democratically defined local conservation priorities.

Not-for-profit facilitators also function as market brokers, mediating between landowners and developers purchasing biodiversity units. They recover their operational costs through a service or brokering fee added to the unit price—passed on to developers rather than deducted from landowners' returns. Any surplus is reinvested in organisational operations or in local conservation initiatives across Oxfordshire and neighbouring counties. Through this arrangement, facilitators perform what some interviewees described as essential "translation work" (I7–8), helping landowners interpret policy requirements, ecological risks, and long-term management obligations and aimed at helping them make an informed decision about whether habitat banking is a nature finance scheme suitable for them first. One practitioner explained:

> "It's about making sure that you're not exposed to market risk. And I think when we go and talk to farmers, that's very much the conversation we have with them. It's not about us advocating to them to completely rewild their farm, because actually, in most cases, that would be a terrible idea." (Not-for-profit practitioner facilitating farmers participation in habitat banking – I7)

This translation work was described as being motivated by a sense of duty for setting best practice in the habitat banking space coherently with the charitable mission of these facilitators, namely maximising financial returns and minimising landowners' exposure to ecological and financial risks, while maximising locally strategic ecological outcomes by fostering highly local collaborative arrangements. As one participant described:

> "The other things that we have committed to do is be very open and transparent with a lot of other entities. So, there are other parts of [a] University that we engage with in terms of monitoring, we engage with [another] University in terms of flood land meadow monitoring. We have [NGO] there in terms of nutrient neutrality, water, etcetera." (Landowner – I25)

Another practitioner added:

> "He's [individual landowner operating in this model] a very forward-thinking person who has diversified in lots of ways, and he's not putting all his eggs in one basket. […] And so just taking a small part of his land and seeing how this [habitat banking under BNG] would work, he felt he could afford to take the

> risk. […] The farmer is very open to sharing all the data about it and how difficult it is." (Not-for-profit practitioner facilitating farmers participation in habitat banking – I20)

Mapping the four market-participation enablers, figure 4 shows that this model is mainly accessible to landowners who already possess suitable *land* and some financial security (available *capital*), since habitat banking cannot represent their sole income. The facilitators contribute specialised *knowledge* and an embedded collaborative network of local organisations, ensuring ecological plans align with wider conservation goals while remaining financially beneficial for landowners. *Collaboration* here serves both a protective and integrative function because it buffers individual participants from risk while connecting site-level actions to landscape-scale ecological strategies.

Figure 4: Map of institutional relations in habitat banking model 3 (landowner owned & run with not-for-profit facilitator).

5.4. Linking models and outcomes

Across the three institutional models identified, our analysis highlights possible tensions between inclusivity and collaboration. The for-profit lease-based model (Model 1) achieves the broadest market inclusion by enabling landowners with limited resources or low risk-taking capacity or appeal to participate through institutional financial intermediation. However, collaboration remains largely confined to business partnerships aimed at operational efficiency and securing market dominance as the market continues to grow. The institutional not-for-profit owned & run model (Model 2) narrows participation to actors already possessing land and organisational capacity but fosters deep ecological integration and collective governance. Its collaborative networks ensure that habitat banking contributes strategically to landscape-scale restoration aligned with democratically set LNRS and to maintaining land accessible to the wider public. This is particularly important to avoid perpetuating the trend of nature conservation approaches facilitating the enclosing and reducing peoples access to nature (Griffiths et al., 2019; Kalliolevo et al., 2021).

The individual landowner with not-for-profit facilitation model (Model 3) bridges these logics. It retains individual ownership and agency while embedding landowners in locally grounded, knowledge-sharing networks led by not-for-profits. Because of these collaborative webs of actors, landowners involved in this model are open to share experiences and data with peers, encouraging horizontal learning and local collaboration in line with wider English land management ambitions (Jones et al., 2023; Riley et al., 2018; Sander et al., 2024).

Overall, the institutional design of biodiversity markets decisively shapes both who can participate and how collaboration emerges. For-profit models expand market reach but risk fragmenting collective ecological action, while not-for-profit and hybrid arrangements prioritise collaborative governance aligned with local conservation priorities while enabling participation to habitat banking to a narrower set of actors. Together, these models reveal the inherent tension between market inclusivity and collaborative governance to pursue collective social-ecological ambitions that underpins the practical and policy challenges of implementing domestic biodiversity markets. In table 3, we summarise the core features of the models at the core of our analysis and the conceptualisations each foster around the themes of inclusivity, collaboration, and habitat banking itself, critical to articulate the implications of our findings both for English conservation and land management policy and wider environmental governance

Table 1: Summary of findings: comparison of models

	Model 1: Lease-based to a for-profit provider backed by private asset management fund under conservation covenant	**Model 2: Institutional not-for-profit owned & run under agreement with planning authority**	**Model 3: Individual landowner owned & run with not-for-profit facilitator under agreement with planning authority**
Actor legally liable to deliver nature recovery and cover upfront costs (legal & monitoring) to register the habitat bank	For-profit land tenant.	Not-for-profit institutional landowner.	Individual landowner.
Habitat Management & Monitoring Plan (HMMP) developed by	Ecologists internal to for-profit land tenant; Landowner's inputs considered to maintain positive relationships with neighbouring farmers and on the state of the land after the 30-year period.	Ecologists internal to not-for-profit providers and a range of third-party not-for-profit organisations engaged in nature recovery in the landscape based on specificities of relevant habitats.	
Ecological work funded by	For-profit land tenant.	Not-for-profit institutional landowner.	Individual landowner.
Ultimate provider of capital	Investment and pension funds through institutional asset managers.	Organisation members and local philanthropists.	Organisational funds.
Motives of habitat bank provider for participating	Making BNG market work and retain national level dominance to make green finance investments appealing to institutional investors.	Pioneering a place-based approach to BNG where this contributes to raising funding for strategic nature recovery at the landscape scale.	Enabling individual landowner participation in the market whilst equipping them with the necessary knowledge and information and whilst raising funding for strategic nature recovery at the landscape scale.
Relations with wider network of	Mostly revolved around process optimisation, with	Mostly with fellow not-for-profit organisations, farmer clusters, and planning authorities to	

nature recovery	fellow national-level organisations, less engaged with local collaborative efforts, e.g. LNRS.	ensure relevance of planned ecological work.	
***Habitat banking* conceptualised as**	Financial product creating economic value-bearing nature recovery for institutional investors.	Financial instrument embedded in other land management and green finance initiatives for not-for-profits to fund landscape-based nature recovery.	Financial instrument to diversify income streams of landowners whilst funding more landscape-based nature recovery through the revenue generated for the not-for-profit facilitator.
***Inclusion* fostered as**	Individual participation of wide range of landowners and risk-appeal based.	Embedded in a wider set of landscape-based actors and as public access to habitat banks.	Risk-informed individual participation of landowners.
***Collaboration* aimed at**	Success of BNG market & financial product, and market dominance through strategic competition.	Make BNG work for wider ecologically strategic nature recovery and facilitate access to knowledge critical to successful participation in habitat banking to fellow not-for-profits.	Make BNG work for wider ecologically strategic nature recovery whilst contributing knowledge sharing to facilitate more individual landowner participation.

6. Bridging individual inclusion and local collaboration

Our analysis show that the organisational nature and objectives of actors on the *supply side* of biodiversity markets—particularly habitat banking under England's Biodiversity Net Gain (BNG)—generate distinct social and institutional outcomes (see Dempsey & Bigger, 2019; Probst et al., 2025). The analysis captures the central tension between individual participation and collective publicly set objectives that sits at the heart of debates on the efficacy of MBIs in environmental governance (Gómez-Baggethun & Muradian, 2015), with important implications for both English conservation policy and market-based environmental governance more widely.

6.1. Policy implications for English conservation policy

By examining three institutional models of habitat banking, we reveal how different actor configurations – for-profit and not-for-profits and hybrid – navigate this tension in distinct ways. The for-profit lease-based model enables broad participation through its capacity to mobilise finance, absorb risk, and provide landowners with low-barrier access to the market. However, this inclusivity relies on economic efficiency and competition, which limit opportunities for landscape-scale collaboration. Conversely, not-for-profit models facilitate deeper ecological coordination through collaborative governance structures but remain accessible to a narrower set of actors with pre-existing resource access to land, capital and ecological and regulatory knowledge, and institutional capacity.

The predominance of the for-profit lease-based model can be traced to structural advantages beyond its inclusivity. It delivers market-competitive (i.e. cheaper) BNG units that align with the temporalities of both developers seeking planning permissions and institutional investors seeking financial returns. Moreover, capacity gaps among local planning authorities – tasked with ensuring that "the right things are delivered in the right places" (DEFRA, 2020b, p. 32) – have made the administrative efficiency of for-profit responsible bodies particularly attractive. The strategic partnerships between for-profit providers, investors, and responsible bodies have been critical in scaling this model, which by May 2025 accounted for the majority of registered habitat banks. However, as the BNG market grows—especially with Nationally Significant Infrastructure Projects joining the scheme from 2026—so too may the misalignment between market dynamics and ecological priorities. The same financial and operational efficiencies that make the for-profit lease-based model broadly inclusive and likely to keep scaling risk amplifying a disconnect between economic objectives and the landscape-level restoration goals envisioned by English conservation policy (see Duffus et al., 2025; Miles et al., 2025).

The dominance of this model has key implications for English conservation policy. The first one emerges from the risk-mitigation strategy that for-profit providers employ. For-profit providers largely avoid establishing multiple habitat banks within the same planning authority or national character area until existing units are fully sold or pre-purchased. This means, information and experiential knowledge sharing among landowners might be discouraged, even when they are already part of a farming cluster, often considered "a particularly useful mechanism to improve landscape-scale collaboration" (Crick et al., 2020, p. 11). By contrast, not-for-profit providers embody a more collaborative ethos. Their governance structures and missions inherently prioritise the collective over the competitive, aligning habitat banking with LNRS objectives and multi-stakeholder cooperation (DEFRA, 2023c; Land use in England Committee, 2022). In these models, openness, transparency, and shared ecological learning replace competition as the mechanism of coordination but, due to the very not-for-profit nature of the actors engaged, these models are unable to match the risk-tailored landowner inclusivity fostered by for-profit providers.

To address some of these preliminary institutional dynamics (e.g., DEFRA, 2025b, 2025c), two practical interventions could enhance both the inclusivity and ecological alignment of BNG. First, increasing capacity and funding for planning authorities would help these to act as agile as responsible bodies in registering and monitoring habitat banks. Second, adjusting the strategic significance multiplier in the biodiversity metric can more effectively incentivise the restoration of conservation-priority habitats. This would improve alignment between market incentives and LNRS , incentivising the recovery of conservation priority habitat types which are currently delivered in lower quantities, potentially due to their lower financial viability (Duffus et al., 2025). To achieve this, changes to the strategic significance multiplier would need to be sufficient to overcome the strong effect of negative risk multipliers but without removing

the powerful incentive for avoidance currently embedded in the metric (Miles et al., 2025; Simmonds et al., 2022).

6.2. Concluding remarks: implications for market-based environmental governance

The findings contribute to broader debates on the institutional foundations of market-based environmental governance. Previous scholarship has highlighted how MBIs and biodiversity offsets specifically, when shaped by market logics alone, risk reinforcing inequalities and fragmenting conservation efforts (Bidaud et al., 2017; Gómez-Baggethun & Muradian, 2015). Our results enrich this critique by demonstrating that organisational type mediates these effects. Not-for-profit providers do not necessarily replicate some of tensions that often hinder the effectiveness of MBIs deployed to support the delivery of social and environmental public goods. Their charitable missions and not-for-profit organisational forms ensure greater coherence between institutional objectives and public ecological goals, mitigating the risk of divergence between financial and conservation outcomes (Dempsey & Bigger, 2019; Gonon et al., 2025; Probst et al., 2025).

Through the lens of critical institutionalism, our findings show how biodiversity markets are not monolithic but are continually shaped through institutional bricolage—the creative reworking of rules and relationships to meet actors' needs and values. Each institutional model represents a different configuration of this bricolage process, reflecting how actors negotiate between formal market logics and local ecological governance practices and their own organisational structure and operational logics, motives, and interests (Cleaver, 2012; Cleaver & de Koning, 2015).

Our findings highlight the need to reconcile financialisation enabling wide market participation, thus individually inclusive models, and locally strategic collaborative governance, thus models inclusive of democratically set and locally relevant conservation ambitions. Their coexistence depends on institutional design. Future policy and research should therefore focus on designing biodiversity markets that balance individual inclusion with collective coordination so to maximise the publicly envisioned social-ecological objectives for which markets are deployed in their, at least theoretical, design. This requires embedding collaborative governance mechanisms directly into market design, ensuring that incentives for local ecological objectives does not remain sidelined from logics of competition and constrained to existing resource access and risk-taking capacity of different actors. As biodiversity markets proliferate globally, the English experience with BNG offers valuable lessons on the governance trade-offs inherent in market-based conservation. Ultimately, reconciling individual participation and collective ecological outcomes will determine whether MBIs evolve into durable mechanisms for effective nature recovery or remain ventures for capital accumulation or development practices re-shaping the *status quo*, like others have previously warned us about (Damiens et al., 2020; Ouma et al., 2018; Sullivan, 2018).

Data availability
Data will be made available on request.

Declaration of competing interest
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethics statement
The procedures involving human participants in this research are in accordance with the UK GDPR (General Data Protection Regulation) and have been reviewed and approved, including the data processing and storing procedures, by the Central University Research Ethics Committee (CUREC) at the University of Oxford, under the reference number **SOGE1A2021-247**.

AI statement
Generative AI (OpenAI ChatGPT, GPT-5) was used solely for language editing and structural refinement. No AI tools were used for data collection, analysis and interpretation. All authors reviewed the final manuscript and take full responsibility for the content.

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Figures

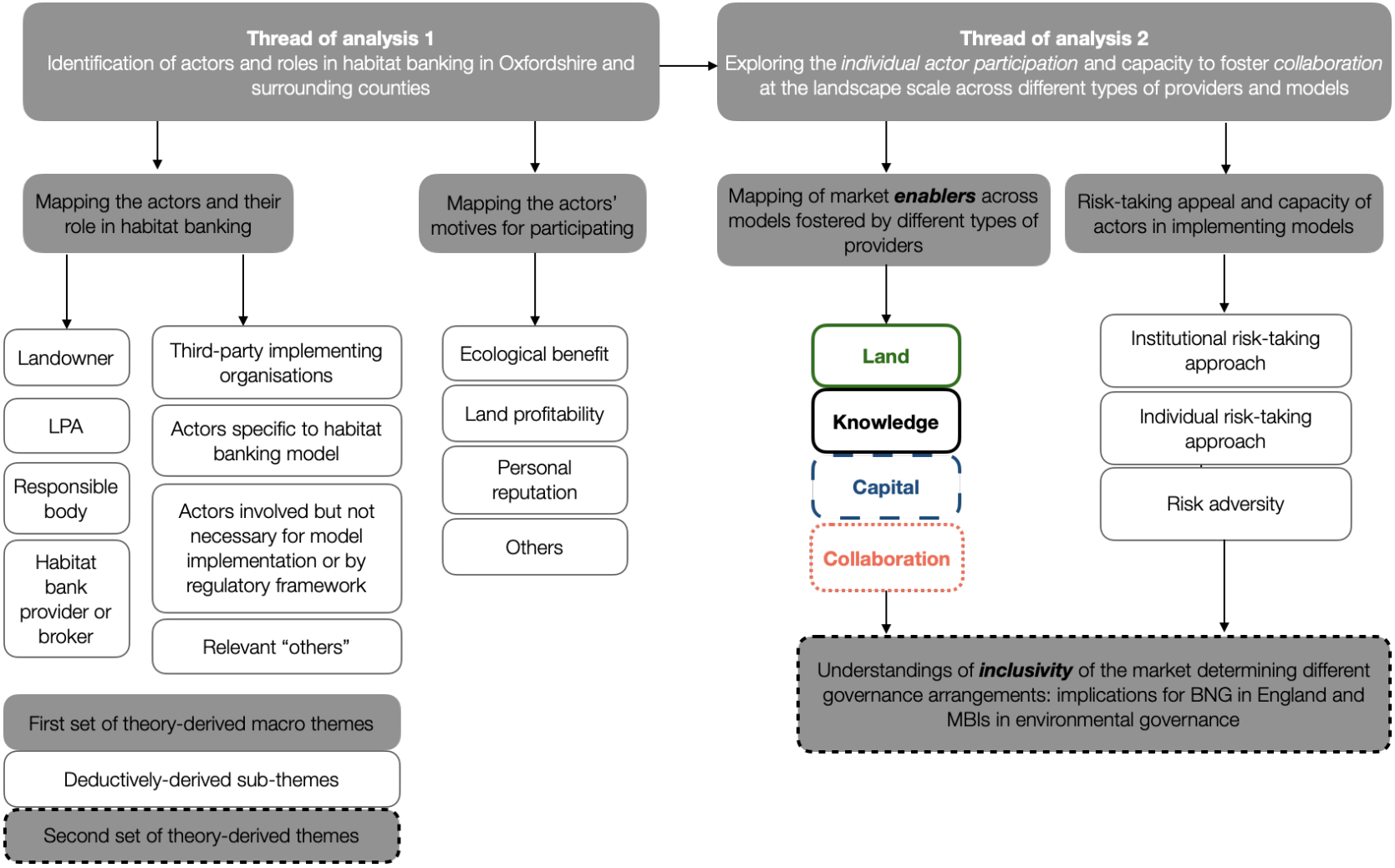

Figure *4*: Thematic coding structure per thread of analysis | Style of lines of *land*, *knowledge*, *capital* and *collaboration* match the style of the arrows on the institutional maps of the different habitat banking models in figures 2-4

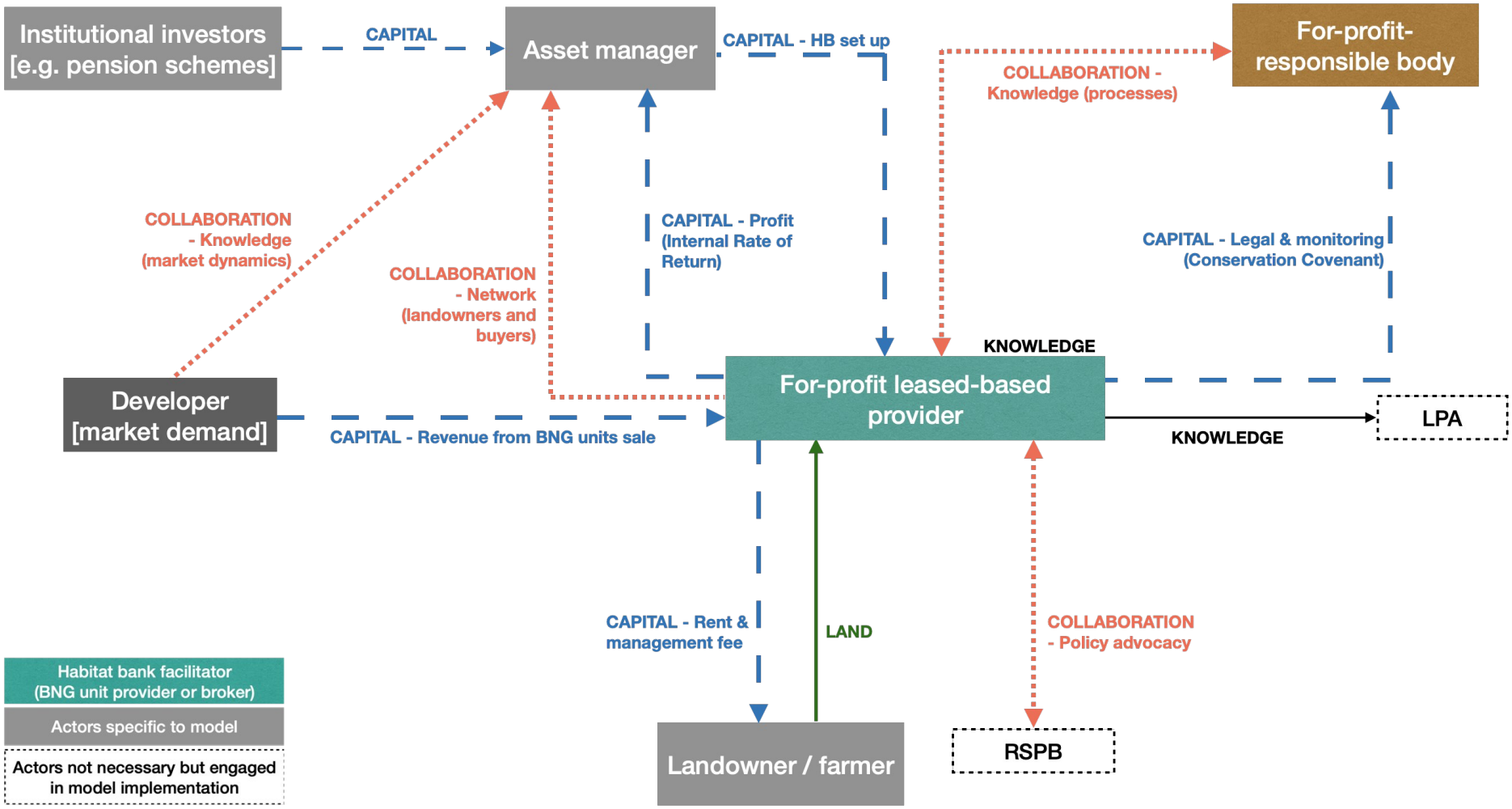

Figure 5: Map of institutional relations in habitat banking model 1 (for-profit lease-based) present nationally with the highest number of habitat banks registered as of May 2025.

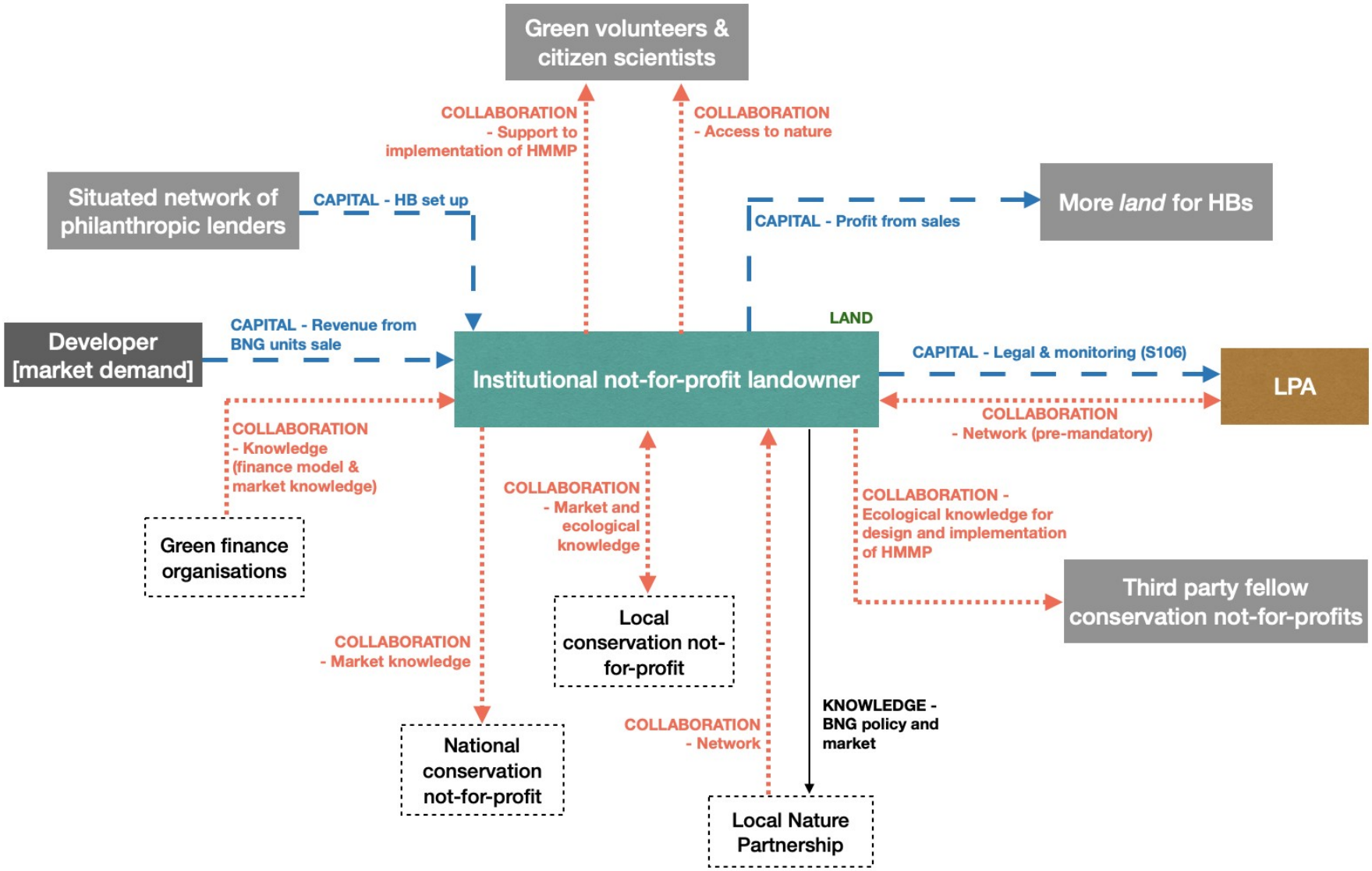
Green volunteers & citizen scientists
COLLABORATION - Support to implementation of HMMP
COLLABORATION - Access to nature
Situated network of philanthropic lenders
CAPITAL - HB set up
CAPITAL - Profit from sales
More *land* for HBs
Developer [market demand]
CAPITAL - Revenue from BNG units sale
LAND
Institutional not-for-profit landowner
CAPITAL - Legal & monitoring (S106)
LPA
COLLABORATION - Network (pre-mandatory)
COLLABORATION - Knowledge (finance model & market knowledge)
Green finance organisations
COLLABORATION - Market and ecological knowledge
COLLABORATION - Ecological knowledge for design and implementation of HMMP
Third party fellow conservation not-for-profits
Local conservation not-for-profit
COLLABORATION - Market knowledge
National conservation not-for-profit
COLLABORATION - Network
KNOWLEDGE - BNG policy and market
Local Nature Partnership

Figure *6*: Map of institutional relations in habitat banking model 2 (institutional not-for-profit owned & run).

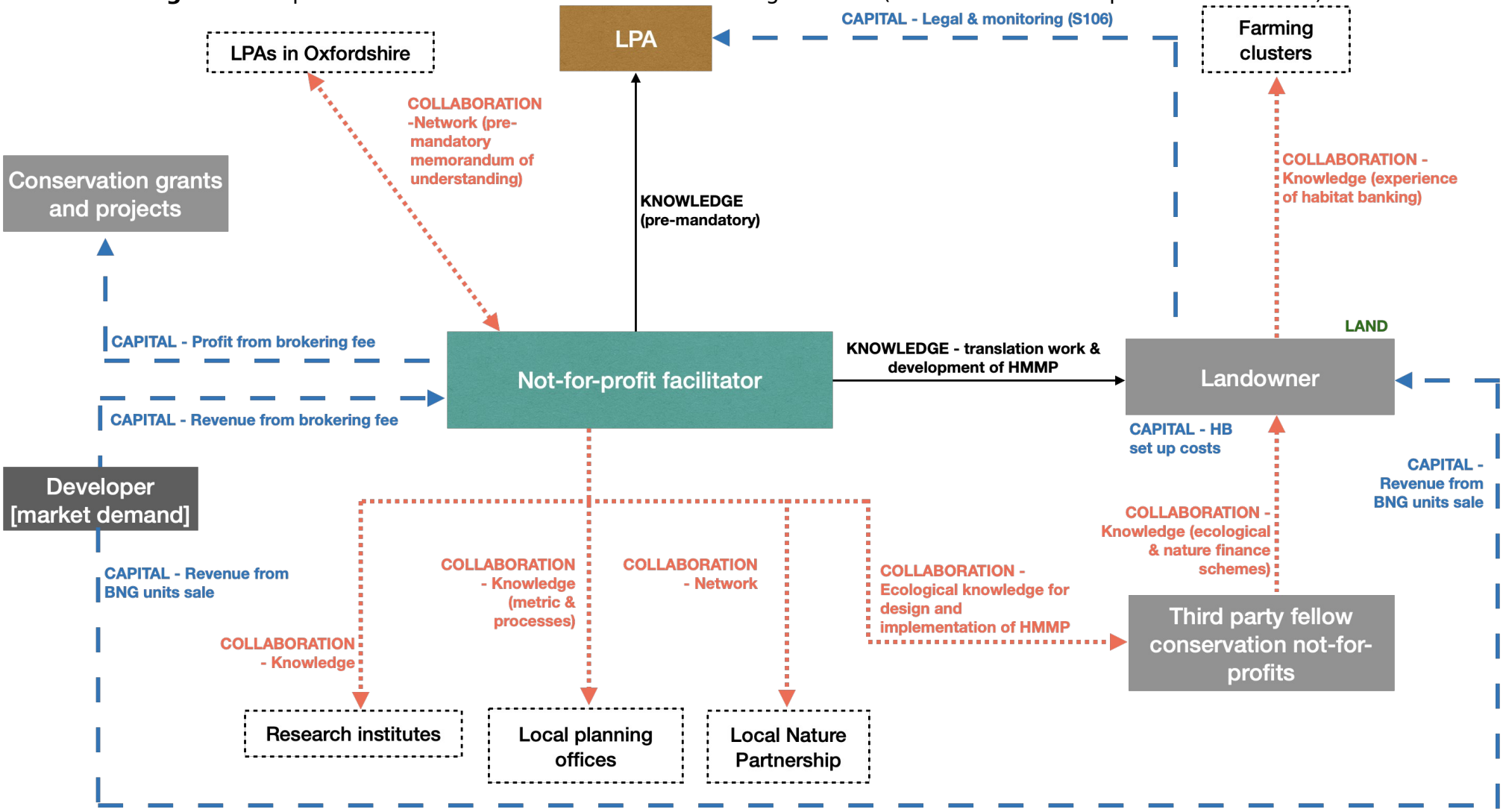

Figure 4: Map of institutional relations in habitat banking model 3 (landowner owned & run with not-for-profit facilitator).

Appendix A: Overview of engaged stakeholders and focus of their engagement for institutional mapping interview

Encrypted name	Role or representative of [type of stakeholder]	Focus of interview/engagement for institutional mapping interview
I-1	Not-for-profit conservation partnership	Global biodiversity finance mechanisms and role and approaches of financial intermediaries for BNG in Oxfordshire.
I-2	Local planning authority	Role of local planning authorities in BNG implementation, including existing capacity gaps.
I-3	Institutional not-for-profit landowner	Role of institutional landowners in the conservation sector in BNG implementation and comparison of between habitat banking models between S106 vs conservation covenant routes.
I-4	For-profit habitat bank provider	Role of intermediary in BNG implementation.
I-5	Institutional not-for-profit landowner	Community stake and potential benefit in BNG policy and habitat banking implementation.
I-6	Entrepreneurial landowner	Nature finance for landowners in business portfolio; BNG implementation from an entrepreneurial land manager perspective.
I-7	Not-for-profit facilitator	Comparisons across habitat banking models and between pre-mandatory and mandatory BNG, including challenges in current competitive market arrangement.
I-8	Not-for-profit facilitator	Comparisons across habitat banking models and between pre-mandatory and mandatory BNG, including challenges in current competitive market arrangement.
I-9	For-profit responsible body	BNG market prospects and considerations about the coexistence of for-profit and not-for-profit implementational models.
I-10	Local planning authority	Comparisons across habitat banking models and between pre-mandatory and mandatory BNG, including challenges in current competitive market arrangement.
I-11	Local planning authority	Comparisons across habitat banking models and between pre-mandatory and mandatory BNG, including challenges in current competitive market arrangement.
I-12	Local planning authority	Role of local planning authorities in BNG implementation, including existing capacity gaps; comparisons across habitat banking models in mandatory BNG, including challenges in current competitive market arrangement.
I-13	Institutional not-for-profit landowner	Articulation of BNG in wider land-management schemes and nature finance opportunities available to farmers and landowners; connecting types of landowners with different nature finance schemes based on contextual equity considerations and risk factors.
I-14	Local planning authority	Role of local planning authorities in BNG implementation, including existing capacity gaps and the role of District Councils as possible proposers of development but also enforcer of BNG regulatory framework.
I-15	Institutional not-for-profit landowner	Role of institutional landowners in the conservation sector in BNG implementation and comparison of between habitat banking models between S106 vs conservation covenant routes.

I-16	Individual landowner	Small scale developer perspective and bespoke BNG implementation - distributional impacts.
I-17	Not-for-profit facilitator	Comparisons across habitat banking models between not-for-profit and for-profit providers, including challenges in current competitive market arrangement.
I-18	For-profit habitat bank provider	Implementational model for BNG and risks consideration in habitat banking - distributional impacts.
I-19	Institutional not-for-profit landowner	BNG policy development and roles of different actors in policy cycle and final agreed statutory framework, including lobbying mechanisms.
I-20	Not-for-profit conservation organisation	Experience in supporting habitat bank creation in a situated network of not-for-profit actors; considerations on knowledge creation and other “enablers” for BNG, including to navigate governance gaps and political uncertainty.
I-21	Individual landowner	Experience and perspective of individual landowner leasing land to for-profit habitat bank provider.
I-22	Institutional investor	Policy development and financial considerations in enabling a for-profit habitat banking.
I-23	Ecological consultancy	Comparison of implementational differences and distributional impacts between pre-mandatory to statutory BNG, including considerations of small-scale vs large-scale developers. Implications, good and bad, or market-based solutions in environmental policy.
I-24	Institutional not-for-profit landowner	Role of institutional landowners in the conservation sector in BNG implementation; comparison between habitat banking models between S106 vs conservation covenant routes; considerations around collaborations with for-profit and not-for-profit actors.
I-25	Individual landowner supported by not-for-profit broker	Experience and perspective of individual landowner undertaking habitat banking facilitated by not-for-profit broker.
I-26	For-profit habitat bank provider	Corroboration of results from participatory mapping in case study area at the national level
I-27	For-profit habitat bank provider	Corroboration of results from participatory mapping in case study area at the national level
I-28	For-profit habitat bank provider	Corroboration of results from participatory mapping in case study area at the national level
I-29	For-profit habitat bank provider	Corroboration of results from participatory mapping in case study area at the national level

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