Institute and Faculty of Actuaries

Introduction to investing in nature

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Section 1: Introduction

"We are facing a global crisis. We are totally dependent upon the natural world. It supplies us with every oxygen-laden breath we take and every mouthful of food we eat. But we are currently damaging it so profoundly that many of its natural systems are on the verge of breakdown." *Sir David Attenborough – Foreword to The Economics of Biodiversity: The Dasgupta Review*

The rapid degradation of natural systems has been driven by human activities resulting in extensive deforestation and land-use change, over-exploitation of natural resources, climate change, pollution and the introduction of invasive species. These drivers of environmental degradation are the product of unsustainable economic activity and are having a devastating impact on the natural world.

There is clear evidence of these impacts; population sizes of mammals, birds, fish, amphibians and reptiles have reduced by 73% on average since 1970 and 1 million plant and animal species are threatened with near-term extinction. Tropical rainforests that are home to over 50% of the biodiversity on land are being cleared for agriculture, commodities and infrastructure at a rate of one football field every six seconds.

With over half of the global economy highly or moderately dependent on the ecosystem services that nature provides, the threat to economic growth and the global financial system if we continue with business as usual is significant. Businesses that depend on nature for the ecosystem services it provides can find that these services become increasingly more scarce, raising operating costs, damaging infrastructure or even stranding assets. In addition, businesses that destroy or degrade natural systems will increasingly be exposed to transition risks related to new policies and regulation, changing consumer preferences and market access, technological disruption and reputational harm.

The physical and transition risks faced by businesses can create financial and reputational risks for investors.

Arguably, there is a requirement for more effective management of risks associated with dependencies and impacts on nature. Investors are increasingly aware of the significant potential for investment in projects to restore nature and in turn potentially help meet their climate commitments. The natural world has the potential to provide over 30% of the climate solution to prevent dangerous global warming by 2100. The restoration of nature can be seen as a new asset class with differentiated and uncorrelated returns with the market on a risk adjusted basis.

Recognition of nature-related risks are in their infancy. If they are to be recognised, financial institutions have an important role to play in financing the transition to nature positive. In addition to risk mitigation, nature-positive finance could reverse the damaging effects of historic economic growth, where nature has been seen as an externality, and help restore ecosystem services.

It is estimated that US$4.1 trillion in finance is required to enable the world to meet its biodiversity and land-use targets by 2050. In China alone, nature positive transitions could add US$1.9 trillion in annual business opportunities to the country by 2030. Public finance alone will not be able to achieve this target and so the role of private finance is significant and essential in scaling financial flows to deliver global natural capital goals.

There is a growing body of research and information to support actuaries to upskill on nature, to better understand both the risks and opportunities that exist. This includes:

- The Taskforce on Nature-related Financial Disclosures (TNFD)
- Climate Financial Risk Forum Nature-related Risk: Handbook for Financial Institutions
- University of Cambridge Institute for Sustainability Leadership (CISL) Handbook for Nature-related Financial Risks
- The Pensions and Lifetime Savings Association 'Nature's Impact' publication
- The Institute and Faculty of Actuaries' page on Biodiversity

This paper does not look to replicate content already covered across these sources and we assume that the reader is already familiar with key nature concepts as described in the TNFD and has taken preliminary steps to understand their nature-related risk exposure in line with the CFRF's Practitioner's Guide to Nature.

This paper focuses on ***how*** a financial institution can 'invest in nature' across the assets classes which it holds on the balance sheet – whether that be to better manage nature-related risk, take advantage of emerging opportunities, or both. It seeks to complement the work of the Green Finance Institute on "Investing in Nature – Opportunities for Institutional Investors" report.

This paper explores two main approaches to "investing in nature":

- Investing indirectly in nature through investing in companies that are taking a leading role in tackling the nature crisis. Such opportunities theoretically exist across all asset classes that an institutional investor invests in, and we explore in this paper what this might mean in the context of investing in **equity** and **credit**.
- Investing directly in nature through natural capital assets or nature-based solutions. Such investment opportunities are typically accessible through **private markets**.

This paper focuses on the investible opportunities that in theory enable exposure to nature, but it does not comment on the extent to which such instruments actually drive positive nature outcomes. The classes of investment opportunities described in this paper are broad, and it would be unreasonable to expect that all past, current or future opportunities in any of these classes will deliver nature-positive outcomes, or that any significant subset of these opportunities will not involve inherent tensions between "good" outcomes for investors, other humans, carbon and nature. Investing in this space is a developing area, and the reader should form their own view (on an individual asset basis) as to whether an opportunity actually delivers desired nature outcomes and what trade-offs may exist.

Section 2: Investing in nature – equity market

2.1 Overview

Investing in nature through the equity market can be considered through two complementary mindsets:

1. **"Offense"**- which aims to generate returns by capturing nature-related opportunities
2. **"Defence"**- which aims to reduce risk by limiting negative nature-related exposure

In practice, there are two main levers for equity investors aiming to encourage portfolio companies to address nature-related issues – **asset allocation** (including tilting and disinvestment) and **stewardship** (including engagement and voting).

Whether an equity strategy aims to capture upside opportunities or limit downside risk, using asset allocation decisions to integrate nature as an investment theme is likely to reduce the investible universe and result in lower diversification than a broad market index.

In this section, we will introduce some of the potential approaches to incorporate nature in an equity investment strategy, discuss risk/return considerations, then examine real-world nature outcomes. We will conclude with some potential actions for equity investors looking to address the nature crisis through their equity portfolio.

2.2 Approaches

A natural starting point to investigate the key features of a biodiversity equities investment is to look at existing equity strategies offered by asset managers. Based on our market research in 2024, we identified around 20 asset managers offering listed equity funds with a specific focus on biodiversity, and a significantly higher number of strategies (by several orders of magnitude) with nature featuring as an important theme as part of a wider sustainability-focussed fund.

Within equity markets, we can distinguish between a range of investment approaches, including active, passive, systematic (rules-based) and private market strategies. By looking at some of the strategies implemented by the asset management industry, we can investigate how engagement and asset allocation can be used to address nature issues. This will help us understand what practical actions investors can take and whether listed equity strategies focussed on nature/biodiversity are likely to have a positive real-world impact on halting and reversing nature loss.

Biodiversity equity strategies follow a variety of approaches including:

- **Wider environmental focus** which includes nature, for instance a fund focussed on climate risk or circular economy which also addresses nature-related issues

- **Sectoral focus**, investing in a key sector for nature and biodiversity (e.g. agriculture)
- **Thematic fund** related to biodiversity, for instance water, marine issues or pollution
- **Negative screening** – avoiding worst impact stocks for biodiversity
- **Supporting biodiversity champions** – investing in innovative companies which have the potential to play a significant role in halting and reversing biodiversity loss

For the funds in the last two categories, either avoiding an allocation to companies with negative nature impacts or investing directly in biodiversity champions, asset managers typically use a combination of qualitative or quantitative methods to assess nature-related impacts and dependencies for each holding. These criteria include a qualitative assessment on supporting biodiversity-related themes (e.g. sustainable agriculture, circular economy), focus on high impact sectors, alignment with UN Sustainable Development Goals or the use of quantifiable biodiversity metrics. Sustainability-related exclusions are also a common component of these funds, particularly relating to key environmental risks. Most of these strategies are actively managed, though there are also several passive/systematic strategies based on reducing negative environmental impacts relative to a benchmark market index.

We also note that some biodiversity equity funds also have explicit social or corporate governance ambitions alongside environmental targets. This is understandable given the interrelations between biodiversity, climate and social issues such as global inequality and a Just Transition. For instance, including a social element to a biodiversity strategy can help recognise the importance of local communities and indigenous peoples in nature preservation and restoration.

This article is primarily written from the perspective of an institutional investor but it is worth highlighting that there is also growing interest in nature investment from retail investors, which is reflected in the growing number of listed equity funds tailored to the retail market.

2.3 Risk and return considerations

Thematic nature investments aim to benefit from long-term trends and opportunities arising from the inefficiency of market pricing related to systemic environmental risks. They have the potential to achieve long-term value generation by playing a role in addressing nature loss. Like climate-focussed investments, biodiversity equity strategies aim to protect asset portfolios from the negative impact of nature-related risks. These include both **physical risks** associated with the nature crisis, such as food shocks, flooding, water shortage, and nature-related **transition risks,** including stranded assets due to stronger regulation aiming to address biodiversity loss.

By design, biodiversity themed equity funds tend to exhibit concentration in certain sectors and geographies more exposed to nature. Supporting nature innovators may also lead to a focus on smaller cap companies, and a growth-oriented style, which can further tilt a biodiversity equity strategy away from a broad market index. Over the past few years, the lower exposure to large cap technology stocks (including the “Magnificent Seven”) in biodiversity themed strategies has resulted in underperformance for some of these funds. This was exacerbated by the fact that most biodiversity equity funds have a limited track

record, with most of their historic performance in a period where market concentration in large tech stocks has driven strong market returns.

Investment risks may be further accentuated for strategies focussed on emerging markets, which also suffer from currency uncertainty, political challenges and less developed financial markets. Naturally, this can be offset by a higher level of expected returns, greater diversification benefits and the potential for meaningful nature impact in the countries with the highest levels of biodiversity (in tropical forests or rich coastal ecosystems for example).

Most equity funds with a nature component are actively managed portfolios. As a result, these face the usual challenge for active managers to avoid underperformance relative to passively managed strategies. Also, some of the existing biodiversity funds have quite high fees relative to the wider market (some even in excess of 2% p.a.), which reflects both the nascency of this type of strategy and the appetite for investors looking to support biodiversity restoration.

Given nature markets are in the early stages of rapid development, entrepreneurs and private equity firms are increasingly focussed on building innovative products and tools to support the nature transition. Early stage or venture capital opportunities are typically higher risk, including lower liquidity than listed equities, but can also offer greater upside potential. Similar approaches can be taken for public equity and private equity investments, but we note that there are additional challenges when investing in companies which are not yet listed. For instance, data availability will be lower, however there may be greater investor input into company management which can help support sustainability objectives.

2.4 Nature outcomes

Nature disclosure frameworks, such as the Taskforce on Nature-related Financial Disclosures (TNFD), emphasise both the dependencies of companies on nature and, conversely, the impacts on nature from the activities of companies. From an investor point of view, this "**double materiality**" goes beyond managing downside environmental risks to an asset portfolio but also considers the impact of portfolio companies on nature and biodiversity. Equity strategies focussed on biodiversity can take a range of approaches to tackle their nature impact, some of which will be covered here.

Demonstrating positive impact is challenging, as it requires an assessment of **additionality**, where a company's work leads to an environmental outcome that is additional to what would have happened without the work. This requires the comparison of a particular outcome with what would have happened otherwise (counterfactual reasoning). From the perspective of an investor, however, the positive impact of an investee company - or **investee impact** - is only part of the picture. We also need to consider whether the actions of the asset owner (or even asset manager) themselves have a positive impact which is additional, in that it would not have happened without the investor's actions. This stronger form of impact **– investor impact** – requires the investor themselves to demonstrate additionality, not just the investee company.

This distinction between investor and investee impact is at the core of understanding the role of equity investments in achieving a positive impact on biodiversity. Equities investment is typically **indirect nature investing**, with the ability to influence outcomes but not a direct investment in supporting the transition towards halting biodiversity loss. Apart from Initial Public Offerings, equity shares are traded in secondary markets, which reduces the ability for positive impact on nature. The investee company may be actively supporting the nature transition and achieving "investee additionality" but by investing in it, an asset owner is simply shuffling a share certificate from one shareholder to another and may not be able to demonstrate the stronger level of "investor impact".

Recent research shows that most of the world's large companies do not yet meaningfully integrate nature-related risks and opportunities into their operations. Disclosure in this area is slowly improving but little action is currently taking place to reverse nature loss, with most companies lacking clear targets and actionable strategies to tackle the biodiversity crisis.

On the other hand, the transition to a world which aligns with the Kunming-Montreal Global Biodiversity Framework, and where we have successfully reversed nature loss, requires a material reduction in harmful impacts on biodiversity, as well as innovation and new technology to enable the transition. This will require significant financing, with equity markets playing an important role in stimulating the required innovation across key sectors through the allocation of capital. Asset stewardship, including investor engagement and voting, is another lever that asset owners can use to have a positive impact on nature. This will be covered in more detail in a subsequent section.

Whether an equity strategy is aiming to support biodiversity champion companies or manage downside risks by screening companies with a negative impact on biodiversity, the strategy implementation will depend on the nature measurement approach and metrics used by the asset manager to assess nature outcomes. In practice, the approach taken will be quite different depending on how nature impacts are measured.

For instance, the biodiversity credentials of portfolio companies will depend on whether we're monitoring:

- **Key drivers of biodiversity loss**, such as land/water use change, pollution and overexploitation. This can be based on company data for each driver of loss, or a location- or sector-based approach to assessing nature impacts
- **Species-focussed metrics** such as Potentially Disappeared Fraction of species (PDF) or Mean Species Abundance (MSA)
- **Habitat-focussed metrics** such as the UK Biodiversity Net Gain metric set out by DEFRA
- **Alignment with UN Sustainable Development Goals** (e.g. SDGs 14 and 15)

In any case, nature metrics are very location-specific and data availability, although it is improving quickly, may be quite limited for some of these approaches. Unfortunately, there isn't a single unit of measurement, like carbon emissions for climate, to measure biodiversity outcomes.

A key consideration when investigating nature impacts for equity holdings is to look at company value chains. Unlike for climate, where value chains are often relegated to "scope 3", these are an integral part of biodiversity measurement, including the sustainability of supply chains and issues related to circular consumption or pollution. Finally, biodiversity impact also needs to consider other related issues. Investors should recognise that transition actions can lead to multiple dimensions of impact, with synergies and trade-offs across nature loss, climate change and local communities.

2.5 Case studies

To illustrate how these approaches can work in practice, we have set out anonymised case studies in the table below which compare and contrast two existing investment strategies: (a) biodiversity champion approach, and (b) biodiversity screening approach.

Approach	Biodiversity champion	Biodiversity screening
Description	Invest in companies helping to protect biodiversity or reduce the threat to biodiversity	Biodiversity screened index global index fund which aims to mitigate biodiversity risk
Style	Active with 30-50 holdings	Passive - full physical replication with hundreds of holdings
Portfolio construction	Sustainability exclusions, sector focus then thematic shortlisting on biodiversity outcomes (e.g. land, marine, deforestation, agriculture)	Sustainability exclusions, ESG risk screening and screening based on biodiversity data score
Benchmark	MSCI All Countries World Index used as a benchmark	Tracks a biodiversity screened global index
Measurement	Uses bespoke global biodiversity mapping built in collaboration with expert non-financial organisation	Considers key pressures on nature for each sector (based on partnership with biodiversity data organisation), and looks at Mean Species Abundance
Other actions	Active engagement program including a focus on nature collaboration (incl. Finance for Biodiversity) and policy advocacy	Sustainability reporting and engagement at a manager level

2.6 Other investor actions

In addition to direct allocation to an equity strategy with an explicit focus on biodiversity, there are several actions that equity-focussed investors can take to tackle this important issue. These include:

- **Stewardship**: nature-related engagement and voting are key tools for equity investors to encourage sustainable practices from portfolio companies, often through their asset managers. Given the low level of awareness on the biodiversity crisis and its close relationship with climate change, education is an important first step. The interdependence of the nature and climate crises means that it may be appropriate to include both nature and climate targets together as part of a formal engagement programme.

- **Regulatory requirements**: increasing sustainability regulation aiming to tackle nature loss means that this topic is becoming a key consideration for investors across their entire portfolio. Recent developments include: the Kunming-Montreal Global Biodiversity Framework, TNFD framework, EU Corporate Sustainability Reporting Directive and Deforestation Regulation, UK Biodiversity Net Gain, France's Article 29 and the SFDR Article 8/9 requirements for asset managers.
- **Reporting and disclosure**: to understand their nature impacts, dependencies and risks, asset owners need to locate and assess their exposure to nature and biodiversity. As a starting point, they should meet relevant regulatory requirements but may look to go further in order to demonstrate leadership in this area. Data availability and relevant company information mean that listed equity is a natural place to start looking at the nature exposure within an asset portfolio.
- **Stakeholder communications**: public nature and biodiversity policies can play a key role to encourage action on this topic, as well as wider stakeholder communication on this topic such as engagement with pension scheme members, insured policyholders, employees, clients and suppliers. This also supports wider education and raising awareness.
- **Collaboration and policy**: an effective way to encourage positive nature outcomes is by joining forces with other investors who have similar objectives. Relevant initiatives include the TNFD Forum, Nature Action 100, Finance for Biodiversity and the PRI's Spring initiative. Investors can collaborate with academia, government, non-governmental organisations, data providers and other key actors to find ways to tackle the complex challenges related to the nature crisis. Asset owners also have the potential to influence government policy and can play a role in shaping the direction of travel.

Section 3: Investing in nature – credit market

3.1 Overview

The public credit markets can play an important role in unlocking investment in nature. Fixed income assets typically make up a large proportion of the balance sheet of institutional investors such as pension funds and insurance companies, owing to solvency and liquidity requirements, and so there is an opportunity to deliver impact at scale.

Institutional investors need to first and foremost deliver on their fiduciary duty and deliver good customer outcomes. It is possible to generate attractive risk-adjusted returns for customers whilst also having a positive impact on nature. There are two broad ways that investors can do this within the fixed income sleeve of their portfolios: (a) fixed income **portfolio re-alignment**, and (b) dedicated **nature-focused fixed income funds**. As we will explore in this section, the most effective approach is to adopt a combination of these two levers.

Integrating nature considerations into credit portfolio construction is ultimately part of good risk management. Nature-related risk is a material financial risk, and those companies with a high impact and/or dependency on nature are more likely to lose value and/or experience a deterioration in the credit-worthiness of their debt issuance.

3.2 Introduction to fixed income

Many institutional investors have significant credit portfolios, and therefore there is significant scope for driving impact. The majority of European institutional investors are universal asset owners, meaning that their credit portfolios touch all parts of the investment universe (e.g. a range of geographies, sectors and sub-sectors) and typically across the full duration and credit rating spectrum.

This diversity within credit portfolios gives rise to varying levels of nature-related impact and dependency. For example, a long-dated investment in a sub-investment grade corporate debt instrument issued by a company which is highly dependent on freshwater for its production processes, will have a very different nature-related risk profile to a short-dated investment in a sovereign debt instrument issued by a state that is not in a nature-depleted condition.

The table below sets out some of the key characteristics to reflect on across a diverse credit portfolio, and how this might drive nature-related risk.

Key characteristics that influence nature-related risk in credit portfolios	Description
Corporate fixed income vs. sovereign debt	Easier to proactively invest in nature through corporate fixed income compared to sovereign debt, though debt-for-nature swaps are typically underpinned by a government guarantee.
Maturity profile	Shorter duration assets provide greater opportunity (at a lower cost) to turn over a portfolio to focus on nature outcomes
Geography	Companies operating in countries which have developed nature plans in line with the Kunming-Montreal Global Biodiversity Framework may be more likely to have considered nature in corporate objectives
Credit rating	Nature-related risk is arguably yet to be adequately captured in credit rating assessments, however there are some instances where elevated nature-related risk has transposed to poorer credit quality (e.g. where there are public nature-related controversies)
Sector and sub-sector	The ENCORE tool can be used to identify those sectors and sub-sectors which are more materially exposed to the ecosystem services that nature provides (from an impact and dependency perspective). For example, companies involved in the construction of utility projects such as canals, reservoirs and sewage disposal plants have a very high impact on areas of freshwater use.
Passive vs. active investing	Active investing provides greater scope for re-aligning credit portfolios towards a positive impact on nature. Passive index-based strategies designed to have a positive impact on nature are still relatively nascent.

3.3 Credit portfolio re-alignment

As described above, one way in which an investor can invest in nature through its credit portfolio is by delivering portfolio re-alignment. Investors should first conduct hotspot analysis to identify which sub-sectors of their credit portfolio are materially exposed to nature-related impacts and dependencies. This helps ensure that any subsequent portfolio re-alignment is focused and delivers the greatest possible impact (within the bounds of any wider risk-return objectives for the portfolio).

The Climate Financial Risk Forum Nature-related Risk: Handbook for Financial Institutions provides insight into how financial institutions have undergone such a 'top-down' hotspot analysis using publicly-available data.

One step further is to then develop a 'bottom-up' methodology which enables investors to identify specific issuers within those sub-sectors, against which re-alignment can be grounded. This is a fast-evolving area and a key challenge that firms face is determining which nature-related dataset(s), tools and metrics to use for this purpose. Ultimately, firms need a pragmatic, proportionate and quantitative way of identifying those companies that are the most material contributors to the degradation (or restoration) of nature. The CFRF provides some guidance on how this could be achieved, recognising that firms will be at varying levels of maturity.

Once detailed issuer-level analysis has been conducted, a basic starting point is then to tilt credit portfolios away from issuers which look unfavourable on a chosen nature-related metric (particularly if they do not have plans in place to improve) and towards companies in the same

sector who perform well on the same metric or have credible plans in place to better manage, monitor and reduce nature-related risk. Such tilting would need to be balanced with any wider risk-return objectives for the credit portfolio.

Fixed income investors could also use the lever of bond maturities to reduce nature-related risk. For example, where an issuer has a high dependency on the ecosystem services that nature provides (as identified by the hotspot analysis and issuer-level analysis described above), an investor may choose to only invest in shorter-dated debt and only re-invest at maturity if the issuer has made sufficient commitments to mitigate those risks (or improve against the chosen nature-related metric).

Using turnover in this way to re-shape the portfolio may be particularly effective for those in short-duration strategies, who may be able to naturally re-shape their portfolio as instruments mature on a regular basis without incurring prohibitively expensive turnover costs. Such costs are likely to be incurred, however, by long-term investors such as pension funds who may not be able to rely on natural turnover to meaningfully tilt their portfolios.

3.4 Nature-focused investment products

Whilst conducting credit portfolio re-alignment requires a relatively sophisticated understanding of nature (including nuances, strengths and limitations of various nature datasets, tools and metrics), investors can also deploy capital into “off-the-shelf” nature-focused investment products.

The marketplace for nature-focused investment products is still small but growing quickly, with growth being driven by a number of new instruments. The table below sets out the most developed fixed income products available to investors.

Investment product	Description
Green/Blue Bonds	Issued by governments, corporates, intergovernmental organisations, financial institutions and development agencies to finance initiatives that protect and enhance natural capital (explicit use-of-proceeds).
Green/Blue Loans	Issued by corporates and financial institutions to fund specific projects with well-defined sustainability criteria that are measured and reported on.
Sustainability Linked Loans	Very similar to Green/Blue Loans. Issued by corporates and financial institutions for projects and general corporate finance, with terms of the loan set against criteria such as issuer ESG policies, commitments and performance and specific, measurable and reported nature-related performance criteria.
Debt for Nature Swap	Transactions in which contributing countries or entities agree to purchase and cancel a portion of a countries debt obligation in exchange for the recipient countries commitment to invest an agreed amount in conservation and/or make similar commitments to conservation.
Nature Performance Bonds	Similar to Debt for Nature Swap where company debt is restructured in return for specific commitments to conservation investments. These bonds can be issued and restructured.
Green Micro-finance	Provision of financial services to poorer households and communities or small and medium sized enterprises that are not served by the mainstream banking sector. Loans and services linked to specific sustainability outcomes.

We provide below a high-level summary of the key features of these assets, recognising that this assessment is subjective. The Red/Amber/Green (RAG) ranking contained within the table below is relative to the other assets described in the table (rather than broader market instruments). We note that the availability and format of data is very varied across the different asset classes, however believe that the rankings are useful to highlight some of the critical areas of difficulty with each investment.

We consider the following items in the table below:

- **Pricing transparency**: Whether the investments have a market price or have to be marked to model. The presence of indices or other relevant market data may also be useful.
- **Cashflow certainty**: Whether the cash flows are predictable. Early repayments and other probabilistic decrements can reduce certainty for some fixed income investments whereas equity like investments inherently exhibit low certainty.
- **Duration**: We have attempted to determine a modified duration for each investment and this is the "duration" definition that we have used throughout the paper. This varies significantly within each of the sectors but we have identified the common durations for investments.
- **Security**: We have considered the presence of tangible security collateralising the bond or loan. We have considered the presence of security to be a favourable feature.
- **Format:** Either bond, or loan. We have assumed that loans are more difficult to manage than bonds.
- **Liquidity:** Depends on the presence of a secondary market and the ability to quickly sell at the "market prevailing" price.
- **Ability to source**: Due diligence is required before purchasing assets but bonds tend to be relatively easy to source, whereas loans require specific conduits into the market.

Sub-asset class	Green/blue bonds	Green/blue loans	Sustainability-linked loans	Debt for nature swap	Nature performance bonds	Green micro-finance
Pricing transparency	High	High	Medium	Low	Low	Low
Cashflow certainty	High	High	High	Medium	High	Low
Duration	< 25 years	< 25 years	< 5 years	< 10 years	< 10 years	< 5 years
Security	Semi-secured	Semi-secured	Unsecured	Unsecured	Unsecured	Unsecured
Format	Bond	Loan	Loan	Loan	Bond	Loan
Liquidity	High	Low	Low	Low	Medium	Low
Ability to source	Easy	Medium	Medium	Difficult	Medium	Difficult

As the table above shows, there are a range of investment opportunities for institutional investors with credit portfolios. However, as outlined in the introduction to this paper, it is important to note that the characteristics above do not consider whether any of the instruments identified demonstrably drive positive nature outcomes.

The next section explores in more detail the investment opportunities that exist in real assets in private markets.

Section 4: Investing in nature – private market

4.1 Introduction to private market assets

There is a risk of damage to natural assets which, if insufficient steps are taken to protect or restore them, could jeopardise the many benefits provided by nature. Our economic system continues to deplete natural resources while producing waste at an unsustainable rate. These concerns have increased the global focus on **natural capital**, presenting opportunities to invest in assets that contribute to its preservation, while generating positive financial returns for investors.

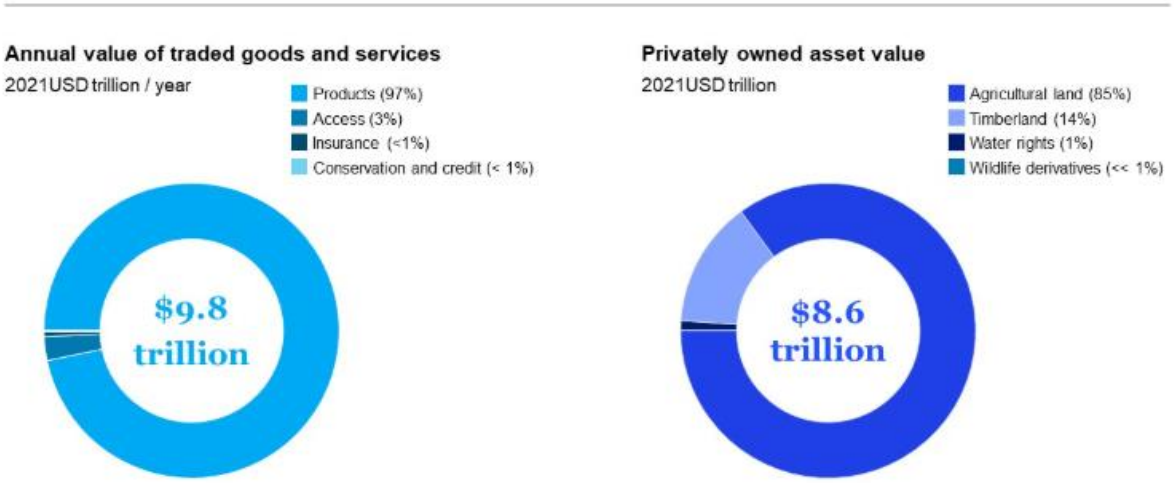
Natural capital represents the assets of the natural environment which provide us with the resources we need to survive and thrive. This includes biotic factors (i.e. living organisms such as plants, animals, fungi and bacteria) and abiotic factors (i.e. non-living components such as soil, water and weather). **Ecosystem services** are provided by natural capital and give benefits to people and the economy, including raw materials, climate regulation, pollination and recreation. Over half of global GDP is highly or moderately dependent on the ecosystem services that nature provides.

Investors interested in natural capital assets need to balance return, risk, and nature outcomes, especially given the nascency of some nature markets. Previous sections covered investment in companies and organisations that are taking a leading role in tackling the nature crisis. The focus of this section will be direct investment into natural capital private market assets, including the key risks and sources of return from these assets.

4.2 Nature markets

Nature markets (or natural capital markets) are a subset of the economy where the financial value of nature is explicitly recognised and accounted for. These are estimated to be worth around $10 trillion, or over 10% of global GDP. These markets involve revenues which rely on a healthy natural environment as an integral part of a product or service. Most nature markets are driven by commodity production, including agriculture, but these are growing at a rapid pace to reflect the wide range of ecosystem services and capture their financial benefit for people and the economy.

Value of Nature Markets (Source: McKinsey State of Nature Markets report)



Only a fraction of nature's true value is currently captured in nature markets and conversely only a small proportion of nature markets are verified with robust sustainability certifications. Hence investors allocating to natural capital through existing nature markets need to be careful to ensure their capital is not causing harmful outcomes for nature and biodiversity.

Awareness is growing of negative economic externalities and their environmental and financial consequences. The global food system, as well as wider commodity extraction, is a major contributor to negative nature externalities with damaging consequences on biodiversity. Threats to biodiversity such as deforestation highlight the importance of sustainable practices, particularly in key sectors such as agriculture and forestry. Market mispricing and even illegal activities further exacerbate the biodiversity crisis and put pressure on natural ecosystems.

Credit based markets and conservation markets are a growing focus for natural capital investors, however these markets currently represent just 1% of the value of all goods and services traded in nature markets. Although established markets such as forestry, commodities and agriculture dominate nature markets today, emerging markets related to carbon capture, water rights, nature-related insurance and sustainable conservation are likely to play an important role in the nature markets of the future. Many of these themes can be accessed through private market investment.

4.3 Investment approaches

A significant increase in natural capital investment by the private sector is required to meet global commitments including the Kunming-Montreal Global Biodiversity Framework. Research carried out by Gresham House and mallowstreet in May 2024 highlighted that 50% of UK asset owners are either already investing in natural capital or will do so within the next 18 months, albeit a fairly modest allocation (less than a 5% allocation in most cases).

Within private markets, natural capital investment spans a wide range of asset classes which include:

- **Private Equity:** Investments in sustainability-focused companies, covering areas such as sustainable agriculture, eco-tourism, marine restoration and biotechnology
- **Private Debt:** Loans for environmentally beneficial projects which support nature
- **Infrastructure:** Green infrastructure projects which support natural ecosystems
- **Real Assets:** Direct investments in natural resources, including forestry, sustainable agriculture, water rights and land restoration
- **Carbon and Biodiversity Markets**: Investments in carbon credits, biodiversity credits (e.g. Biodiversity Net Gain) and offset projects such as reforestation

Previous sections have covered equity and debt investments so we will primarily consider real assets and some of the more nascent nature investment markets such as financial credits which aim to monetise ecosystem services. Real asset investments are typically illiquid in nature so may only be appropriate for investors with long investment timescales.

For each type of real asset, we can consider a range of approaches, for instance forestry investments could be split into:

- **Core commercial forestry assets:** investment into operating timberland which harvests and sells timber, as well as benefiting from land appreciation.
- **Improved forest management:** adjusting the harvesting methods and timescales to create additional GHG emission sequestration or other environmental benefits.
- **Afforestation:** growing new trees in an area that was not a forest in the recent past.

Similarly, agriculture investment can involve several approaches to access the asset class:

- **Leasing model:** investment in farmland which is then leased to farmers with no ongoing involvement in the food production process.
- **Operating model:** investment in farmland where the investor takes responsibility for agricultural production. One option is to take a partnership approach where the investor holds a majority stake and operation is done in partnership with a farmer.
- **Improvement model**: involves buying land with the objective of making a financial return through land improvement, sustainability enhancements or brownfield development. Investments can be structured as private equity or real estate.

Some of the other nature-based investments can include:

- **Carbon**: carbon sequestration to generate (statutory or voluntary) financial credits.
- **Biodiversity**: mechanisms designed aiming to translate verified and measurable positive impacts on biodiversity into tradable financial credits.
- **Ecosystem restoration:** generating financial returns through some of the economic benefits associated with the protection and restoration of natural ecosystems.

4.4 Market drivers

Nature markets are expected to benefit from long-term supply and demand dynamics. A growing global population and the accompanying requirement for food, timber and other natural resources is expected to outstrip the pace of global supply which is limited by the

finite stock of natural resources. This is a primary market driver for the growth in value of natural capital assets and highlights the importance of sustainable natural capital practices to support future supply.

Consumer preferences are likely to be a key driver of demand driving nature markets, including a growing preference for sustainable products and services. New technology and innovation will also play a key role to facilitate market transactions. Further enhancements such as new financial instruments, carbon and nature pricing mechanisms, and leveraging public private partnerships will also drive higher investor demand in private market nature assets.

Regulatory incentives are expected to further encourage the recognition of the value of ecosystem services. This includes greater recognition of nature-related risk and opportunities in government and company decisions, as set out by the Taskforce on Nature-related Financial Disclosures. This trend is expected to increase recognition of biodiversity as a key investment issue for private market investors. Corporate and investor sustainability objectives, including Net Zero ambitions, could be another important market driver for natural capital investment.

4.5 Risk and return considerations

Financial returns are typically comparable to traditional private markets, with potential for long-term stability of cashflows. Investors need compensation for illiquidity, so high single-digit to low double-digit asset returns are the usual expectation, with the potential higher expected returns for more nascent nature markets. Natural capital strategies are typically actively managed portfolios and sometimes have quite high management fees.

Natural capital assets can offer diversification of returns against traditional asset classes such as equities, bonds and real estate. Their returns tend to be driven by longer-term trends not directly linked to economic cycles and can often provide negative correlation with traditional asset classes. Natural capital, particularly assets which deliver raw materials such as timberland or farmland, may also provide a degree of inflation linkage which can be attractive to institutional investors, particularly if they need to meet inflation-linked liabilities.

In sustainable forestry, for example, investment income traditionally comes from timber sales, which is a function of land value appreciation, biological tree growth and changes in the price of timber. More recently, additional sources of return are available, from the sale of carbon credits, combining forestry and renewable energy (e.g. wind turbines in forests) and the potential for further returns related to biodiversity markets

Similarly, sustainable farmland returns traditionally come from the production and sale of agricultural commodities, as well as capital appreciation of the underlying land. As with forestry, additional return levers are now available, for instance through environmental subsidies, carbon capture and nascent biodiversity markets. Regenerative agriculture is an example where financial returns and positive impact can be well aligned, particularly over the long term. For instance, reducing fertiliser and pesticide inputs through better soil

management has the potential to both reduce operating costs and increase future crop resilience.

Natural capital investment faces a range of potential risks, including:

- **Physical risks:** assets can be vulnerable to the adverse impact of climate change, including droughts, floods, invasive species and irregular weather patterns.
- **Regulatory risks**: due to shifts in policy and legislation, as well as changes in compliance regimes or political issues, particularly in emerging markets.
- **Market risks**: price volatility of assets, for instance due to lower commodity demand.
- **Illiquidity risk:** underlying investments are typically illiquid and often structured in closed-ended funds with long investment periods.
- **Reputational risks:** investments can have a significant impact on local communities which needs to be accounted for and addressed as part of the investment process. There is also a need to consider wider environmental impacts, including on local biodiversity.

Risk management is key for investors in private market nature assets. This includes diversification across asset classes and geographies, robust risk assessment of each investment and understanding of the current regulatory environment. Careful stakeholder engagement is also key to avoid reputational risks from the extraction of natural resources. As an example, sustainable forestry practices which recognise climate and biodiversity risks, with diversification across geographies and income streams (including carbon credits) can help mitigate some of the risks set out above.

The table below sets out some of the key investment considerations for several natural capital asset classes, including income sources, pricing, cashflow certainty and investment liquidity.

Asset class	Forestry	Agriculture	Nature restoration	Financial credits
Format	Real asset	Real asset	Contractual income	Carbon or nature credit
Primary income source	Timber	Food products	Downside risk protection (e.g. flood mitigation)	Positive climate / nature outcome
Pricing transparency	Medium	Medium	Low	Medium
Cashflow certainty	High	High	Medium	Low
Duration	< 20 years	< 20 years	< 20 years	< 5 years
Liquidity	Low	Low	Low	Medium

4.6 Nature outcomes

Private market investment, if done carefully, can offer the potential for a positive real-world environmental impact alongside generating investment returns. However, if an investor's objective is to achieve meaningful biodiversity impact alongside an attractive risk-adjusted return, careful due diligence is required to avoid unintended environmental consequences associated with monetising ecosystem services. Caution is particularly warranted when

investing in extractive industries where commercial activities have the potential for negative impacts on wildlife and natural ecosystems.

Investors will need to consider the duration of any of the asset classes described above, and how this compares to the anticipated duration of the asset actually meeting its core objectives. For example, an investment in commercial forestry with a duration of <20 years may be considered inherently speculative due to the >30 year full cycle that such assets typically experience.

Natural capital investors need to consider double materiality, looking at both the financial impact of environmental risks on each asset they hold and, conversely, the impact of these asset on nature. Careful consideration is required for investment in natural capital assets to ensure positive climate and nature outcomes in practice.

Regulatory frameworks, including forestry and agriculture regulation, help support positive nature outcomes related to natural capital investment. Recent tools and frameworks, such as the Natural Capital Protocol, TNFD framework and Woodland Carbon Code (in the UK) provide further guidance and help limit potential negative impacts. Unintended consequences on nature and biodiversity are partly controlled by requirements of external certifications, and through the focus of asset managers on reporting impacts against the UN Sustainable Development goals, as well as aligning with Sustainable Finance Disclosure Regulation requirements (e.g. Article 8 and 9 investment funds).

Measuring nature outcomes for private assets relies on key performance indicators such as biodiversity net gain, soil health, carbon reduction and improvement in water quality. Carbon sequestration and nature benefits are typically modelled using standard methodology then audited by a third party. Technology plays a key role in gathering nature data, including through the use of:

- **Environmental DNA**: regular species monitoring, particularly through water samples.
- **Bioacoustics**: using audio recordings to detect presence of key species.
- **Camera traps**: data on species location, population sizes and interactions.
- **Geospatial data**: monitoring ecosystems integrity and health through spatial data.

There are often synergies between sustainable nature practices and long-term investment returns of natural capital assets. However, in practice, there can also be some trade-offs between positive nature outcomes (for instance restoring and protecting 30% of land by 2030 as set out in the Global Biodiversity Framework) and enhancing the yield from real assets such as farmland and timberland in the short-term. Improving nature data and robust disclosure of impacts and dependencies is an important step to help asset owners find the right balance between risk/return requirements and achieving positive outcomes for biodiversity and nature through natural capital investment.

Section 5: Conclusion

Actuaries and investment professionals should be aware of the key risks and opportunities related to nature, and understand some of the equity, credit, and private market solutions now available in this space. Natural capital investment spans a wide range of asset classes so actuaries and investors need to understand the key features of each asset class, both looking at risk/return considerations and in terms of the impact on nature and biodiversity. Although it is still a nascent area, there are already a range of different approaches gaining traction and growing investor interest in these solutions.

Scaling up nature markets and capturing opportunities to reflect nature's true value requires a growing market infrastructure to support transparent and integrated nature investment. Part of this involves public and private collaboration, with innovative regulation coupled with leadership from private actors. Progress also relies on clarity regarding the best measurement and disclosure structures to facilitate nature-positive investment and equitable nature markets.

Alongside using the asset allocation "lever" to tackle the nature crisis, other investment actions can and should play a key role, including engagement, collaboration and reporting on nature.

Asset owners should actively challenge whether their investment portfolios have a positive real-world impact on nature, alongside delivering an attractive risk-adjusted return that meets fiduciary responsibilities, and how their portfolios could meaningfully evolve to halt and reverse the degradation of nature. Quoting Sir David Attenborough again: **"The final chapter is ours to write. We know what we need to do. What happens next is up to us."**

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