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WORLD ECONOMIC FORUM

Investing in Natural Capital: Innovations Supporting Much-Needed Financing for Nature

INSIGHT REPORT

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Images: UpLink Top Innovators, World Economic Forum, Getty Images

Contents

Forewords

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Maintaining the balance of nature and respecting the scientifically defined safe limits is essential for preserving Earth's vital systems and sustaining humanity. The scientific community has established a clear link between nature and biodiversity loss, climate change and decline in human well-being. The interdependences span multiple systems, from agriculture and water to air quality; if not carefully managed, they will continue to have a significant impact on human health, food security and social stability as well as on biodiversity and nature. This is highlighted by the work of the Potsdam Institute of Climate Impact Research, which introduced the concept of planetary boundaries and tipping points.[1]

Scientists have assessed all of the boundaries and discovered that six of the nine boundaries have been crossed. The impacts are far-ranging, including water scarcity as precipitation patterns change, flooding as natural barriers are removed, soil degradation leading to lower crop yields, loss of pollinators or natural pest control and species depletion – and the list goes on. Weather events have become notably more extreme, with significant economic costs and lives lost. Monetary estimates vary but the consensus is that nature loss is costing trillions of dollars per year. In Europe alone it is estimated to cost 3% of GDP (€450 million) per year.

The world's natural assets include land, soil, air, water and all living organisms. These assets provide ecosystem services that are essential for human survival and economic activity, such as the provision of clean water, fresh air and fertile soil. Natural capital refers to these assets and the services they provide. The World Economic Forum estimates that paying for the use of natural capital, and protecting nature and biodiversity, could generate $10 trillion annually and 400 million jobs in the future.[2]

The challenge today is that these assets and services are rarely assigned a monetary value in the market. The fact that natural capital is not priced means that their contribution to the economy and well-being is often overlooked or undervalued, and their depletion or degradation is not being accounted for in economic decisions. Examples include the climate regulation provided by forests or the pollination services provided by bees.

Market innovations are needed to ensure that these services start to be priced in accordingly and businesses are incentivized to act to support nature restoration and protection. These can take many forms – from carbon and bio-credits to requirements in permitting processes, for example – requiring new solutions and innovations to make this a reality.

Ensuring that the loss is halted and reversed is not just an ethical imperative but a practical necessity. It underpins the health of our planet and the well-being of current and future generations. Innovation and research are essential to accelerate investments in nature, driving the scientific discovery of natural systems while developing sustainable technologies and solutions that enable scaling and impact.

Technology and innovation are critical – advances in remote sensing, artificial intelligence (AI), environmental DNA (eDNA) sampling, and bioacoustics and blockchain technologies are revolutionizing environmental monitoring and management. For example, satellite imagery and drones provide real-time data on deforestation, illegal mining and water quality, allowing for timely interventions. AI algorithms can analyse complex ecological data to predict environmental changes and optimize conservation strategies. Blockchain technology can enhance transparency and traceability in supply chains, ensuring that products are sourced sustainably. These innovations not only help preserve natural capital but also create new investment opportunities in related technologies and provide the basis to measure improvements.

Mercuria is bringing its extensive markets, financial acumen and nature-based solutions and experience to drive innovation and investment in nature restoration and protection.

Silvania, our nature investment platform, is investing an initial $500 million to restore and protect nature across the globe. This platform combines cutting-edge science, innovation and business solutions to scale ecological protection and restoration, benefitting biodiversity and local workforces, while delivering sustainable financial returns.

The work done by UpLink, the World Economic Forum's open innovation platform, to channel private finance into Top Innovators, spotlighting opportunities and raising awareness about successful and innovative ventures, will undoubtedly encourage others to invest more into natural capital. Furthermore, showcasing the role of technology and innovation in enhancing sustainability can attract tech investors and entrepreneurs to the green economy. By amplifying these success stories, we can build momentum, attract more stakeholders, and accelerate the transition towards a sustainable and resilient future.

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Biodiversity loss is accelerating at an alarming rate. Species populations have declined by 69% since 1970, with the most significant losses in Latin America and Africa.[3] More than 420 million hectares of forests have been lost in the past 30 years – an area nearly half the size of Canada's entire land mass.[4] Furthermore, ocean heating, pollution, aridification and species loss are on the rise, with 90% of marine species at risk of extinction by 2100 if greenhouse gas (GHG) emissions continue to increase.[5] These declines disrupt ecosystems, threaten human health, accelerate climate change and undermine the global economy. Addressing the biodiversity crisis, marked by a $711 billion annual financing gap, is crucial for reversing ecosystem decline and fostering a sustainable economy.[6] Innovative solutions are essential to preserve biodiversity and protect natural landscapes.

The World Economic Forum, as the international organization for public–private collaboration, is committed to protecting, restoring and regenerating our global commons to ensure a resilient society and economy. Through our Centre for Nature and Climate, we coordinate significant multistakeholder engagement to unlock greater finance for nature, with three focus areas: (1) mainstreaming natural capital in decision-making; (2) supporting the finance sector's transition to become nature-positive; and (3) championing innovative approaches to finance nature.

This report brings together insights in each of these areas to provide a clear message: investing in natural capital is essential, attractive and feasible. Economic growth today is at odds with the health of our natural world, which in turn underpins our socioeconomic well-being. Reversing our impact on natural capital and enhancing its value for future generations will be critical to our survival. In this report, we aim to showcase new ways in which technology, people and new business models are making this possible and unlocking greater finance for nature. This report has been written as a collaboration between the Nature Positive pillar of the Forum's Centre for Nature and Climate and UpLink, the Forum's open innovation platform.

The Nature Positive pillar spearheads a multisectoral movement headed by the World Economic Forum, driving economic action to halt biodiversity loss by 2030 and enable humans to live in harmony with nature by 2050 – the mission at the heart of the Kunming–Montreal Global Biodiversity Framework.[7] Through this work, the Forum is leading business and policy transformation for a nature-positive world by building the knowledge base to make a compelling economic and business case for safeguarding nature (across marine and terrestrial ecosystems), inspiring leadership to achieve nature-positive transitions in industry sectors, identifying solutions for scale in priority socioeconomic systems and unlocking financial resources through innovative mechanisms.

The Forum's work in financing for nature, including the Natural Capital Initiative, the Biodiversity Credits Initiative, 1000 Ocean Startups and 1 Trillion Trees Initiative (1t.org), has contributed to this report.

Under the Forum's Nature Positive pillar sits 1t.org – a platform for the trillion trees community, part of the World Economic Forum's efforts to accelerate nature-based solutions and set up to support the United Nations Decade on Ecosystem Restoration. 1t.org aims to conserve, restore and grow 1 trillion trees by 2030, for people, biodiversity and planet, and to mobilize greater public–private ambition to maintain and restore Earth's most precious ecosystems.

UpLink's technology-driven platform surfaces early-stage entrepreneurs and creates an innovation environment in which to drive positive systemic change for people and planet. The Forum's UpLink Innovation Ecosystem accelerates progress on the United Nations Sustainable Development Goals (SDGs) by bringing together innovators, investors, experts and partner organizations. For each of our Innovation Challenges, we select a group of winners who are then invited to join the ecosystem, which today includes more than 450 Top Innovators, 80 Top Investors and 400 ecosystem partners.

In collaboration with Mercuria, 1t.org and UpLink have been supporting the growth and scale of high-impact entrepreneurs addressing biodiversity loss. Since 2020, UpLink and 1t.org have run 17 Innovation Challenges, sourcing more than 1,500 applications and engaging with a community of over 200 "ecopreneurs". These ecopreneurs are businesses that put the environment at the core of their business model and are working on novel solutions to address nature and biodiversity loss. Thanks to its collaboration with Mercuria, in March 2024, UpLink and 1t.org launched the Biodiversity Challenge, which has selected 17 Top Innovators with leading solutions, from gamification of nature conservation to grassroots business incubators, who will receive support in scaling their ventures and deepening their impact. Some of the case studies featured in this report draw on this community.

The publication of this report is another important step in the continued collaboration between the World Economic Forum's Nature Positive pillar and UpLink. The report aims to provide a framework for evaluating how innovation can mobilize more investment for natural capital, shedding light on examples from across the globe of where such innovation has taken place, as well as examining what it will take to scale their business and investment models. Ultimately, we intend this report to showcase what is possible and what is still needed for natural capital to be mainstreamed in our economies and society. We hope you will join us in this transformation of natural capital investing, which can lead us to live in a more harmonious and prosperous world.

Executive summary

Investing in natural capital is essential, attractive and feasible.

Natural capital underpins all socioeconomic activities, but it is insufficiently valued today. Natural capital – the world's stock of natural resources – provides a range of critical benefits to humanity, from food and timber to climate regulation and cultural value. More than half of global GDP is moderately or highly dependent on nature. Despite this, the economic models that underpin business and society do not systematically account for the value of nature, creating perverse incentives to destroy natural capital at the cost of economic growth. Goods that can be extracted and traded – crops, fuels, minerals – are priced and invested in, but critical ecosystem services such as water filtration, pollination, protection from extreme weather events and air-quality regulation are not.

It is therefore unsurprising that natural capital is declining at unprecedented rates. Natural capital per capita dropped by 40% in 1992–2014, while produced capital doubled in the same period.[8] Meanwhile, most private and institutional investors remain disincentivized from investing in nature, citing concerns about financial returns and unproven business models. The burden of providing nature finance is largely left to public and philanthropic investors, despite nature-negative financial flows from the private sector being nearly three times as large as those from the public sector. Furthermore, nature-negative flows from the public and private sectors are nearly 35 times those of nature-based solutions investments.[9] This scenario of "investment-as-usual" is no longer feasible, and there is a need to redirect financial resources to *invest in* natural capital rather than *at the cost of* natural capital.

Encouragingly, innovations throughout the investing value chain are providing new incentives for private investors to invest in nature. Both the public and private sectors are rethinking how they engage with nature, moving from extractive to regenerative approaches, underpinned by a deeper understanding of the risks associated with business-as-usual. This is giving rise to new opportunities for a broader spectrum of private investors along the value chain of nature investing, from strengthening ecological evidence to making concerted efforts in market development; and from creating new tools for capital allocation through to developing projects and models with positive outcomes for nature, as well as better monitoring, reporting and verification (MRV) technologies. This report identifies innovations in four areas that are creating such opportunities:

- **Technological advances:** The convergence of emerging technologies and their application in nature monitoring is creating a vibrant "nature tech" ecosystem with new investment opportunities in start-ups around the world. These include applications of technologies such as internet of things (IoT) sensors, satellite imagery, drones, environmental DNA (eDNA) sampling and artificial intelligence (AI)-based analysis of data. Better monitoring helps generate more comprehensive and granular ecological evidence to invest in nature and enable better evaluation of project implementation.

- **Financial instruments:** New finance instruments that create markets to enhance a broad range of ecosystem services beyond traded goods are increasingly appealing to a broad range of investors, asset managers and corporates. These include new forms of venture building for nature, an emerging market for biodiversity credits, and new concepts such as nature asset companies (NACs).

- **Business models:** The World Economic Forum has previously identified more than 60 business models in a nature-positive economy that could be worth $10.1 trillion in 2030, including regenerative agriculture, ecotourism, mine rehabilitation, payments for ecosystem services, natural water supply and more.[10] Many of these business models have achieved commercial scale, provide local communities with clear incentives to shift from business-as-usual models and are creating new opportunities for investors.

- **New investors:** A combination of new technologies, financial instruments and business models has attracted new investors to the nature-investing value chain. This includes investor groups across the spectrum of capital with different mandates, including traditional asset managers, institutional investors, venture capital (VC) funds, impact investors, venture philanthropists and private-sector businesses. New nature funds are plugging a critical gap by highlighting new ideas and engaging collaboratively – a departure from the zero-sum investing of the past.

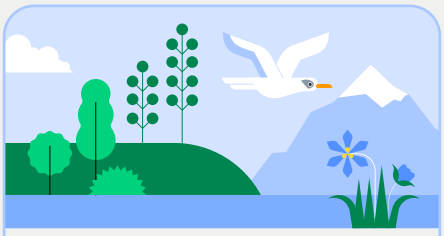
Ultimately, these innovations cannot, and will not, take place in a vacuum – an innovation ecosystem is needed to strengthen and scale their impact. Greater multistakeholder collaboration is needed in a variety of areas – the benefits of new technologies need to be distributed equitably, natural capital markets require more robust supporting infrastructure, novel business models need patience and expertise to scale, and investors need greater support to understand and develop new investment models for natural capital. This collaboration will be essential to mainstream nature in financial systems, and indeed in the global economy.

1 Understanding natural capital

Natural capital is the world's stock of renewable and non-renewable natural resources that combine to yield a flow of benefits to people.

Natural capital is critical to human well-being and socioeconomic progress. The term "natural capital" derives from ecological science; it refers to the world's stock of natural resources, both renewable and non-renewable, that yield a flow of benefits to humanity. The Natural Capital Protocol sets out concepts foundational to understanding natural capital and its benefits, outlined in Figure 1.[11] The benefits of natural capital are conceptually similar to "nature's contributions to people" (NCPs) identified by the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES).[12] The value that nature provides is indispensable to human well-being and socioeconomic progress – indeed, half of global GDP is moderately or highly dependent on nature.[13] The health of natural capital therefore directly underlies the health of the world's economies and societies.

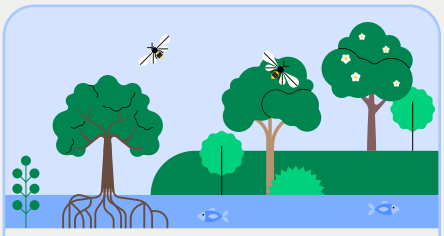
FIGURE 1 **Natural capital underpins all socioeconomic activities**



STOCKS

Natural capital

The stock of renewable and non-renewable natural resources on Earth (e.g. plants, animals, air, water, soils, minerals, biodiversity) found in ecosystems that combine to yield a flow of benefits to people



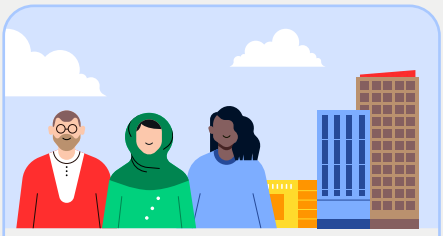
FLOWS

Ecosystem services

Benefits to people from ecosystems, such as food, timber, fibre, pollination, water regulation, climate regulation, recreation, mental health and others

Abiotic services

Benefits to people that arise from geological processes such as minerals, metals, oil and gas, geothermal heat, wind, tides and the seasons



VALUE

Benefits to business and society

Include safe habitats, reliable climate, food production, water supply, energy, good air quality, material resources, education, culture, scientific enquiry

Source: Capitals Coalition (2021)

Between 1992 and 2014 the stock of natural capital per person globally declined by nearly

40%

while produced capital per person doubled, and human capital per person increased by 13%.

Current economic models have encouraged growth at the cost of natural capital. As natural assets have been valued and traded for millennia, particularly in the agricultural, fisheries, forestry, mining and other primary sectors, governments and businesses have traditionally viewed "natural capital" as resources that can be cultivated, extracted, assigned financial value and traded. However, the full value of natural capital extends far beyond that captured by the price of such goods, including critical contributions to climate regulation, water quality, pollination, air filtration, safe habitats, genetic diversity, education, cultural value and scientific value, among many others. These more diverse benefits are largely considered as "free" inputs in the production process without any clear economic incentives for their protection, maintenance or enhancement. Any negative consequences are viewed as environmental "externalities", the responsibility for which accrues to communities, not individual organizations.[14] Consequently, in a global economy that prioritizes profits and cost efficiency for traded goods and services, natural capital is not prioritized in decision-making, despite its critical benefits.

As a result, natural capital is in severe decline today. The "Great Acceleration" of the past century has brought significant economic benefits and advances for human health but has come at significant cost to natural capital.[15] The Dasgupta Review by Sir Partha Dasgupta, *The Economics of Biodiversity*, estimated that between 1992 and 2014 the stock of natural capital per person globally declined by nearly 40%, while produced capital per person doubled, and human capital per person increased by 13%.[16] The United Nations Environment Programme's *State of Finance for Nature* estimates that nature-negative financial flows totalled nearly $7 trillion in 2022, including $1.7 trillion of harmful public subsidies primarily in agriculture and energy and more than $5 trillion in private-sector impact, particularly from primary and secondary sectors.[17] Business-as-usual is clearly no longer feasible.

There is a significant shortfall in the investment needed to reverse this situation. The nature-positive economy requires $2.7 trillion of annual capital investment through to 2030,[18] but investment today falls well short of this target. As an example, annual required investment in just the portion of finance needed for nature restoration and conservation – $542 billion through to 2030 to meet global biodiversity targets – lags by $342 billion annually.[19] In a similar analysis, the Paulson Institute estimates that the nature-finance gap may be significantly higher – an average of $711 billion annually.[20] In recognition of the nature-finance challenge, the Kunming–Montreal Global Biodiversity Framework (GBF) outlined a goal of mobilizing an additional $200 billion per year by 2030 for biodiversity from domestic, international, public and private sources, via Target 19.[21] However, this still leaves out the trillions of dollars required to scale nature-positive business models in agrifood, the built environment and extractives systems. Investment-as-usual, similarly, is no longer feasible.

The average annual nature finance gap is estimated at

$711

billion through to 2030.

The public sector is nature's primary investor today. The public sector provides the most funding for protecting, restoring and enhancing nature – around 82% of total financial flows or $165 billion annually.[22] Governments, multilateral development banks (MDBs) and intergovernmental organizations have a clear incentive to invest in nature to protect the benefits it provides to society, as well as to support the communities that depend on nature for their lives and livelihoods. While economic development policy has typically allocated significantly higher funding to development areas that contribute to traditional notions of economic growth, such as education, healthcare, trade, urbanization and industry, there are encouraging signs that nature is now receiving a "seat at the table". Ministries of agriculture, planning, development and environment and finance have increasingly been working together to mobilize greater public finance for nature. For instance, a number of countries and entities including China, the European Union and Japan have recently submitted their National Biodiversity Strategy And Action Plans (NBSAPs) in the run-up to United Nations Convention of Biodiversity (CBD) Conference of the Parties (COP) 16 from 21 October to 1 November 2024, which incorporate elements of multi-ministerial collaboration to generate greater finance for nature.[23] The emergence of green business units within ministries, as well as those working on green taxonomies, allows for the required enabling conditions to generate more financing for nature. For instance, Sri Lanka's Central Bank released its Green Finance Taxonomy in 2022, to enable financial markets to raise greater capital for investments in climate and nature activities.[24]

Incentives for other investors to invest in nature have typically been less clear. Nature restoration and protection has emerged as an adjacent priority for philanthropic investors over the past decade, as a result of climate-related investments in vulnerable communities. However, the share of investment remains small – philanthropic finance for climate mitigation represented less than 2% of the estimated $810 billion of donations in 2021 – well behind economic development, health, education and community development.[25,26] Meanwhile, private finance flows to nature are very limited – estimated at just $35 billion in 2023. This is a fraction of private markets, which exceed $10 trillion globally, and a far smaller proportion still of global equity and fixed-income instrument markets that exceed $100 trillion each.

Several barriers have been cited that prevent private capital flow to natural capital. First, given the nature of public goods, there has been little motivation and few "pull" factors that draw private investors to invest in what is seen as part of a global commons and a resource to be used (an input), rather than something to be invest in and receive a benefit from (an output). Second, typical reasons include a perception of "poor" return profiles for nature-based business models relative to traditional business models – largely because natural capital remains unpriced in the economy – the smaller ticket size of individual investments in restoration or protection projects, and the significant time required for such investments to provide returns. Third, the fact that data on natural capital does not appear on balance sheets or factor in public-sector decision-making processes and is not systematically valued in economic systems means that the costs associated with nature degradation are not priced in and the benefits of keeping nature intact or even maintaining it in an improved condition are not being included in calculations, as they should.

Encouragingly, there are signs that the incentives for private investors to invest in nature are strengthening. Over recent years, even among high-rate environments, larger volumes of capital are being deployed towards natural capital solutions. Innovation is playing an important role in providing new opportunities for capital to flow to and for nature.

It is clear that multiple levers need to be addressed for more investment to flow to natural capital. The next section focuses on innovations that are giving way to this emerging, positive trend for more capital to flow to natural capital, while recognizing that there are other important aspects including regulation and policy, accounting and pricing mechanisms, among others that will also need to be pursued in parallel to achieve a more nature-positive vision for the world.

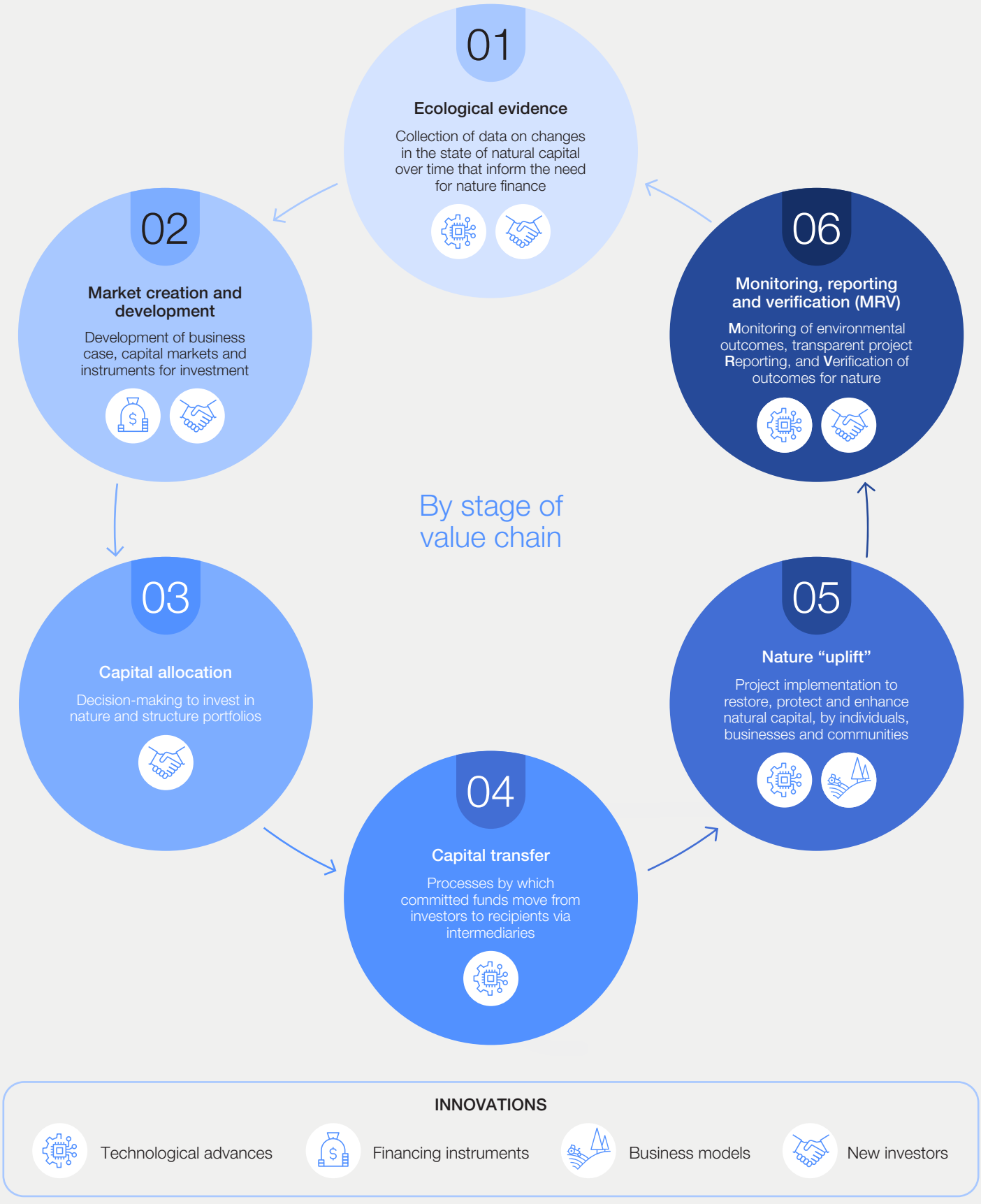
2 Unlocking finance for natural capital

Innovations in the nature-finance value chain are creating momentum for greater private investment in natural capital.

The term "innovation" suggests renewal as well as the creation of something new. The term comes from the Latin *innovatio*, which derives from *innovare*, meaning to introduce something new, renew, restore or return to a previous state. It can denote the act of either doing something new or of doing something old in a new way. In the case of natural capital, it is important to consider innovation across this spectrum of not only doing something new in terms of approach or technology but also of renewal of practices (such as those based on Indigenous wisdom and knowledge) and of ways in which nature can regenerate itself. While this report focuses on those aspects that are largely new and on commercial business models, there are equally important actions that can be taken from traditional practices and wisdom, which are not fully covered here.

Innovations throughout the nature-investing value chain are improving incentives for private investors. To identify where this is happening, these innovations are classified as: 1) technological advances; 2) financing instruments; 3) business models; and 4) new investors. These are captured in Figure 2 and explained in detail in this section.

FIGURE 2 | **Innovations across the nature investment value chain**



Source: World Economic Forum

2.1 Technological advances

The convergence of emerging technologies, and their application in nature monitoring, is creating new investment opportunities in start-ups around the world.[27,28] Figure 3 captures this "nature tech" start-up ecosystem in greater detail. This environment is underpinned by a range of new technology applications in nature monitoring that generate more comprehensive and granular ecological evidence of the need to invest in nature, and enable better evaluation of the projects being implemented. These include the application of technologies such as IoT sensors, satellite imagery, drones, eDNA sampling and AI-based analysis of data.[29] IoT sensors provide continuous in-situ data on ecosystem health, while satellite imagery offers comprehensive landscape analysis.

eDNA helps track biodiversity by detecting genetic material in environmental samples. AI enhances data analysis, enabling predictive conservation efforts, and drones facilitate detailed, localized monitoring of hard-to-reach areas. These technologies are becoming more affordable and precise, and their applications are collectively enhancing the real-time accuracy, efficiency and scope of natural capital health monitoring and the transparent verification of results from projects designed to restore ecosystems. The environmental data harnessed from these technologies, when combined with data on commodity production and supply chains, is also supporting businesses to better understand and report the environmental impact of their supply chains.[30]

FIGURE 3 **Convergence of nature and technology has given rise to a vibrant start-up environment globally**

Note: The above mapping is not an exhaustive list and many of these start-ups are working across multiple value chain stages; it includes start-ups that have been selected as UpLink Top Innovators in the past two years and those that have an explicit technological component.

Source: UpLink, World Economic Forum

Despite these rapid advances, there remain areas for improvement. Ensuring that these technologies and tools are relevant, accessible and affordable for all stakeholders, particularly in biodiversity-rich regions, remains a challenge. Additionally, integrating these technologies into policy and strategy can be complex and requires ongoing collaboration between the public and private sectors. Continued innovation and cross-sector partnerships will be needed to fully realize the potential of technology in advancing nature finance.

Interestingly, technological advances observed in other fields could further improve the nature-finance value chain. Experts note that capital transfer from investors to project developers and communities has historically faced efficiency challenges due to the involvement of multiple intermediaries, manual reconciliation and a lack of transparency, causing delays and increased costs. In development finance more broadly, blockchain technology and smart contracts are increasingly being used to solve similar challenges – these are essentially self-executing contracts that automate and secure transactions based on the terms of project agreements.[31,32,33] Deploying such innovations in nature finance could streamline capital transfer and promote greater investor confidence, enabling quicker deployment of funds to projects.

2.2 Financing instruments

In recent years, new instruments have emerged to give private investors more options to participate in nature finance. While sustainability-linked bonds and loans have somewhat matured, many new instruments are based on the valuation of specific natural capital assets and ecosystem services that together improve outcomes for nature, including land, water rights and attribution for positive outcomes in carbon removal and biodiversity. These are "packaged" in the form of direct investment in companies or landowners that have rights on the underlying ecosystems, including nature asset companies (NACs),[34] nature equities[35] and insurance products that create incentives to protect ecosystems and avoid losses from extreme weather events and investments in early-stage ventures in agriculture.[36] They can also be channelled via indirect instruments that enable investors to contribute to projects that restore or protect natural capital, including carbon and biodiversity credits.[37] Figure 4 presents a snapshot of these new instruments, contrasting them with typical instruments of relevance for public and philanthropic investors.

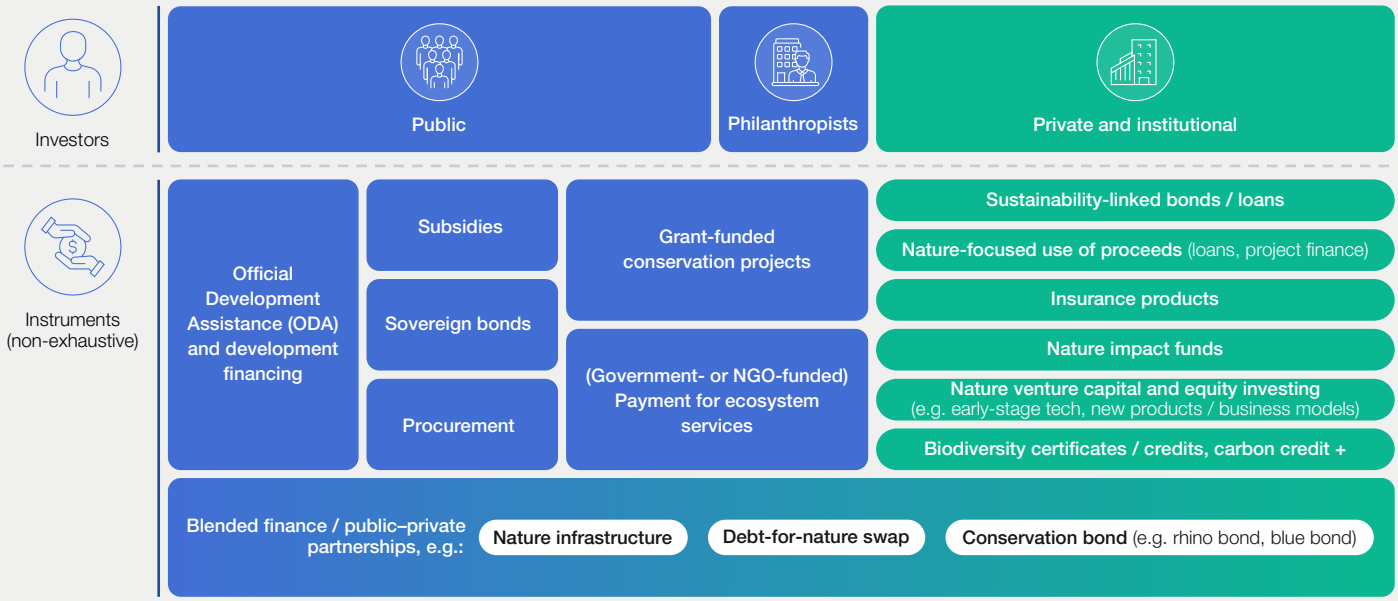
> Natural capital accounting and valuation provide a conceptual 'bridge' between the worlds of ecology, economics and finance, and conceptualize natural capital assets as conventional goods worth restoring, maintaining and enhancing for their productive value.

These instruments are also increasingly benefitting from robust natural capital accounting and valuation to support accurate and transparent pricing. Natural capital accounting and valuation provide a conceptual "bridge" between the worlds of ecology, economics and finance, and conceptualize natural capital assets as conventional goods worth restoring, maintaining and enhancing for their productive value.[38] Natural capital *accounting* is the process of recording physical changes in specific natural assets or resources over time, including land, water, carbon stocks and forests, and, by extension, recording the flow of benefits these assets provide within specific time frames. Natural capital *valuation* converts physical environmental accounts and flows of benefits to decision-relevant metrics of value to the organization conducting the accounting, using a variety of economic techniques, including monetary equivalence to facilitate comparison with financial data. Together, these processes can provide a clear picture of nature's current and future value and underpin investments in this value.

Critically, these instruments aim to solve challenges that have hindered private-sector finance for nature. They can aggregate smaller nature-related projects that typically would not receive investment due to the smaller market size and be transacted through exchanges and analogue instruments such as equities that provide investors with greater familiarity. "Catalytic capital" (also referred to as concessionary finance or patient capital) from philanthropists and the public sector in the early stages of market development for blended finance instruments also plays a critical role in derisking the involvement of private-sector investors and can help provide reliable returns.

However, the capital markets infrastructure that supports these new financing instruments for nature remains underdeveloped. There are several key areas for development, including clear rules and fiduciary responsibilities that enable public or private placement, transparent pricing and listing on exchanges, and independent audit and verification of underlying projects to ensure robust accounting and genuine outcomes, especially in biodiversity-rich regions.

FIGURE 4 | **The spectrum of nature finance instruments**



Source: Adapted from World Economic Forum and Oliver Wyman (2024)

2.3 Business models

The *Future of Nature and Business report* identifies 60 nature-positive business models across three key socioeconomic systems that could collectively be worth

$10.1

trillion in additional business value by 2030.

Innovations in business models that support the protection and restoration of natural capital are making nature finance a more attractive proposition for private investors. The World Economic Forum's *Future of Nature and Business report* identifies 60 such models across three key socioeconomic systems that could collectively be worth $10.1 trillion in additional business value by 2030.[39] Key models that directly promote protection and restoration include organic food and beverages, ecotourism, micro-irrigation, sustainable fisheries, agroforestry, mine rehabilitation, sustainable forestry management, payments for ecosystem services (i.e. compensating landowners or communities for maintaining or enhancing ecosystem services, such as clean water, carbon sequestration or biodiversity, to offset environmental impact), non-timber forest products and community-based natural resource management (CBNRM). Key nature-based infrastructure models are also being developed, centred on the use of nature to provide solutions that human-made infrastructure would otherwise provide, including wetlands and glaciers for natural water supply, forests and urban green spaces for air purification and cooling, and coastal ecosystems for shoreline protection.[40]

Many new approaches successfully layer multiple income streams for communities to ensure long-term economic viability. For instance, "bundling" multiple business models has proven successful in providing farmers and local communities in tropical forest regions with appropriate incentives to switch away from deforestation-heavy commodity production. These include agroforestry, non-timber forest products, ecotourism and carbon revenue streams.

While these business models successfully integrate financial returns and ecological impact, they vary to some degree on the levels of commercialization today. Some of the more nascent business models, including in sustainable agriculture, face stiff competition from "business-as-usual" practices that can be more profitable in the short term for a variety of reasons. The lack of externality pricing, as outlined in Section 1, is a key issue – past research has highlighted that placing a value on the true cost of nature could make nature-positive business models significantly more attractive. For instance, the value of top business opportunities associated with the SDGs rises by 40% by simply removing harmful subsidies and repricing three factors for which reliable data is available – carbon, water and food.[41]

Other critical barriers to scale include poor access to markets, limited technical assistance to local communities, limited access to finance, challenging enabling infrastructure for clean electricity and sustainable inputs, and a lack of strict enforcement of environmental regulation related to illegal deforestation and mining.

Ultimately, greater finance, better technology, supportive policies and multistakeholder collaboration are needed to scale these models and unlock their full value. For a new nature economy to become mainstreamed, further support across the public and private sectors and civil society is needed to ensure alignment of incentives and a conducive operating environment for innovation to flourish. Patient capital in the early stages of business maturity, matched with technical expertise, are critical to ensuring that new business models survive and thrive.

2.4 New investors

> A new nexus of ecologists, technology innovators, entrepreneurs and finance experts are together expanding the reach and relevance of nature finance to investors throughout the global economy.

A combination of new technologies, financial instruments and business models has given rise to a number of new investors in the nature-investing value chain. This nexus of ecologists, technology innovators, entrepreneurs and finance experts are together expanding the reach and relevance of nature finance to investors throughout the global economy. This includes institutional investors such as pension and endowment funds as well as large asset managers who typically seek long-term, resilient investments; VC funds and private-equity investors who seek to invest in early-stage start-ups; and impact investors and venture philanthropists who provide catalytic or patient capital. Prominent examples of nature funds that draw in private investors and have been developed in recent years include the Mirova Natural Capital (MNC) Fund under Natixis Investment Managers,[42] the Meloy Fund for Sustainable Community Fisheries managed by Rare,[43] Patagonia's Tin Shed Ventures[44] and Home Planet Fund,[45] HSBC's Pollination/Climate Asset Management joint venture,[46] the Nature Conservancy's NatureVest impact investment fund[47] and AXA Investment Manager's Natural Capital Strategy fund.[48]

FIGURE 5 | **The new nature investor nexus**

Public — Blended and patient capital — Private

National and regional governments

Multilateral development banks

ADB, AIIB, CABEI Central American Bank for Economic Integration, European Investment Bank, European Bank for Reconstruction and Development, IDB, IsDB, NDB, The World Bank

Intergovernmental organizations

GGGI, gef, Green Climate Fund, IFC, IPBC, IUCN, United Nations

Central banks and supervisory bodies (enablers)

Family offices (excludes angel investors)

Bluerain Partners Group, Builders Vision, Kaltroco, Naia Trust, RS Group, Rumah Group, Silverstrand

Venture building and venture philanthropy*

AMAZ aceleradora de impacto., Barka, brainforest Venture Platform, C Minds, Deep Science Ventures, Flora, Amazon Investor Coalition, Mutual Empathy, Fresh Ventures Studio, Fundo Vale, Social Alpha, terratai, Third Nature, Latimpacto

Foundations and philanthropy

Bezos Earth Fund, Good Energies, Gordon and Betty Moore Foundation, Innovate 4 Nature, Home Planet Fund, re:wild, Open Society Foundations, Rohini Nilekani Philanthropies, Schmidt Marine Technology Partners, Sea Forward, Tata Trusts, Temasek Foundation, The Rockefeller Foundation, The Habitats Trust, UBS Optimus Foundation

Civil society

Conservation International, Ocean Born, Ocean Community, Oceanhub Africa, Rewilding Collective, The Nature Conservancy, blue, WWF, World Resources Institute

Venture capital and private equity

Logos Capital, Astanor, Where tech meets nature, At One Ventures, AquaSpark, Azolla Ventures, Bregal Milestone, Campo Capital, Cerulean Ventures, Criterion Africa Partners, ECBF European Circular Bioeconomy Fund, EcoEnterprises Fund, EQT, impact+earth, IIX Impact Investment Exchange, understorey, KPTL, Moringa, Katapult, Nucleus Capital, planetA Ventures, Potato Productions, Prelude Ventures, AENU, Propeller, ReGen Ventures, Sand River, Sudlich Capital, Superorganism, SWEN Capital Partners, Symbiotic Projects, Systemiq, s2g ventures, tinshed Ventures, The Meloy Fund, The First Thirty, aiim, Ternel, Triton, 2150

Asset managers

asn impact investors, Climate Asset Management, CVC, DWS, Eurazeo, Federated Hermes, Fidelity International, generation, Gresham House, La Financière de l'Échiquier, Lombard Odier, Manulife Investment Management, mirova Responsible Investing, New Forests, nuveen Natural Capital, Ofi invest, Permira, redwheel, Robeco We are Sustainability Investing., Schroders, sWc The Shared Wood Company, SwissLife, Tikehau Capital, Temasek, UBP

Banks and debt providers

ABN·AMRO, BNP Paribas, Calvert Impact Capital, DBS, eco business Fund, NESST, Rabobank, &Green

Insurance

AXA, Swiss Re, Zurich

Pension funds

ABP, apg, CalSTRS, CDPQ, CPP Investments, pka, PensionDanmark

Corporates

Citi, BASF We create chemistry, Mercuria, Microsoft, Mitsubishi Motors, Petronas, salesforce, T-Mobile

Central banks and supervisory bodies (enablers)

*Includes incubators and accelerator programmes

Note: The investors listed are non-exhaustive, and the key selection criterion is that they have explicit public material stating investment in nature. Corporates listed comply with the prior and have also invested in at least one UpLink Top Innovator.

Source: UpLink, World Economic Forum

Nature investment volumes are increasing in the face of difficult macroeconomic headwinds. For example, even given the general slowdown in VC markets in 2023, the "nature tech" sector experienced significant growth, with investments rising by 18%, deal volume increasing by 27% (particularly in early-stage ventures, which grew by 35%) and a more even distribution across various sectors and regions.[49] This trend extends across the spectrum of capital from philanthropic capital to pension funds.

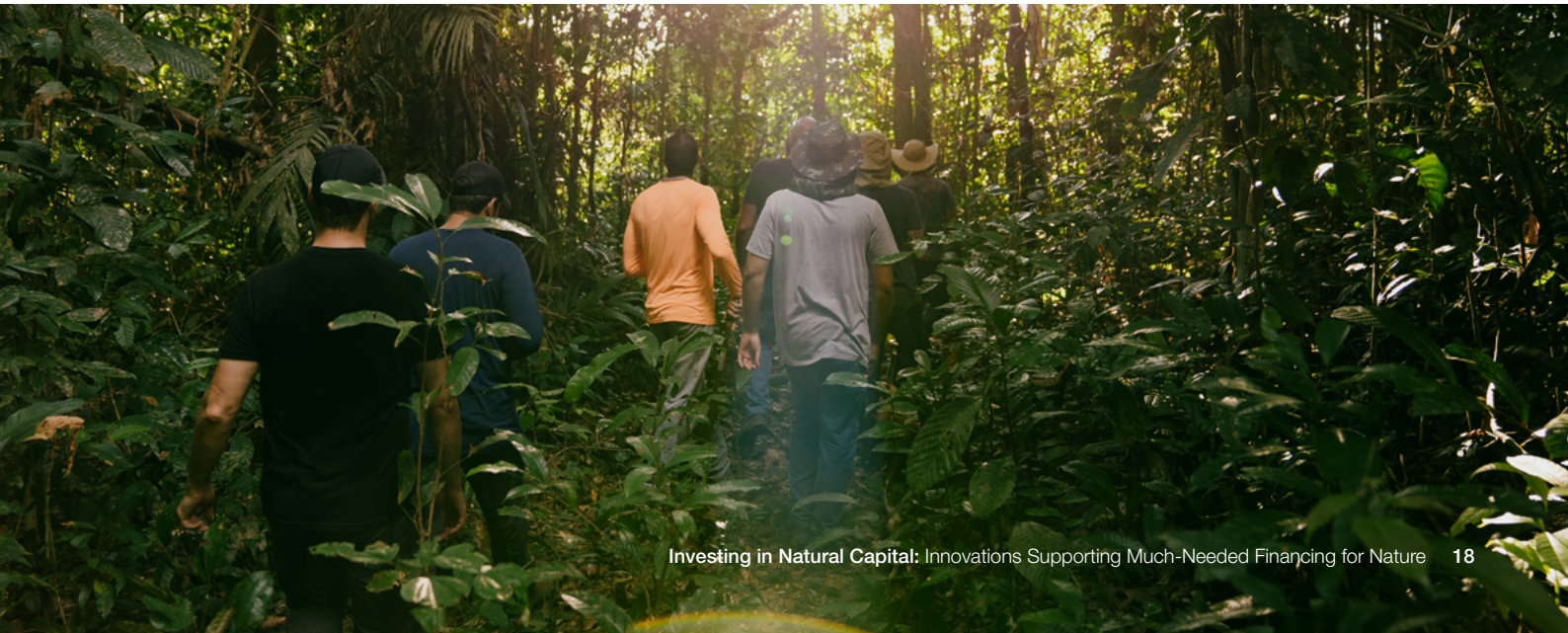
Furthermore, private-sector businesses beyond the finance sector are also increasingly involved in the nature-finance value chain. This includes sectors with a significant exposure to natural capital, including agriculture, mining and forestry, but also those that directly affect nature through their value chains, including food and beverages, consumer retail and manufacturing. This shift reflects the emerging need for compliance and voluntary disclosure, including via the Taskforce on Nature-related Financial Disclosures (TNFD), which encourages businesses to evaluate their risks and dependencies on nature and in turn identify opportunities to improve their environmental performance.[50] It also reflects the economic opportunity that shifting to nature-positive business models brings, including access to new markets, customers and resilient growth.

New investors are also spurring demand for an enabling ecosystem of actors to support investments in nature. This includes professional service firms that advise investors on nature investment strategies and recommend specific investments, audit and assurance firms that perform due diligence on investments and assess the quality of reporting and disclosures, and standards bodies and stock exchanges that provide disclosure and accounting standards. These organizations play an important role in bringing expertise, trust and transparency to nature investments.

The influx of new investors and the environment surrounding them helps address several key challenges in the nature-finance value chain. First, many are combining investment with technical expertise in nature tech, regenerative agriculture and carbon markets, among other areas. Second, investors are funding a broader range of businesses, ranging from seed finance all the way through to latter series financing and even public businesses. Third, a culture of collaboration is deeply embedded in the teams behind these new funds, providing a platform for new ideas and better decision-making.

However, there remains a need for more patient capital and more appropriate valuation of natural capital across the economy. First, while new investors are meaningfully contributing to closing the nature-finance gap, the majority of investors retain shorter time horizons for returns than is suitable for nature-based business models. This applies particularly to early-stage businesses and projects that actively incorporate elements of ecosystem restoration and protection. Experts have cited that such models typically require seven to eight years before generating positive returns for investors while traditional investment models aim for target returns within four to five years. More patient capital is needed to support such projects and businesses, both from existing sources and through better management of traditional investor expectations. Second, until natural capital is more comprehensively priced within economic models, so that investments that rely on nature's degradation are more appropriately costed, it will be difficult for nature investments to compete with returns achieved through destructive activities. Financial models used by investors still need to be adjusted to take into account the real costs, risks, dependencies and opportunities related to investments that rely on a healthy and stable planet to be profitable and impactful.

The next section explores some of these innovations in greater detail using case studies and spotlighting the pioneers who are contributing to a vibrant and investible nature-finance environment.



3

Spotlighting innovations in natural capital

The nine case studies in this section bring innovations in the nature-investing value chain to life.

Case studies

CASE STUDY 1

Nature data aggregation

Value-chain areas	Ecological evidence, MRV
Innovation areas	Technological advances, new investors

Companies offering biodiversity monitoring tools and technologies and data aggregation are emerging – enabling better decision-making and more capital to flow to nature. On the front end, nature data provides the ecological evidence for baseline analyses and gives a clear picture of the state of nature. On the back end, as MRV, this data provides project developers, investors, financial institutions and other key stakeholders with the confidence that outcomes have been truthfully and rigorously achieved. These technologies can enable a new nature economy to thrive, if used in a way that is cost-effective and globally scalable, and can solve a key challenge that stands between rhetoric and action. Tools that are applicable only locally can help only with that locality; thus, to scale investment in nature, these companies need to be able to operate anywhere in the world where investment is needed (which is just about everywhere).

One such example of an emergent biodiversity data and analytics company is Pivotal. Based in the UK, Pivotal is recognized for its innovative approach to aggregating data from diverse ground-level and remote monitoring sources. By bridging the biodiversity data gap, the company provides highly localized, ground-verified and auditable insights into the state of nature, with applications spanning corporate disclosures, natural capital asset management, conservation, supply-chain monitoring and commodity certification. The company's technology platform integrates various monitoring tools, including drones, acoustic sensors, camera traps, smartphones, high-resolution cameras, eDNA and satellites, coordinated through algorithmically designed sampling plans to ensure robust and unbiased data collection. Pivotal also facilitates community-led data collection through in-field training, a smartphone application and on-site surveyors, empowering local communities. Since commercializing the business in 2023, the company has progressed to monitoring and reporting on biodiversity for a FTSE 15 fast-moving consumer goods (FMCG) company, one of Europe's largest energy companies, a European asset manager with assets under management (AUM) of more than $150 billion and one of Asia's largest forestry and paper companies – and its data will soon be included in public disclosures by TNFD early adopters.

One of Pivotal's innovations lies in its clustering and local models (CaLM) approach, which uses machine learning to create highly accurate, locally tuned models for species detection and identification. CaLM ensures precise, locally specific data processing and sample selection, while also enabling global scalability. Pivotal's identifications undergo rigorous quality control by a global network of ecosystem experts, combining AI's efficiency with human expert knowledge to create an auditable system that generates highly accurate biodiversity data on a large scale. Its peer-reviewed analytics methodology transforms this data into comprehensive, science-based metrics for tracking and aggregating biodiversity changes over time. Pivotal can then link measured biodiversity gains to a variety of financial mechanisms, and support strategic decisions such as capital allocation and management, and nature action planning, enabling money to flow to those activities where it has the greatest impact. Ambitious and forward-thinking impact investors – such as AENU, one of Pivotal's investors and an UpLink Top Investor[51] – provide the much-needed capital to support these early-stage nature data solutions.

Scaling nature data solutions will depend on three important factors: (1) whether the data answers key questions that underpin strategic business and nature decisions; (2) cost competitiveness; and (3) clarity on data ownership and community involvement. First, there is a need to refine existing business models to align with market need. Nature data and analytics are useful only if they generate insights that guide a corporate, investor or other actor in taking decisions that affect business success and nature outcomes. Second, as there are varying costs associated with different technologies and approaches, there will need to be a careful balance between a race to the bottom and maintaining high-quality, auditable and up-to-date data. All nature data has gaps and uncertainties because biodiversity is naturally variable; the important thing will be to make sure it is clear where those uncertainties lie, and what that means for making appropriate decisions. Lastly, as these technologies seek to improve decision-making for nature and people, it is critical that the correct guardrails and ownership and governance structures are in place to ensure community buy-in, involvement and long-term benefit. It is people – living and depending on nature – who need ultimately to see the benefits from changes taking place based on the data collected and analysed.

CASE STUDY 2

Marine restoration assets

Value-chain areas	Ecological evidence, nature "uplift", MRV
Innovation areas	Technological advances, business models, new investors

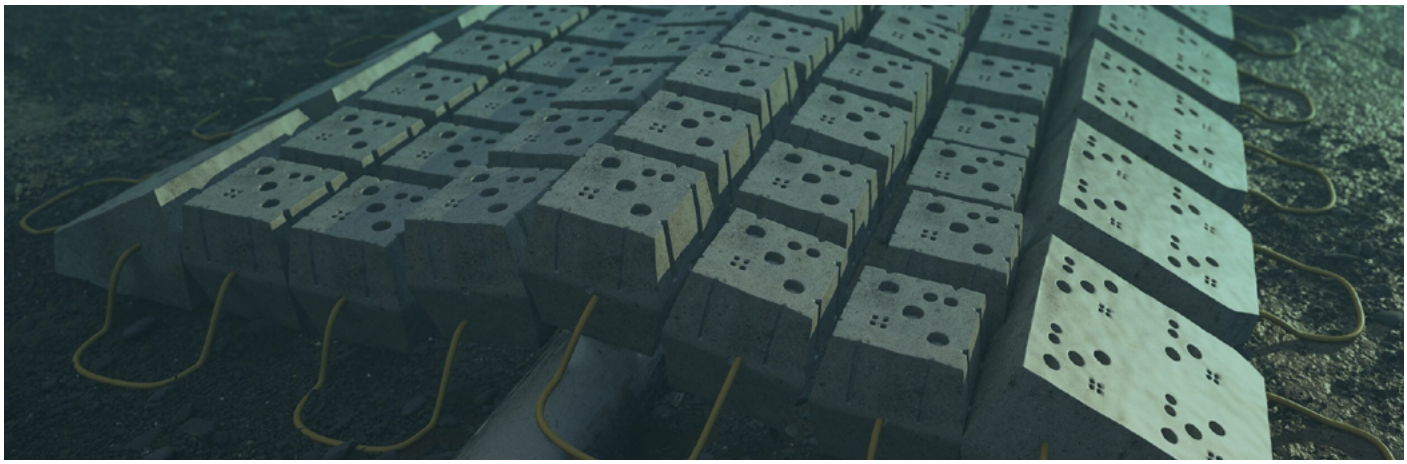
New companies are transforming industrial assets to be net-positive for the environment, turning potential ecological liabilities into assets. In the burgeoning field of green industries, the challenge of balancing development with environmental conservation is ever-present. While a key component in the transition to renewable energy, offshore wind farms require extensive hard infrastructure that can disrupt marine ecosystems. However, a new wave of companies is emerging with innovative solutions designed to not only mitigate these impacts but also enhance biodiversity and natural capital, potentially tapping into carbon and biodiversity credit markets.

One such company leading this charge is ARC Marine, a UK-based scale-up that makes artificial reefs out of recycled materials. ARC Marine designs, builds, installs and monitors reef cubes® that support marine biodiversity around infrastructure such as cables, jetties and offshore turbines/platforms. These reef cubes®, the company's flagship product, are carbon-neutral, plastic-free structures made from 98% recycled materials and designed to replace harmful construction materials traditionally used in offshore developments. The "reef cubes®-in-a-box model" offers a scalable solution that can be easily deployed near marine construction sites worldwide, promoting nature-inclusive design that results in habitat creation and increased biodiversity. To date, the company has installed more than 1,300 reef cubes in three different countries across Europe, has repurposed more than 620 tonnes of by-product material and has created more than 3,400 square metres of new marine habitat.

The company has garnered notable recognition and investment, highlighting the growing interest in nature-positive infrastructure. In 2022, ARC Marine won RWE's Innovation Ecology Award for its potential to enhance the environment around offshore wind installations. This accolade led to a research and development (R&D) partnership with RWE to potentially install 40,000 reef cubes® around a wind farm in the UK, demonstrating the practical application and scalability of the solution. Moreover, ARC Marine secured funding from Mercuria's nature-based investment platform, Silvania, which was part of a £2 million funding round. This investment underscores the financial viability and growing market demand for green infrastructure solutions.

ARC Marine aims to be among the first to offer joint carbon and biodiversity credits in the marine environment. This secondary business model uses the ecological benefits of the company's installations to generate environmental credits, providing a new revenue stream that can attract investment. To ensure that the biodiversity gains are quantifiable and verifiable, ARC Marine employs advanced monitoring technologies, including eDNA analysis, remotely operated vehicles (ROVs) and a proprietary long-range underwater video system (LRUV). These technologies enable the company to provide rigorous, science-based assessments of the ecological impacts of its projects.

Scaling up businesses such as ARC Marine that target the capex-intensive infrastructure market requires engagement with strategic customers to advance paid pilot projects and advocating for policy and regulatory frameworks that support nature and biodiversity-positive business models. First, given the large capex need, securing client contracts is essential to reduce investor risk and showcase the growing desire for green infrastructure solutions. Second, strong policy and regulatory environments can provide the right incentives for green infrastructure to look for solutions like that provided by ARC Marine to repair damage to marine ecosystems and generate nature-positive benefits to project sites. Ultimately, the right mix of enabling environment and clear demand from industry can pave the way for larger pools of capital to finance these types of infrastructure solutions.



CASE STUDY 3

Grassroots accelerators for nature enterprises

Value-chain areas	Market creation and development, capital allocation, capital transfer, nature "uplift"
Innovation areas	Business models, new investors

Grassroots accelerators help build resilient nature enterprises by empowering Indigenous people and local communities (IPLCs). In addition to offering access to networks, infrastructure and business mentorship, grassroots accelerators differ from traditional accelerators in their hyper-local focus, and their centring of IPLCs as effective stewards of their own lands. In providing the necessary services and resources to help grassroots organizations and rural enterprises become financially self-sufficient, these accelerators ensure that the monetization of activity based on access to common-pool resources is done in a manner that sustains livelihoods, but also ensures continued future access to non-substitutable components of natural capital.[52] The importance of grassroots buy-in as a key enabler of project success is increasingly evident in decision-making regarding investing in nature.

GroundUp Conservation is one such grassroots accelerator operating across the Western and Eastern Himalayas, the grasslands of Central India, the Western Ghats in western India, and the Terai Belt in India and Nepal. It supports grassroot organizations and small-scale informal enterprises to formalize through business advisory and technical capability-building, employing a six-step process designed to help the enterprises achieve financial independence and realize their commitment to conservation, well after GroundUp's exit. Working at the intersection of conservation and livelihoods, GroundUp co-develops interventions with IPLCs, ensuring that traditional knowledge is integrated into the implementation of landscape restoration and conservation, sustaining enterprises such as ecotourism and non-timber forest-product processing. These projects are packaged as part of an impact investment portfolio, providing a bridge for GroundUp's extensive network of philanthropic, government and development agency partners to directly finance and engage with grassroots organizations.

GroundUp's bottom-up approach sets it apart from other large project developers operating without an exit strategy that primes IPLC-led nature-based enterprises for long-term success. Support is offered until an enterprise is generating revenue, with the concessional capital flowing through GroundUp, which derisks projects and paves the way for more traditional forms of capital to step in post-GroundUp support. It is a model that helps break the chain of donor dependence, with enterprises empowered to improve local livelihoods, reinvest profits back into nature and ensure that conservation action is sustained in perpetuity.

Less than 2.1% of global funding reaches grassroots communities, despite their importance in stewarding a significant portion of the world's biodiversity resources.[53] Scaling nature-based enterprises and unlocking greater flows of capital for grassroots initiatives, especially in the developing-country context, will require progress on the following: raising the profile of biodiversity loss as a risk to society and economy; spotlighting the success of IPLC-led initiatives in creating effective pathways for the recovery of biodiversity; and strengthening the network of government, corporate, development and civil-society agency partnerships supporting grassroots initiatives. To build these new partnerships and alliances with grassroots initiatives requires long-term commitments and the involvement of local communities – so that communities are not seen as beneficiaries but as active decision-makers and participants – and appropriate benefit-sharing mechanisms to be in place. GroundUp hopes to advance action on these issues through a proposed grassroots-to-grassroots platform, featuring lessons learned from enterprises it has accelerated, with the intention of spurring the development of more nature-based enterprises across the region.

CASE STUDY 4

Venture building for nature

Value-chain areas	Market creation and development, capital allocation, capital transfer, nature "uplift", MRV
Innovation areas	Financial instruments, business models, new investors

"Venture building" for nature[54,55] is an investment model that involves creating and nurturing new enterprises that focus on protecting, restoring and enhancing ecosystems until they are able to access institutional capital. A venture-building platform typically invests in early-stage start-ups with nature-positive business models, including but not limited to regenerative agriculture, sustainable fishing, coastal restoration and payments for ecosystem services, and supports them to scale, commercialize and become profitable. This not only helps to attract greater flows of finance for natural capital, but also creates economic opportunities for local communities. Venture building can attract investment from diverse sources, including impact investors, development finance, venture capitalists and private-equity investors, large asset managers and institutional investors.

Terratai is an emerging example of venture building for nature – Asia's first such company. Terratai works with early-stage companies in Indonesia with the potential to address systemic challenges within food systems that are driving ecosystem degradation and biodiversity loss, and which could be scaled across the Asia-Pacific region. It provides such businesses with a blend of services including access to early-stage finance (e.g. working capital loans or equity); tailored company-building services including business development; and deep expertise on nature-based solutions, provided by experts with relevant conservation expertise. Investments include companies such as Forestwise, which harvests, produces and distributes illipe butter, a more sustainable and traceable alternative to cocoa butter.[56] Terratai also supports businesses involved in ecosystem restoration (e.g. of forests, reefs and mangroves) and enhancing ecosystem values (e.g. forest health, nature credits, "blue" carbon). The investors with which Terratai works include a mix of development financiers providing technical assistance and grants, impact investors, traditional investors and venture philanthropists. The blended finance approach, combined with the close venture-building engagement of the Terratai team over several years, helps derisk private-sector investment in early-stage ventures, and ultimately helps to build the next generation of investable nature-focused companies. Partners and supporters include the RS Group, UBS Optimus Foundation, the Swiss Re Foundation and Indonesia's Sustainable Districts Association (LTKL).

Terratai's venture-building model for nature is considered innovative for many reasons. First, its investment model is highly localized and built on significant knowledge of Indonesian food, land and ocean-use systems. Each venture is also put through rigorous due diligence processes, where business owners are also expected to demonstrate projected uplifts. Second, the "ticket size" of its typical investments are much smaller than traditional investments, rarely exceeding $0.5 million. This, combined with its localized and rigorous approach to quantifying impact, allows Terratai to build a pipeline of potential nature-based projects and ventures that typically remain "hidden" from traditional investors. Third, despite being a for-profit enterprise, its investment model centres on patient and risk-tolerant capital. In contrast to typical venture-building efforts, where exits are expected around the three-year mark, Terratai invests with a time horizon of a minimum of five to seven years to allow ventures to achieve resiliency and scale. Fourth, its "end-to-end" service model is unique, spanning nearly the entire value chain of nature finance, and enables the company to develop solutions from the ground up that can demonstrate clear positive impacts on nature. Non-financial support is highly tailored to the context of each early-stage venture, thereby creating a small but resilient portfolio. Finally, Terratai's capital-investment model is itself expected to transition over time – as private-sector investment in its funds increases and returns materialize, it will be able to finance greater investments through its own balance sheet.

However, greater support will be needed to scale venture-building models for nature. Catalytic capital from philanthropists and development financiers remains crucial in curating the investor pipeline and derisking private-sector investment in new business models, but is insufficient to meet the needs of the nature-finance gap today. Building greater capacity for due diligence is also critical as this is a time- and resource-intensive process; as an example, Terratai believes it needs to increase its capacity tenfold in the coming years. Raising awareness with investors remains an important development area – particularly with regard to the fundamental viability of investing in nature, measuring returns across both financial and natural capital and adjusting expectations on the consistency of returns in the short term. A greater number of players in the nature venture-building space could also be transformational – allowing more nature-based businesses to access capital from a wider variety of investors and creating an enabling environment for nature builders, including supportive policy-makers, professional service firms and increased public awareness.

CASE STUDY 5

Investment-readiness support plus capital

Value-chain areas	Market creation and development, capital allocation, capital transfer, nature "uplift"
Innovation areas	Business models, new investors

Similar to venture building, accelerator programmes for nature-based solutions aim to rapidly advance and scale up innovative projects and strategies that use natural processes and ecosystems to address environmental and societal challenges. These accelerators provide support such as funding, mentorship and resources to initiatives that deploy inherent capabilities of nature, such as reforestation, wetland restoration and sustainable agriculture, to mitigate climate change, enhance biodiversity and improve human well-being. By fostering collaboration among scientists, entrepreneurs, policy-makers and community leaders, nature-based solution accelerators help turn promising concepts into impactful, sustainable actions that benefit both the environment and society.

One such example of this nature acceleration support is UpLink Top Investor Barka Fund, an Africa-based accelerator and investment fund. Barka supports and invests in African entrepreneurs who are addressing urgent climate and environmental challenges in their communities, specifically start-ups working in the agriculture and food, environment and natural resources and renewable energy sectors. It supports entrepreneurs in two ways. First, through its Investment Readiness Program, where for 13 weeks it works closely with a cohort of 10 companies in a specific region (e.g. the Great Rift Valley, the Sahel, Lake Kivu and the Rusizi Basin, and the Cocoa Belt), and provide them with financial advisory support, team scale-up advice (e.g. team assessment and development) and technological support. Second, Barka's investment fund provides minority equity investments and shareholder loans, ranging in total from $50,000 to $500,000, with post-investment technical assistance to provide expertise to businesses as they grow.

Barka Fund is implementing an innovative model for a number of reasons. The mix of investment-readiness support and small tickets for early-stage businesses is catalytic. First, acceleration programmes and investors have historically not been within the same organization, and thus, whether and when a business was in fact "investment-ready" for an investment could vary greatly. Having technical support mixed with investment solves two major challenges for early-stage entrepreneurs. Second, the smaller ticket sizes allow for a new set of nature-based solutions to flourish, as traditional sources of financing often have a ceiling ($50,000 for micro-finance institutions) or floor ($1,000,000 for VC and private equity) that leaves out SMEs who are ready to scale their businesses and their impact. Traditional sources of financing also often have unrealistic payback periods and high rates and lack technical support. Third, Barka's long and personal relationship with its pipeline of investees, which begins in the Investment Readiness Program, helps to bridge information gaps about potential investments, therefore removing the risk often associated with SME investment in Africa. Fourth, Barka Fund is well connected within the regional and global innovation environment, which is able to support not only the organization's scale but also that of the innovators with whom it works. This includes investment and technical support Barka has received from the Bezos Earth Fund, the Development Finance Corporation, the World Resources Institute and others.

However, greater interest and investment support will be needed to bring early-stage nature models to scale. First, there is a need for a greater understanding of the risks and opportunities for regions, such as the Sahel. These regions could have attractive and feasible investment opportunities if given acceleration and investment support like that offered by Barka. Second, there is a need, again, for more patient and catalytic capital, to build the pipeline of new nature businesses. The pipeline of nature businesses that can receive a ticket size of greater than $1 million in many Global South countries is still quite limited, and these early-stage businesses need a mix of technical and financial support to reach a scale at which most traditional investors could be able to come in. Lastly, there is a need for further collaboration and for new actors to be brought into supporting early-stage innovators through investment-readiness programmes like that of Barka.

CASE STUDY 6

Nature asset companies (NACs)

Value-chain areas	Market creation and development, capital allocation, capital transfer
Innovation areas	Financial instruments, business models, new investors

Nature asset companies (NACs)[57,58,59,60] are a new type of company that converts the full value (total economic value) of natural assets to financial capital. NACs are a voluntary, market-based financial instrument that packages the "rights" to ecological attributes related to underlying natural capital assets, including ecosystem services, such as fresh-water provisioning, climate stability and pollination services. These rights are valued through robust natural capital accounting and valuation that includes the existence, production and bequeathing value of nature. NAC's equity is offered for investment via both public and private-equity placements that are directly tied to the valuation process. Asset owners are incentivized to maintain and enhance the natural capital as it correlates to the value of the company, and investors are rewarded for incremental gains in the value of the underlying natural assets. NACs therefore transform nature into an investible asset, generate greater finance for natural capital, build financial value for asset owners or stewards, create resilient jobs, establish price signals for externalities and provide investors with a new portfolio allocation tool for nature.

The NAC model has been developed by the Intrinsic Exchange Group Inc (IEG), a financial innovation company based in the United States. IEG pioneered the NAC concept in response to private and institutional investors' demands for nature-positive investments. In the model that IEG has developed, NACs are formed through three steps: (1) identifying existing or potential natural capital assets that can form the basis for a NAC (e.g. degraded agricultural land, intact forest, marine protected area); (2) forming a NAC as a new corporation to license the rights to natural capital assets; and (3) converting asset value to financial capital via the capital markets process. Issuers of NACs typically include private and Indigenous landowners, farmers, corporations with natural assets and even governments; investors typically include institutional investors, family offices, MDBs and retail investors; and IEG currently connects issuers and investors via its private exchange. Company performance is reported using auditable traditional financial statements and ecological performance reports (EPRs), which are both part of the IEG Accounting Framework. This framework is grounded in the methodology of the United Nations System of Environmental-Economic Accounting (SEEA) – the UN's statistical standard for natural capital accounting and valuation; it has also made the Ecosystem Accounting (EA) module from the SEEA fit-for-purpose for the private sector.

The NAC model has recently attracted attention due to its innovative structure and appeal to market and non-market organizations alike. It was developed over the course of almost a decade of research and development by a team of ecologists, economists and financial experts, and through significant multistakeholder consultation with academia, stock exchanges, more than 200 investor groups, landowners and audit and assurance firms, among others. More than a dozen pilot projects have been commissioned, including an Indigenous-led NAC in North America to conserve more than 1 million acres of land, an agricultural NAC led by a major food company to finance regenerative practices in its grain-supply chain and a marine and terrestrial NAC for a government in Latin America and the Caribbean seeking to meet its 30% conservation goals as outlined in the GBF.

Scaling the NAC model is possible but requires significant multistakeholder collaboration. Greater scale could be achieved via public listings, and the accompanying standardization of pricing, transaction processes and auditing. In addition to private market trading, IEG is exploring public-exchange opportunities to list NACs in the US, Europe and Asia. Regulatory approval will be needed for public listing and may be required in some jurisdictions to enable corporates to directly invest in or create new NACs. Finally, it will be critical to build greater capacity with governments, investors, professional service firms and natural capital asset owners and stewards to set up NACs, conduct natural capital accounting and valuation, and perform due diligence and audits.

CASE STUDY 7

Replenishing the forest microbiome

Value-chain areas	"Nature uplift", MRV
Innovation areas	Technological advances, business models, new investors

From the lab to the forest, practices to rewild the forest microbiome are taking root. While fungal inoculants do already exist, with examples of a handful of species that could be grown and sold off the shelf, in practice the science has shown that this is generally unsuccessful.[61] Instead, a new model is emerging whereby hundreds of species of inoculants are bundled together so that ecosystems are able to sequester more carbon, faster. This shift is already starting to happen in the world – from inoculants as an ingredient in fertilizers to inoculants as a fundamental component of restoration.

Funga is a US-based forest microbiome company accelerating ecosystem recovery by focusing on what is happening below the ground. Funga's approach draws inspiration from the human microbiome project and uses recent advances in DNA sequencing technology. The organization aims to "rewild" the forest fungal microbiome to enhance tree growth and carbon sequestration. By collecting soil samples from forests worldwide and sequencing the DNA, Funga identifies which fungal species promote accelerated tree growth and carbon removal, and can be used to recreate intact, wild fungal communities. Similar to the way in which faecal transplants in humans restore microbial biodiversity to treat diseases, Funga uses soil inoculants to reintroduce beneficial fungi into forest ecosystems and then sells high-quality carbon credits from the additional carbon sequestered. This method, known as microbial soil inoculation, involves sourcing soil from "donor forests" rich in biodiverse and high-performing fungi, which is then used to inoculate forest landscapes. Born out of the Crowther Laboratory at ETH Zurich, the company has been partnering with North America's largest tree nursery, PRT, developing services to grow microbes directly in the forest.

VC has been instrumental in Funga's rapid development and deployment of its innovative technology. Traditional academic and small-scale pilot projects often lack the scale and urgency required to address climate and biodiversity crises effectively. VC, with its propensity for high-risk, high-reward investments, provides the necessary resources and drive to accelerate the commercialization and scaling of groundbreaking technologies. The emergence of venture capitalists in the nature investment space over the past few years has created the right type of capital and incentives for those founders with solutions that are able to meet ambitious and tight time frames. Investors in Funga – such as Superorganism, the first biodiversity-focused VC fund launched in autumn 2023 – are critical for providing the capital, expertise and alignment on impact for businesses such as Funga to get to impact faster and reach even greater scale.

To scale Funga and other fast-growth nature start-ups, more VC and early-stage, impact-focused capital is needed. First, Funga's work exemplifies the role of enabling technologies and "accelerators" that can harness biodiversity for better and faster environmental outcomes. Second, the scalability of Funga's microbial inoculation method is a significant advantage – microbes grow quickly, and the integration of fungal inoculants into existing forestry practices allows for rapid deployment. Ultimately, VC financing has enabled Funga to match its operational speed with the urgent needs of the climate and biodiversity crises, highlighting the critical role of VC in fostering innovative and quick-to-scale solutions.

CASE STUDY 8

Nature credits for smallholders

Value-chain areas	Market creation and development, nature "uplift", MRV
Innovation areas	Technological advances, financial instruments

Nature credits are financial instruments designed to value and trade the conservation and restoration of natural ecosystems. These include carbon credits but encompass a broader range of environmental benefits beyond carbon sequestration, including biodiversity protection, water purification and soil health. The largest of these markets is the voluntary carbon market (VCM), which reached a value of $2.4 billion in 2023 and is projected to continue to grow in the years to come.[62] The VCM remains one of the key means of providing financial flows for biodiversity benefits. However, concerns about transparency and accountability have placed its trajectory on a rocky path.

To address these issues, technological advances in blockchain have given rise to enabling solutions and platforms, such as Open Forest Protocol (OFP). OFP is a start-up based in Switzerland that uses blockchain technology to create an open, transparent and accessible platform that democratizes access to carbon accreditation by eliminating the upfront costs and by working with more than 30 decentralized validators. This blockchain-based MRV approach brings increased transparency and trust, as well as ensuring that more funds are reaching farmers and local communities. The use of blockchain allows for fewer intermediaries and additional consultants and provides a way for projects of less than 1,000 hectares to access carbon markets. OFP currently operates in more than 20 countries, including Colombia, Kenya, Mexico, India and Thailand, with plans to expand further by focusing on afforestation, reforestation and agroforestry.

OFP's approach is innovative for a few reasons – particularly its mix of technology, openness and inclusivity, and its nature-aligned timeline. First, by using blockchain technology, OFP ensures an immutable, transparent and globally accessible record of transactions, which improves trust and accountability. Second, OFP shares many of its tools and technologies for free and has a no-upfront-cost model, which democratizes access to carbon accreditation and makes it accessible to high-integrity projects regardless of their size or location. Third, since its founding, OFP has aligned its business model with a restoration timeline that follows the pace of nature. The company has secured funding from a unique mix of angels, foundations and VCs who understand that restoration effects and returns take time. This shift towards more patient, impact-driven capital allows nature to regenerate and achieve results over a 5–10-year period, rather than the typical four to five years.

Scaling technologies and platforms such as OFP requires patience, catalytic capital and business/government collaboration. Nature's timelines are long, and changing people's relationship with nature takes time and know-how. Given the time constraints, patience is essential for meaningful long-term impacts. Furthermore, additional capital pools are needed to finance small to medium projects (under 1,000 hectares). For example, foundations and family offices could fund a portfolio of restoration projects in various regions and different landscapes, thus reducing risks. Finally, governments play a vital role in creating the right enabling conditions and ensuring the viability of nature credits. If this is in place, a shift will become apparent in the development of nature credits from niche to mainstream, benefitting ecosystems and local communities.

CASE STUDY 9

Scaling tech-enabled agroforestry

Value-chain areas	Nature “uplift”, MRV
Innovation areas	Technological advances, business models, new investors

The mix of agroforestry – the integration of trees and shrubs into agricultural landscapes – with technology offers a promising solution to numerous global challenges, including climate change, biodiversity loss, food security, water availability and poverty alleviation. Historically, the scaling of agroforestry practices has proven difficult due to several persistent bottlenecks: 1) planning the right mix of species, and modelling it financially, where information is scarce; 2) accessing capital for agroforestry projects of all sizes, especially for smallholders; 3) managing complex multispecies systems, which requires a high level of know-how; and 4) establishing reliable sales channels for agroforestry products and carbon credits. The emergence of advanced technologies such as remote sensing, IoT and AI have provided new ways to address these challenges.

Courageous Land, a Brazil-based agroforestry company, is looking to scale agroforestry through its Agroforestry Intelligence Platform. This solution combines software, human capital (e.g. technical assistants in the field) and partnerships with investors, with brands that are looking to source the agroforestry products and carbon credits, and with the farmers themselves. The success of this model depends on the three main factors: human capital, cutting-edge technology and catalytic capital. First, Courageous Land emphasizes training and the deployment of independent, certified professionals to provide technical assistance across regions. This decentralized model ensures that local expertise is available, promoting better management practices and enhancing productivity. The platform also focuses on attracting and training new agronomists and forestry engineers who are passionate about sustainable agriculture, ensuring a steady supply of knowledgeable professionals. Second, the tech platform offers farmers and agroforestry partners crucial tools they can use to glean key information on, for example, species suggestion, carbon and financial projections, management tasks and inventory management. The platform facilitates market access, connecting producers with buyers interested in sustainably sourced products and carbon credits. By aggregating data and providing actionable insights, the platform enhances decision-making and operational efficiency.

Finally, there remains a great need for patient and smart capital to not only bring the right type of capital to nature-focused start-ups but also provide the ability to validate and test new models. For example, Fundo Vale, a strategic supporter of Courageous Land, acts as a bridge for capital as well as for other partners – providing grant capital, access and support to a wider nature-based solution environment to support the growth and scale of Fundo Vale’s broader portfolio and impact. The aim is principally twofold: to generate large-scale agroforestry impact for people and planet and to build a track record and generate data that demonstrates the viability and profitability of agroforestry, thus unlocking larger flows of capital from other climate funds and investors.

While tools and technologies can be transferred more easily once developed, building out agroforestry expertise at scale remains challenging. Planting the right tree in the right place can be effective only if there are people on the ground who have bought into the project and vision. Fulfilling this human capital need by training and empowering a generation of agroforestry professionals remains the greatest hurdle. When young people in rural regions begin to see that staying, working and living on the land is a viable and attractive possibility, a necessary shift will take place, from viewing land as degraded and of worth only for its cut trees, to seeing it as an oasis filled with endless possibilities.

Note: The case studies in this section feature UpLink Top Innovators (except case studies 4 and 6, Terratai and IEG).

uplink

Conclusion

The innovations presented in this report provide important levers to accelerate investment in natural capital.

Investing in natural capital presents clear opportunities that require multistakeholder collaboration to come to fruition. This report underscores the urgent need, attractiveness and feasibility of investing in natural capital. Opportunities for investment in nature are expanding, with promising applications of new technologies, new financial instruments that appeal to a broad range of investors and nature-positive business models that are gaining commercial traction. Investors throughout the global economy can begin exploring these opportunities by seeking out knowledge and partnerships from the vibrant environment highlighted in this report, assessing their impacts and dependencies on nature, and evaluating how best to diversify their portfolios to include ventures that offer both ecological benefits and financial returns.

As highlighted in this report, there are five critical areas of development that could support greater investment in natural capital:

- Improved accessibility, relevance and affordability of technological advances in nature monitoring, and embedding these deeper in decision-making.
- Development of sophisticated capital markets infrastructure to ensure transparency, accountability and the efficient flow of capital to nature-positive projects.
- Improved valuation and pricing of natural capital, so that natural capital investments can compete with traditional business models, driven by better technologies, supportive policies and strengthened collaboration.
- More patient and catalytic capital that aligns with the speed of nature, allowing for both impacts and returns to be achieved over a longer time horizon.
- Inclusion of local peoples – living and depending on nature – as active participants and decision-makers in projects, businesses and initiatives, and appropriate and fair benefit-sharing and governance mechanisms.

The World Economic Forum recognizes the value proposition of natural capital. Investing in the health of the Earth is a compelling priority and a profitable venture. As the organization for public–private cooperation, the Forum is committed to mobilizing finance for natural capital and driving innovation towards a nature-positive economy with its valued partners, including leading governments, businesses, investors, academics, civil-society organizations, innovators, Indigenous leaders and other international bodies. The Forum's UpLink and nature-positive initiatives provide a strong platform to advance collective efforts and know-how to integrate natural capital into the core of economic and financial systems.

The Forum invites the global community to collaborate in this endeavour. A new coalition of investors, ecologists, technology innovators, entrepreneurs, financiers and local communities have a unique opportunity to reorient the global economy to a path that enables humanity to live in harmony with nature. This is essential for the survival of humankind, for our communities to thrive and for businesses to remain vibrant sources of livelihood for future generations.

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