



Green Finance in the context of Trees, Woods, and Forests

A review of current evidence, identifying
research gaps and how these could be
addressed.

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Executive Summary

Recent evidence of major investment gaps in UK natural capital has highlighted a growing urgency to utilise 'green finance' to leverage private funding for increased delivery of ecosystem services from trees, woods, and forests (TWF) in the UK if government nature recovery and climate change mitigation targets are to be met. To help inform their future development in the UK forestry sector, a quick scoping review was conducted to better understand the existing evidence base on different green finance mechanisms. This involved examining definitions of green finance and reviewing the current extent of applications to TWF in the UK; reviewing evidence from recent studies on applications and critical success factors of green finance mechanisms; and identifying evidence gaps – including those that Forest Research (FR) could potentially help fill.

The review found a variety of definitions of green finance in the literature, with no standard definition. However, in broad terms, green finance can be characterised as 'environmentally-targeted sustainable finance', constituting a subset of 'sustainable finance' that focuses primarily on achieving specific environmental objectives. Green finance mechanisms focus (at least in part) on levering in private sector investment and often involve financial markets. They do not necessarily involve explicit remuneration of ecosystem services provision, so green finance mechanisms do not invariably involve Payments for Ecosystem Services (PES). However, to the extent that PES schemes constitute project-focused forms of green finance or act as a source of revenue for investors, they could be characterised as a subset of green finance, although they generally include wider (non-financial) elements too.

The review also found some recent evidence on green finance mechanisms relevant for applications to TWF in a UK context, including in relation to Timberland Investment Management Organisations, Environmental Impacts Bonds, and Community-funded Forestry. It highlights the importance of 'blended financing' as a

mechanism to help de-risk 'green projects' (i.e., projects expected to generate positive environmental impacts, or in some cases reduce adverse ones) and make them more attractive for private investors. Five case studies are highlighted. Three of these relate to wider financial mechanisms – namely, Community Interest Companies, Retail Crowdfunded Bonds, and Woodland Nature Credits.

Limited detailed evidence was found, however, on critical factors which underpin the successes and failures of the different mechanisms. This is due in part to the early stage of projects implementing green finance mechanisms in the UK. Drawing instead from the broader literature, some general critical success factors were found. These include the need for more investment-ready projects; the necessity of robust governance and regulatory green finance frameworks; and the importance of consulting all project stakeholders from the start.

The review concludes that FR could usefully contribute to filling several research gaps by undertaking the following.

- More in-depth research on evidence of successes and failures of specific TWF-related green finance mechanisms considered promising but have yet to be applied in the UK context, such as Timberland Investment Management Organisations (TIMOs) and Environmental Impact Bonds (EIBs).
- Gather evidence on the successes and failures of existing (and future) green finance projects across the UK, including the critical factors underpinning them.
- Research to investigate and identify conditions which enable successful operation of public-private blended finance schemes.
- Review evidence on successes and failures of the United Nation's REDD+ mechanism to identify transferrable findings and lessons applicable to the UK context.

1 Introduction

1.1 Context & Background

The concept of 'green finance' has been burgeoning in popularity in recent years. This is arguably driven in part by increasingly clear empirical evidence of global economic dependence on nature (Wentworth & Hand, 2022), as well as major investment gaps in natural capital (WEF, 2022). For forest related finance gaps alone, estimates suggest that in order to meet global climate, biodiversity, and land management targets, financing of forest establishment and management across the world needs to reach US\$203 billion annually by 2050 (FAO, 2022) – a four-fold increase by 2050 compared to 2022. In the UK specifically, at least £1.8 billion is estimated to be required for woodland creation and management activities over the ten year period 2022-2032, which is more than 2.5 times the level of public spending currently committed (GFI, eftec & Rayment Consulting, 2021:p.53).

The UK has been a pioneer of several recent green finance initiatives. This is illustrated by its move to be the first G20 country to implement mandatory climate-related risk disclosures in line with the Taskforce for Climate-related Financial Disclosures recommendations (DBEIS, 2021), as well as its role in hosting the secretariat for the Taskforce for Nature-related Financial Disclosures (GFI, 2022). Another prominent example is the government's publication of a nation-wide Green Finance Strategy in 2019 (DBEIS, 2019), which aims to help achieve the country's climate and environmental objectives in pursuit of sustainable growth.

FR is seeking to better understand ways in which natural capital markets and PES mechanisms can be extended, and the potential to develop new mechanisms to increase and further protect the multiple ecosystem benefits that the UK's Trees, Woods, and Forests (TWF) provide. An important element linked to this is exploring green finance mechanisms and existing applications to TWF. This will help identify evidence gaps to inform potential needs and avenues for further research on the topic. It will also help forest policymakers and practitioners better understand the

topic regardless of their level of expertise in financial economics. This study fits under FR's [research programme on achieving multiple ecosystem service benefits](#), and will help inform work on developing new PES markets linked to FR's [research programme on markets for forest products and services](#).

1.2 Aims & Objectives

The overarching aim of this study is to conduct a Quick Scoping Review (Collins et al., 2015) on green finance and its applications to TWF with the purpose of identifying existing research gaps and potential avenues that FR could usefully pursue in relation to the topic. Specific objectives are as follows:

- i. Examine how green finance is defined in the existing literature, briefly comparing it with Payments for Ecosystem Services (PES) and identifying their relations to one another.
- ii. Determine the general extent of coverage by green finance mechanisms of UK forest ecosystems, collating sample case studies of mechanisms and instruments where available.
- iii. Review existing evidence on successes and failures of TWF-related green finance mechanisms and underpinning factors involved.
- iv. Provide a brief overview of the existing evidence, identifying evidence gaps and potential for further research on forests-related green finance mechanisms to support increased private sector investment in the UK's natural capital.

1.3 Report Structure

The report is structured as follows: Section 2 provides a brief overview of how green finance is defined in the literature and how it relates to PES. Section 3 then details some green finance mechanisms identified in the existing literature as most suitable for channelling investment into TWF in the UK context. It also highlights case studies of TWF-related projects which showcase innovative use of green

finance mechanisms. Section 4 briefly examines evidence on successes and failures of relevant green finance mechanisms. Section 5 considers potential research avenues to address research gaps identified.

Further information on scope and the methodology adopted for evidence collection in this study can be found in the Appendix.

2 Definitions of Green Finance

It is clear from researching the literature that the term 'green finance' currently has no unified, agreed-upon definition. As with many terms and concepts, its exact meaning varies according to the motivations of its users. This is illustrated by a survey conducted by the World Bank Group on how public and private financial institutions define the term (Bergedieck, Maheshwari & Ugaz, 2017). Table 1 presents variations of definitions from across the relevant literature.

Table 1: Different definitions of green finance from across the literature.

Definition	Source
"Investment in environmental technology, infrastructure, and services"	Green Finance Taskforce (2018)
'...any structured financial activity that's been created to ensure a better environmental outcome.'	World Economic Forum (Fleming, 2020)
'On a conceptual level, 'green finance' can be understood as financing of investments that provide environmental benefits in the broader context of environmentally sustainable development.' It 'also involves efforts to internalize environmental externalities and adjust risk perceptions in order to boost environmental friendly investments and reduce environmentally harmful ones.'	G20 Green Finance Study Group (2016)
'Green Finance is a strategic approach to incorporate the financial sector in the transformation process towards low-carbon and resource-efficient economies, and in the context of adaptation to climate change.'	German Corporation for International Cooperation (GIZ, 2011)
Finance for 'achieving economic growth while reducing pollution and greenhouse gas emissions, minimising waste, and improving efficiency in the use of natural resources'	OECD in UNEP Inquiry Working Paper (Forstater & Zhang, 2016)
'Green finance policy refers to a series of policy and institutional arrangements to attract private capital investments into green industries such as environmental protection, energy conservation and clean energy through financial services including lending, private equity funds, bonds, shares and insurance.'	People's Bank of China (2015)

'Green finance is a broad term that can refer to financial investments flowing into sustainable development projects and initiatives, environmental products, and policies that encourage the development of a more sustainable economy. Green finance includes: (i) climate finance; (ii) biodiversity finance...; and (iii) finance for other environmental objectives...'	International Development Finance Club (IDFC, 2021)
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A 2019 report '[Demystifying Green Finance](#)' (Ozdemiroglu, 2019) published as part of the UK Valuing Nature Programme ([VNP](#)) presents by far one of the most comprehensive, openly available breakdowns of what the term entails. The report highlights an earlier piece of work part of a UNEP Inquiry which collated various high-level and thematic definitions of green finance (Forstater & Zhang, 2016), explaining how the term should be distinguished from two other commonly used ones, namely 'sustainable' and 'climate finance'. The former is the broadest of all three terms as it encompasses general CSR (Corporate Social Responsibility) and ESG (Environmental, Social, and Governance) factors, whereas the latter is the narrowest, and covers a 'subset of environmental aspects'. Green finance therefore sits within the broader landscape of sustainable finance and for the purposes of this study is considered to encapsulate financial mechanisms related to conserving and enhancing benefits associated with the natural environment, such as biodiversity, climate, and fresh water supplies. In this sense it could be thought of as 'environmentally-focused sustainable finance'.

The VNP report also emphasises a useful distinction between 'greening finance' and 'financing green' (see [Table 2](#) for definitions) made by the UK Government in their Green Finance Strategy (DBEIS, 2019). As with that report, this study focuses primarily on mechanisms concerned with 'financing green'.

Table 2: Definitions of 'Greening Finance' and 'Financing Green' within the UK's Green Finance Strategy (DBEIS, 2019)

Greening Finance	'Ensuring current and future financial risks and opportunities from climate and environmental factors are integrated into mainstream financial decision making, and that markets for green financial products are robust in nature.'
Financing Green	'Accelerating finance to support the delivery of the UK's carbon targets and clean growth, resilience and environmental ambitions, as well as international objectives.'

The Green Finance Study Group (GSFG, now SFSG – Sustainable Finance Study Group) highlights that the lack of clarity in what constitutes green finance is a major challenge for its development (G20 GFSG, 2016). This is because it restricts the ability of investors, companies, and institutions to measure associated financial flows, hence limiting their confidence in allocating resources to green-finance-related investments. Furthermore, the creation of a definition that is too narrow risks disregarding 'different contexts and priorities', whilst having too broad a definition makes it more difficult to draw comparisons (across organisations and markets) and risks greenwashing of financial investments (Landberg, Massa & Pogkas, 2019). Creating a single, unified definition of green finance that is clear is therefore a complex task, and perhaps one that may not necessarily be immediately desirable. Nevertheless, efforts are being made within the UK to create common and consistent frameworks and terms surrounding green finance (DBEIS, 2019; Young et al., 2022).

2.1 The Relationship Between PES & Green Finance

At its very core, Payments for Ecosystem Services (PES) can be thought of as payments to incentivise, or in exchange for, the provision of ecosystem services. As Tobin-de la Puente & Mitchell (2021) note, PES is 'not a single type of policy or intervention, but a spectrum of arrangements...'. It can be classed as a form of a

market-based mechanism used for the correction of economic market failures but is not exclusively market-based given that government payments can be involved (Saraev, 2019) - in which case they can be considered to comprise a form of public money for public goods (Kuhfuss, Rivington & Roberts, 2018). For more in-depth examinations of the definitions of PES, consult Kuhfuss, Rivington, & Roberts (2018) and Saraev (2019).

At first glance PES and green finance might seem to some like interchangeable terms. Like the former, there are no restrictions on the latter on whether financial flows are derived from private or public sources, even if in both cases policy interest mainly focuses on their use in levering in private sector finance. Both also refer to an array of financing mechanisms and instruments.

However, while PES schemes generally incorporate wider non-financial elements defining market rules and standards too, the ecosystem services payments involved can be viewed as a subset of green finance for three reasons. Firstly, like conventional finance, one of the main instruments of green finance through which capital can be invested is 'project finance' (Ozdemiroglu, 2019). To the extent that PES involve payments for particular projects to provide ecosystem services, they could be considered to fall under the green finance instrument sub-category of 'project finance'.

Secondly, in PES schemes, the payments 'buyers' make to 'sellers' for providing ecosystem services could be viewed as constituting a form of green finance. Green finance mechanisms, however, are broader in the sense that 'buyers' (or investors) may instead make payments (or investments) without expecting specific levels of changes in ecosystem services to be provided in return. For example, a company may be interested in funding a woodland creation or habitat restoration project that meets environmentally related Corporate Social Responsibility objectives without needing to quantify the additional ecosystem services provision expected.

Thirdly, PES can be seen by investors who provide green finance as one means to generate a return on their investment. In deciding whether to invest in natural capital projects, investors generally assess the ability of the projects to generate financial returns through reliable revenue streams. Payments made by a third party for the delivery of ecosystem services – e.g., a utility water company paying a farmer for improving water quality through an afforestation project (Finance Earth & eftec, 2021) – can provide an important source of revenue for investors.

Thus, on the three grounds outlined above, 'PES' could be viewed as a form of 'green finance'.

3 Green Finance in the Context of TWFs of the UK

3.1 Financial Mechanisms/Instruments

The application of green finance mechanisms in general and in the UK-context has been an increased focus of recent publications. This is especially evident in the grey literature, with public organisations, charities, and collaborative initiatives such as NatureScot, Scottish Wildlife Trust, and Financing Nature Recovery UK each publishing reports on the topic (SWT & SEPA, 2020; Young et al., 2022; Hume et al., 2021; Finance Earth & eftec, 2021; Underwood et al., 2022). By far the most relevant report identified, however, is a 2017 report by Numbers for Good (2017) commissioned by the FC which provides a detailed examination of innovative financial mechanisms that have potential to finance forestry projects in the UK. Below are a few examples of such mechanisms highlighted in these reports, with brief summaries of their general principles. (Further details on each and other examples, such as Municipality Bonds and Landscape Enterprise Networks, can be found in the full reports with links provided in the references section).

3.1.1 Timberland Investment Management Organisations (TIMOs)

TIMOs are groups designed to help institutional investors 'manage large-scale investment in woodland assets' (Hayes, 2021; Finance Earth & eftec, 2021). While they generally aim to generate financial returns for investors in TWF-related assets through activities like timber harvesting, projects that they manage can also be designed to generate TWF-related ecosystem services and associated revenues.

TIMOs have thus far mainly operated most effectively in countries such as the US where land markets are more financially liquid compared to the UK, with more large parcels of land being traded – something which occurs less in the UK (Numbers for Good, 2017). Nevertheless, there is some potential for TIMOs to operate in the UK by focusing on enhancement of forest biodiversity while leveraging biodiversity net

gain credits to increase returns (Finance Earth & eftec, 2021; Gresham House, 2022). This is, however, subject to more research and clarification of how such applications of the mechanism would operate in practice. An example of a US-based TIMO is provided in Section 5.3.1.

3.1.2 Environmental Impact Bonds (EIBs)

EIBs are inspired by UK-pioneered Social Impact Bonds (SIBs) and operate on the same underlying basis. Fundamentally, they create opportunities for investors to provide upfront capital for, and earn returns from, projects which aim to generate positive environmental impacts. A feature of EIBs is that in creating these investment opportunities, they transfer the risks of failing to deliver environmental impacts from funders and providers of the outcomes to private investors (Numbers for Good, 2017). For instance, where UK government (e.g., Defra or the Forestry Commission) was previously the sole bearer of risks involved in paying for a project to plant trees and mitigate flooding, the use of an EIB would enable these risks to be partially or fully transferred to private investors as their capital is used to fund interventions of the project instead.

No example of an EIB mechanism, let alone a TWF-related one, has been found to be applied in the UK context at the time of writing this report. However, one prominent example from the US is the [DC Water Environmental Impact Bond](#), which focuses on reducing stormwater runoff and provides a comprehensive example from which lessons can be learnt.

3.1.3 Community-funded Forestry

Community-funded forestry green finance mechanisms, as the name suggests, operate in circumstances where communities own and manage forests. Community-based organisations, such as community land trusts, form the building blocks of the mechanism and can generate financial investments in forest assets through legal structures that enable equity financing. The mechanism involves reinvesting any

business surplus generated into the community-owned forests and activities that benefit the community (Numbers for Good, 2017).

One of the key features which makes them applicable to the UK context is their suitability to be operated on a wide range of scales, including smaller ones – a difficulty faced by a number of other financial mechanisms such as green bonds. As Numbers for Good (2017) explains, capital as little as several thousand pounds is needed in comparison to asset values of approximately £50 million expected by institutional investors. The mechanism therefore complements others through its ability to attract capital from non-institutional investors.

It is important to note that Community Forestry (e.g., see the Mersey Forest case study in Section 3.3.5) does not invariably involve projects that are community-funded, as many projects rely on external funding. In other words, community-funded forestry is a mechanism applying to a sub-set of community forestry projects.

One example of a community-funded forestry project is the three-acre [Folly Wood](#) in Gloucestershire bought, owned, and managed by [Stroud Woodland Co-op](#). The Co-op operates under a legal structure known as a community benefit society, which is a type of community land trust (Numbers for Good, 2017). Shares in the wood are available for sale to those with local connections (see: [Stroud Woodland Co-op Membership](#)), though as little information on successes and failures or key factors involved has been found online, the project is not included as a case study in Section 3.3.

3.2 Blended Finance

Some of the reports mentioned above highlight the importance of 'blended finance' when seeking to attract private sector investment into TWF (Finance Earth & eftec, 2021; Underwood et al., 2022). Pioneered by the World Economic Forum (2015), it involves the use of public or philanthropic finance to help de-risk green projects which are in their infancy or inherently riskier, and which otherwise would not have

been attractive from an investor's perspective. The de-risking is achieved by, among other things, designing appropriate policies and demonstration pilots which illustrate the feasibility of projects and their ability to generate reliable revenue streams (Toxopeus & Polzin, 2021; Underwood et al., 2022). By lowering the riskiness of such projects, investor confidence can be built, and private finance can be better catalysed.

One example of blended financing is the Brylle Water Forest project in Denmark (Valatin et al., 2022; De Vreese, Kalt & Valatin, 2021) which was initiated in 2014 by the region's public water company, [VanCenter Syd](#) (VCS). The project involved the acquisition of 156ha of land for afforestation in part for water quality protection, and the cost for this was co-covered by both VCS (60%) and a nature-focused private commercial foundation, [Hedeselskabet](#) (40%). While not explicitly a blended-finance initiative, the project illustrates the use of public funds to attract private financing.

Another example within the UK is the recent Defra-funded Natural Environment Investment Readiness Fund (NEIRF), which aims to 'develop nature projects in England to a point where they can attract private investment' (GFI, n.d.). The fund had approved a total of 79 nature-related projects as of July 2022, several of which contain a TWF component. Regardless of whether successful, the catalogue of projects provides opportunities for future case studies with useful learning opportunities for further advancing green finance mechanisms in the UK.

3.3 Forest-Related Case Studies

The suite of TWF-related projects in the UK that apply innovative green finance mechanisms to channel private investment is currently limited but continues to grow. Below are five case studies which illustrate different forest-related projects that involve innovative applications of green finance mechanisms. With the exception of the case study of the Mersey Forest, information on them was mainly derived from the [case study platform](#) recently developed by the Green Finance

Institute. Note that the mechanisms in these case studies do not all match those highlighted in Section 5.1, as the latter do not all have working examples as yet, especially in the UK, or as evidence on existing projects is very limited (e.g., see Section 3.1.3).

3.3.1 Lyme Timber Company TIMO

Lyme Timber Company is a US-based, employee-owned TIMO that has operated and generated returns for investors since 1976, working to retain working forests and prevent their conversion to other land uses, and to restore the forests by investing in stream, wetland, and habitat creation (GFI Hive, n.d.). The company attracts private investment through private equity funds and generates its revenues from the sale of sustainably harvested timber, conservation easements, mitigation bank credits and carbon offsets. In 2021, it had approximately US\$1.01 billion worth of assets under management (with more than 85% of these assets consisting of forestland) and generated roughly US\$4.2 million in revenue from generation of ecosystem services alone (The Lyme Timber Company, 2022).

3.3.2 Wyre Natural Flood Management (NFM) Project

Initially a NEIRF pilot project (Triodos, 2022a), the Wyre NFM project is a multi-partner project led by The Rivers Trust and Wyre Rivers Trust, together with the Triodos Bank, the Environment Agency, United Utilities, Flood Re, Co-Op Insurance and the Esmée Fairbairn Foundation. The project aims to implement a range of targeted NFM measures, including 39 ha of woodland planting, to reduce risks of flooding faced by communities of the Wyre catchment in Lancashire, as well as improve biodiversity in the area. These measures are being funded through a blended-finance approach, with £628k of grants from the Woodland Trust, and £850k in private investment in the form of a 9-year commercial loan at a 6% interest rate (reduced to 5% for impact investors if specified biodiversity targets are met). The interest is to be met through £2m in payments for ecosystem services expected during the 9-year period. Representing an innovative green

finance mechanism (Triodos, 2022b) the project operates using a Community Interest Company (CIC). The CIC acts as a 'special purpose vehicle' and in essence transfers most of the project risks (including financial, performance, and reputational ones) which would otherwise be faced by landowners to the investors and ecosystem services buyers (GFI Hive, n.d.). The private funds were secured in 2022 and are the first of its kind in the NFM space. Learnings from the project regarding leveraging private funding have been utilised in developing other green projects in the UK.

3.3.3 Trees for Life (Retail Crowdfunded Bond)

Based in Scotland, Trees for Life is a charity that is rewilding and reforesting parts of the Scottish Highlands to help re-establish the Caledonian Forests which have faced centuries of deforestation pressure. The charity struggled to cover its operating costs in its early years after it first acquired a 10,000-acre piece of land in Dundreggan in 2008 to carry out its rewilding objectives. It has since been successful in raising revenue through issuing carbon credits for natural regeneration of trees under the Woodland Carbon Code (WCC), selling these at a relatively high price of £50 per Pending Issuance Unit (priced in November 2022) due to the associated rewilding, biodiversity and land restoration narrative. The charity plans to allocate over a quarter of the proceeds of the sales of the credits to land and nature-related local community projects. It is also developing a rewilding visitor centre that is expected to attract 70,000 visitors and generate a revenue stream of £1.5 million annually by 2030. This project is being funded in part by capital raised through a retail crowdfunded bond offered through Triodos Bank's crowdfunding platform, which constitutes an innovative use of such a mechanism in the nature restoration space. While the capital raised is for the development of the centre instead of tree planting initiatives specifically, the project nevertheless illustrates the potential to attract substantial private capital if well designed, with the charity's target capital amount of £2 million being raised in a mere 48 hours. The charity

continues to progress its rewilding efforts, generating incomes of more than twice their expenditures in the past two financial years (Trees for Life, 2022, 2021).

3.3.4 Bank of Ireland Woodland Nature Credits

Bank of Ireland's (BoI) Woodland Nature Credits is a green finance mechanism in the Republic of Ireland that represents the first of its kind instrument within the [EU Taxonomy](#) to combine carbon sequestration with biodiversity and amenity ecosystem services from native woodland restoration to attract private capital. The instrument has raised €2 million in capital through issuing performance-tied credits to fund land acquisition, planting of 600,000 native trees across 200 hectares of land in Ireland, as well as subsequent monitoring and verification costs. There are plans to issue a further €5 million worth of credits in 2022. The credits are primarily carbon focused (75%) based upon the Woodland Carbon Code calculator, with biodiversity (15%) and amenity (10%) uplift based upon converting into 'carbon equivalent' using a model developed by BoI. The instrument provides an innovative example of how a financial mechanism incorporating carbon, biodiversity, and amenity values could potentially also be applied in the UK.

3.3.5 The Mersey Forest: Blended Financing & Environmental Bonds

[The Mersey Forest](#) is one of thirteen registered Community Forests Organisations in England (ECF, n.d.) and includes a growing network of woodlands and green spaces located across Merseyside and North Cheshire. Established in 1994 in efforts to regenerate the local economy and increase tree planting, the organisation is run by a partnership of local authorities, landowners, public organisations (including the Forestry Commission, Natural England, and Environment Agency), businesses, and the local community. To date it has planted more than nine million trees, created 3,192ha of woodland, and increased woodland cover in the region by 70% (Mersey Forest, 2022). This work has been made possible through a blend of public and private finances, with core funding provided by the local authorities involved and leverage to raise additional income through 'grants, consultancy work, corporate

social responsibility, unrestricted donations, and other innovative mechanisms' (Mersey Forest, 2014, n.d.). The organisation has raised a total of £85 million in external funding since inception, which on average equates to ten times its core partner funding (Mersey Forest, 2022:p.8, 2014:p.35). An independent evaluation is reported to have estimated the social return on investment at £12.18 for every £1 spent (Mersey Forest, 2022:p.10). In addition, with funding under the NEIRF, the Mersey Forest are exploring development of a place-based investment vehicle in the form a 'bond repayable through biodiversity, carbon credits and catchment services' (EA, Defra & NE, 2021) which would help to further unlock private finances for the organisation.

4 Successes & Failures of TWF-Related Green Finance Mechanisms

4.1 Brief Characterisation of the Scopus Literature

A broad examination of all the literature identified through the Scopus search showed that little evidence has been published on the successes and failures of green finance mechanisms that have been applied, or are applicable, to the UK's TWF. Studies were found to focus mainly on the application of carbon financing mechanisms, especially in tropical forests and lower-income country contexts, with heavy focus on the United Nation's REDD+ (Reducing Emissions from Deforestation and Forest Degradation Plus) mechanism, which is not directly relevant to the UK context. Of the handful of studies on higher-income countries or with similar contexts to the UK, many were found not to focus on green finance mechanisms specifically, but instead on tangential topics. These include, for example, studies which investigate the maximisation of returns-on-investments in conservation of temperate US forests (e.g., Wang, Atallah & Shao, 2017; Murdoch et al., 2007).

As for the studies which were classed as most relevant and reviewed in full, they too were found not to have strong focus on successes and failures of green finance mechanisms. Most focused on ways to generate project revenue (e.g., Goldstein et al. (2006)) or to finance TWF-related initiatives, with some mention of relevant barriers and challenges to private sector investments in green projects. In addition, these studies focus either on lower-income countries or the global context, but not the UK specifically.

Given the above, the following section highlights some general principles concerning barriers, challenges, successes, and failures of green finance mechanisms identified through the most relevant academic literature. It also draws on relevant findings from the grey literature reviewed.

4.2 Findings

One of the most prominent barriers to the deployment of green finance mechanisms identified across the literature is a lack of a pipeline of investment ready projects. This is a result of a variety of factors, including uncertain project outcomes and revenue streams; insufficiently patient capital and seed funding to test new business models; complexity in creation and management of projects and a lack of project developer expertise and capacity; difficulties in achieving a project scale that is viable for investors (Lambooy & Levashova, 2011; Rode et al., 2019; Ozdemiroglu, 2019; Finance Earth & eftec, 2021; Finance Earth, 2022). As the FAO (2022) describes it, it is currently easier to answer the question of 'where from' than it is to answer the question of 'where to' when seeking to invest in TWFs. In a UK forestry context, high opportunity costs of woodland creation combined with modest woodland grant rates and limited short- and medium-term income streams are often considered important factors limiting the supply of woodland creation projects. While UK woodland carbon projects, particularly those registered under the WCC, are generally well established and hence far along the pathway of investment readiness, most other potential sources of TWF-related revenue (e.g., from biodiversity net gain credits) are currently at a more nascent stage (Finance Earth, 2022).

Another barrier, or conversely critical success factor, relates to whether there are appropriate governance and regulatory frameworks in place (Chow, 2015; Ozdemiroglu, 2019; Young & Castro, 2021; Finance Earth, 2022). Such elements are crucial because the smooth operation of green finance mechanisms and the ability of green projects to thrive is ultimately dependent on consistent and clear targets and baselines, as well as robust measurements, reporting, and verification of project outcomes. An example in a UK forestry context is the clarification of regulatory requirements for compensating for woodland creation impacts on existing species habitats that is planned in England during 2023 to help reduce current uncertainties in the woodland creation consenting regime.

Furthermore, the literature highlights the importance of consulting all stakeholders from the outset in creating a new financial mechanism (Lambooy & Levashova, 2011; Ferguson et al., 2016; Rode et al., 2019; Pike et al., 2022). Through knowledge sharing and collaboration with all relevant stakeholders, including local communities, trust and feelings of engagement can be built. This can then result not only in greater support from local communities and other stakeholders, but also greater awareness of green finance investment opportunities amongst potential investors, as well as greater understanding of the particular financial mechanisms focused on.

Overall, key organisations in the UK studying green finance issues appear aware of these mutually reinforcing barriers and critical success factors. This is illustrated by the wide range of interventions to address barriers to the growth of nature-based solutions markets identified by Finance Earth (2022). It is also illustrated by the recent launch of Financing Nature Recovery UK's Recommendations and Roadmap report (Young et al., 2022) which aims to help scale up high-integrity nature markets through focusing on three key elements: market design, governance, and operation; all of which tackle the aforementioned barriers.

One example of a solution highlighted during the report launch webinar (Pike et al., 2022) is the aggregation of smaller individual projects to meet the minimum requirements of institutional investors. This is an active interest of the UK Infrastructure Bank (UKIB) which seeks to invest in and grow natural capital markets by utilising its initial financial capacity of £22 billion to crowd in much needed private capital (UKIB, 2022).

Other examples of specific solutions highlighted during the webinar include the design of appropriate insurance products and risk transfer mechanisms to lower project risks, as well as the employment of trusted intermediaries (e.g., specialist advisors and outcome verifiers) to provide expert knowledge and guidance to non-specialist stakeholders. In a UK forestry context, some Community Forests (which

often play an important role as trusted intermediaries championing woodland creation and management initiatives in their area) are starting to become interested in developing green finance mechanisms to fund increased woodland creation (e.g., see Section 3.3.5 on The Mersey Forest and their 'Doubling Nature Investment Readiness' NEIRF project).

5 Evidence Gaps & Recommendations for Future Research

Various knowledge gaps were identified through the research conducted for this study. Recommendations to address these are as follows:

- **Undertake in-depth research on evidence of successes and failures of specific TWF-related green finance mechanisms considered promising in the UK context.** Existing reports identified mechanisms considered suitable in the UK context, but there is a dearth of published evidence on the successes and failures of these (e.g., concerning TIMOs). There appears to be more evidence on applications of green finance in tropical forest settings (e.g., in relation to Community Forestry), although this literature has not been reviewed so far due to being considered less relevant to the UK. However, given the dearth of evidence identified so far, reviewing the wider literature on these green finance mechanisms is worth considering. This wider review could potentially yield useful insights to help underpin further development of TWF-related green finance mechanisms in the UK.
- **Gather evidence on the successes and failures of green finance projects across the UK, including the critical factors underpinning them.** The literature search identified very little existing evidence on project successes or failures and key factors involved – perhaps due to the relative infancy of green finance projects in the UK and green finance as a topic. There is potential to seek evidence directly from projects such as those mentioned in Section 5.3 (e.g., through surveys and interviews) as they develop to help inform further development of green finance mechanisms and applications to UK forestry.
- **Investigate and identify conditions which enable successful operation of public-private blended finance schemes.** This relates to the challenge

of coordinating public and private finance identified by Toxopeus and Polzin (2021) who conducted a systematic review into financing barriers and strategies in the context of urban nature-based solutions. Such research could be timely given the increasing importance of blended finance in catalysing private sector financing of green projects which are particularly risky by nature. This would benefit from collaborative input of multiple stakeholders (e.g., via a platform like the [Scottish Nature Finance Pioneers Group](#)). Evidence could be gathered through an initial review of existing literature, supplemented by interviews and/or surveys of relevant stakeholders and organisations involved.

- **Consider undertaking a rapid review of evidence on success and failures of REDD+ mechanisms to identify transferrable findings and lessons applicable to the UK context.** Most of the evidence identified through our search on green finance related to REDD+ mechanisms. This evidence was not reviewed as it was considered likely to be of more marginal relevance to the UK. Lessons could, however, potentially still be learned from such studies; hence there remains scope for a rapid review of this literature.

6 Conclusions

While definitions of Green Finance are diverse, it generally refers to the financing of green projects and/or the greening of the financial system. This review found limited evidence on TWF-related green finance mechanisms currently being used in Britain (e.g., Community-funded Forestry projects) or that appear suitable candidates for application in a UK forestry context (e.g., TIMOs and EIBs). Evidence is especially scarce in relation to critical factors underpinning the success and failure of the different mechanisms.

Major evidence gaps on applying green finance mechanisms to leverage more private funds into UK's TWF exist, and these could usefully be addressed. Increased evidence gathering about their operation would be timely given the growing interest in the topic and would be aided by an increasing number of projects applying green finance mechanisms in the UK, as well as a growing literature on the topic. Most of the evidence identified in this review comes from grey literature rather than academic papers and highlights the importance of research that engages relevant stakeholders in the industry, including financial institutions and potential investors in UK natural capital.

Acronyms

CIC	Community Interest Company
Co-op	Co-operative
DBEIS	Department for Business, Energy, & Industrial Strategy
Defra	Department for Environment, Food, & Rural Affairs
EA	Environment Agency
EIB	Environmental Impact Bond
Eftec	Economics for the Environment Consultancy
FR	Forest Research
GFI	Green Finance Institute
NE	Natural England
NEIRF	Natural Environment Investment Readiness Fund
PES	Payments for Ecosystem Services
REDD+	Reducing Emissions from Deforestation and Forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks
UKIB	United Kingdom Infrastructure Bank
UNEP	United Nations Environment Programme
TIMO	Timberland Investment Management Organisation
TWF	Trees, Woods, and Forests
WCC	Woodland Carbon Code
WEF	World Economic Forum

Glossary

Community Interest Company (CIC)	A 'limited company' which conducts business or other activity for the benefit of a community rather than purely for private gains (DBEIS, 2022, 2016).
Co-operative	'A business or organisation that's owned and controlled by its members, to meet their shared needs' (Co-operatives UK, n.d.). Unlike regular companies, co-ops are strictly owned by individuals who are close to the business (e.g., the employees, local residents, or customers).
Green Project	Taken in this report to mean projects expected to generate a positive environmental impact, or reduce adverse ones (e.g., through tree planting, woodland management, or wider activities involving the extension, restoration, and protection of natural habitats).
Financially Liquid	Relates to the concept of 'liquidity' in finance and refers to when assets (e.g., a piece of land) can be converted into cash or traded (i.e., bought and sold) at relative ease (Mueller, 2022).
Limited Company	A company whose 'owners' assets and income are separate and distinct from the company's assets and income', meaning that any losses are limited to what is invested into the company (Hayes, 2022a).
Project Finance	Refers to the direct financing or channelling of capital into a project, as opposed to through financial securities and commodities (Ozdemiroglu, 2019:p.6)
Special Purpose Vehicle (SPV)	A subsidiary company or separate legal entity that is often created for the purposes of isolating financial risks from a parent company (Hayes, 2022b).

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Appendix: Scope & Methodology

Scope

This Quick Scoping Review focuses primarily on green finance mechanisms in the UK and in geographic regions with broadly similar climatic conditions. Where evidence was lacking for forest ecosystems and/or the regions of interests, findings from other ecosystems and/or regions of the world was drawn upon and transferred where possible.

The study also primarily focuses on green finance mechanisms that channel private sector investments, as opposed to public sector financing. However, initiatives whereby public funding is used to mobilise private investments (i.e., blended finance) is within the scope of the study. Furthermore, given that the output of this study is aimed primarily at forest policy advisors and those familiar with development of the UK Woodland Carbon Code, this study also focuses on other financing mechanisms that that are less well-known.

Methodology

To collect the evidence necessary for this study, both grey and academic literature was considered. The former was relied on heavily due to the relative abundance of recent literature – a result of the recent policy interest in green finance. Several relevant organisational websites were searched for useful publications and provided a useful starting point for the evidence review. These included:

- [Nature-Based Finance Learning Hub](#) of the Ecosystems Knowledge Network
- [Finance Earth](#)
- [Financing Nature Recovery UK](#)
- [Green Finance Institute Hive](#)

The search and screening of academic literature for evidence was conducted based upon using Scopus roughly in accordance with pre-existing guidance for conducting

Quick Scoping Reviews (Collins et al., 2015). The search terms and string employed are provided below, along with a description of the search hits, inclusion/exclusion criteria, and studies screened.

Table 3: Search Terms Adopted for Scopus Literature Search

Land Use	Green Finance	Topics/Themes of Interest
Forest Woodland Tree	(Green* OR Carbon* OR Climate OR "Nature-based" OR "Nature-based solutions" OR "NbS" OR "Natural Climate Solutions" OR "Natural capital" OR "Nature positive" OR "Conservation" OR "Biodiversity") W/1 (financ* OR invest OR investment OR investing) [†]	"Case stud*" Gaps Barriers Obstacles Challenges Success Failure Mechanics Mechanism Products Structures Vehicles Instruments
[†] Note: invest* is not used here because it can produce results with the word investigate , which has been identified to produce irrelevant results		

Search String:

*TITLE-ABS-KEY ((*forest* OR woodland OR tree) AND ((Green* OR Carbon* OR Climate OR "Nature-based" OR "Nature-based solutions" OR NbS OR "Natural Climate Solutions" OR "Natural capital" OR "Nature positive" OR Conservation OR Biodiversity) W/1 (financ* OR invest OR investment OR investing)) AND ("case study" OR mechani* OR products OR structures OR vehicles OR instrument OR gaps OR barriers OR obstacles OR challenges OR success OR failure)) AND LANGUAGE(English)*

As of 24th June 2022, the search string above yielded 368 hits, five of which were duplicate studies, leaving 363 unique hits. Papers were screened in two separate passes. Criteria used for initial screening included whether a publication contained an indication of discussing successes and failures of forestry related green finance mechanisms, particularly in relation to attracting private investment. Designations of 'clearly relevant', 'uncertain'; and 'clearly not relevant' were used to indicate which studies were of interest based on the criteria above. Of the publications considered, 28 were deemed 'clearly relevant'. These were subsequently further screened for relevance based on a stricter combination of indicators about the location of study and extent to which TWF-related green finance mechanisms are discussed. A total of 12 of the 28 'clearly relevant' studies were deemed 'highly relevant' in terms of coverage of green finance mechanisms, though one was considered less relevant due to its geographical focus on a developing country case study (for Kenya). The remaining 11 'highly relevant' studies were reviewed in full.

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