Catalysing Finance and Insurance for Nature-based Solutions

A collection of case studies from around the world

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Federal Ministry for Economic Cooperation and Development

Nature^Squared CONNECTING ECOLOGY AND ECONOMICS

Foreword

Dear readers,

Healthy ecosystems are the foundation of every society. We cannot prosper without them, yet we continue to destroy them. The unprecedented loss of natural capital threatens our livelihoods, industries, food and energy security, resilience to climate change, and cultural heritage. The risk it poses to our financial systems is also significant. The message we receive from scientists like Johan Rockström is clear[1]: **"This is not an environmental issue. It is about security, about economics, about jobs, and about dignity and fundamental development."**

The international community has taken an important step with the Kunming-Montreal Global Biodiversity Framework, agreeing to place 30 per cent of the world's land and 30 per cent of oceans under protection and to mobilise 200 billion US dollars a year for biodiversity-related measures in all countries by 2030. However, it is high time that we move from agreements to implementation, and it is evident that this will require large amounts of capital.

On the one hand, the public sector must step up. The German government is already one of the biggest donors to biodiversity conservation worldwide, but to address the urgency of the crisis, Germany is increasing funding for international biodiversity conservation to 1.5 billion euros annually starting from 2025 at the latest. On behalf of our donors, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has a long history of supporting conservation and sustainable use of forests, oceans, wetlands, and other ecosystems. For example, in 2022, GIZ's portfolio of ongoing projects contributing to the Convention on Biological Diversity amounted to EUR 770 million. In our partner countries, we work with national decision makers to improve policy and legal frameworks, support project developers in implementing Nature-based Solutions, build capacity of the local population to protect and restore nature, and cooperate with the financial sector to scale up the provision of suitable financial products.

On the other hand, private financial institutions will undoubtedly contribute to achieving these targets. It is ultimately in their business interest: the risks posed by the depletion of natural capital must be addressed and the first-mover advantage of contributing positively to nature is an opportunity to be seized. GIZ's extensive work in financial sector development[2] across the globe has continuously demonstrated the importance of the private financial sector in supporting sustainable development. As the case studies in this report reveal, there is ample scope for stronger collaboration between the public and private sectors. We at GIZ are interested in further leveraging the different capabilities and strengths to mobilise the capital needed for the conservation, restoration, and sustainable use of all ecosystems.

Thankfully, implementation is already underway, and this report highlights some of the current approaches to financing Nature-based Solutions. It showcases innovative financial solutions, including specific insurance products, and initiatives to embed considerations of nature in conventional financial products, as well as the vital partnerships that are being forged. I look forward to seeing how the lessons from these experiences are used to both replicate and scale Nature-based Solutions.

Ingrid-Gabriela Hoven | Member of the Management Board
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

1 Johan Rockström: How Bad Is the Wider Environmental Crisis? - YouTube
Retrieved from https://www.youtube.com/watch?v=LNKIQ7_-UtA.
2 As of May 2023, GIZ's financial sector development portfolio of ongoing projects was around EUR 1 billion.

Contents

1. Introduction

The greatest long-term financial and operational risks identified in the World Economic Forum's 2023 Global Risk Report are those arising from environmental degradation and nature loss.

They go well beyond climate change. Extreme weather events, biodiversity loss, ecosystem collapse, and natural resource crises are ranked among the six top-identified risks.[1] As of 2022, thresholds of six of the nine planetary boundaries, which determine the natural and social boundaries within which humans can flourish, have been crossed.[2] This has serious economic and financial consequences.

The average annual economic damage caused by natural disasters over the last 10 years has increased more than fivefold compared to the 1980s: from US $26.8 billion (1983–1992) to US $150 billion (2013–2022).[3] In 2022, rising water temperatures threatened nuclear electricity generation in France whilst severe droughts presented challenges for chip fabrication in Taiwan.[4] For the Dutch financial sector alone, it has been estimated that €510 billion (36%) of the investment portfolios of Dutch banks, pension funds, and insurers are highly or very highly dependent on one or more ecosystem services and are therefore exposed to significant levels of risk related to biodiversity loss.[5] The economic and financial implications will only increase as environmental degradation and nature loss continues.

As we near irreversible and dangerous tipping points for our planet, central banks, supervisors, and policymakers have recognised that financial systems must address nature-related financial risks.

The Network for Greening the Financial System (NGFS) has highlighted the macroeconomic, macroprudential, and microprudential materiality of nature-related risks and is scaling up work on the topic.[6] Both the NGFS and the Coalition of Finance Ministers for Climate Action have emphasised the mutually reinforcing dynamics between nature loss and climate change. Namely, that it will be impossible to meet global climate goals without meeting global goals for nature and vice versa. Engaging with nature is thus unavoidable for companies and financial institutions that have made net-zero pledges.

At the same time, the regeneration and sustainable management of our planet's ecosystems also offer significant opportunities.

Nature-based Solutions (NbS), such as restoring mangroves, coral reefs, and peatlands or implementing agroforestry systems, can be an effective means to address environmental and societal challenges. NbS create, restore, or enhance carbon sinks that sequester vast amounts of carbon and generate substantial benefits in terms of disaster risk reduction, climate change adaptation, diversified income generation, and increased biodiversity.[7] Consequently, NbS also represent attractive business cases, as demonstrated by the case studies featured in this report.

Despite all of this, the current level of capital flowing into NbS is far from sufficient.

By 2050, an estimated US $674 billion will be required annually to halt and reverse biodiversity loss, limit climate change to below 1.5°C, and achieve land degradation neutrality.[8] This equates to four times the current level of investment, which stands at only US $154 billion.[9] The Kunming-Montreal Global Biodiversity Framework, negotiated and agreed by 196 countries in December 2022, foresees a fundamental change. It calls for a progressive alignment of "all relevant public and private activities, fiscal and financial flows" with the conservation and restoration goals of the framework.[10] Private finance is to be mobilised, blended finance scaled, and nature-related financial risks disclosed and managed.[11]

The lack of proven business cases is a key challenge facing investments in NbS and the development of insurance solutions.

The private sector is calling for more evidence on both the financial returns and the environmental and social benefits. To mobilise private finance and insurance solutions for NbS, more information is needed on why existing NbS projects have been successful, especially relating to their underlying financing structures. Coupled with better disclosure of their associated risks and opportunities, such insights can support the development of a robust pipeline of bankable projects.

This report showcases a variety of credible business cases, which are in part financed by the private sector and have been successfully implemented in emerging markets and developing countries.

These include investment projects, funds, and insurance vehicles in the Global South across a variety of ecosystems, including mangroves, coral reefs, and agricultural systems. The case studies provide a deep understanding of the underlying business models and financial structures and highlight the social and environmental impacts of each of these projects.

Much pioneering work has already been done. It is time to learn from these experiences and scale up.

1 World Economic Forum (2023).
"2. Global Risks 2033: Tomorrow's Catastrophes", Global Risks Report 2023. Retrieved from https://www.weforum.org/reports/global-risks-report-2023/in-full/2-global-risks-2033-tomorrow-s-catastrophes.

2 J. Lokrantz/Azote based on Steffen et al. (2015).
"Planetary Boundaries". Stockholm Resilience Centre. Retrieved from https://www.stockholmresilience.org/research/planetary-boundaries.html.

3 Our World in Data (2022).
"Global damage costs from natural disasters, 1980 to 2022". Retrieved from https://ourworldindata.org/grapher/damage-costs-from-natural-disasters; own calculations: 10-year average of annual economic damage from 2013–2022 compared to 1983–1992.

4 Crellin, F. (15 July 2022).
"Warming rivers threaten France's already tight power supply". Reuters. Retrieved from https://www.reuters.com/business/energy/warming-rivers-threaten-frances-already-tight-power-supply-2022-07-15/; Guo, S. (9 November 2021). "How Climate Change Affected Thirsty Chipmakers". MSCI. Retrieved from https://www.msci.com/www/blog-posts/how-climate-change-affected/02841370014.

5 DNB-PBL (June 2020).
Indebted to nature: Exploring biodiversity risks for the Dutch financial sector. Retrieved from https://www.dnb.nl/media/4c3fqawd/indebted-to-nature.pdf.

6 NGFS (24 March 2022).
Statement on Nature-Related Financial Risks. Retrieved from https://www.ngfs.net/sites/default/files/medias/documents/statement_on_nature_related_financial_risks_-_final.pdf.

7 UNEP/EA.5/Res.5
defines NbS as "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits." Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED SOLUTIONS FOR SUPPORTING SUSTAINABLE DEVELOPMENT. English.pdf?sequence=1&isAllowed=y.

8 UNEP (2022).
Time to act: Doubling investment by 2025 and eliminating nature-negative finance flows. Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/41333/state_finance_nature.pdf?sequence=3.

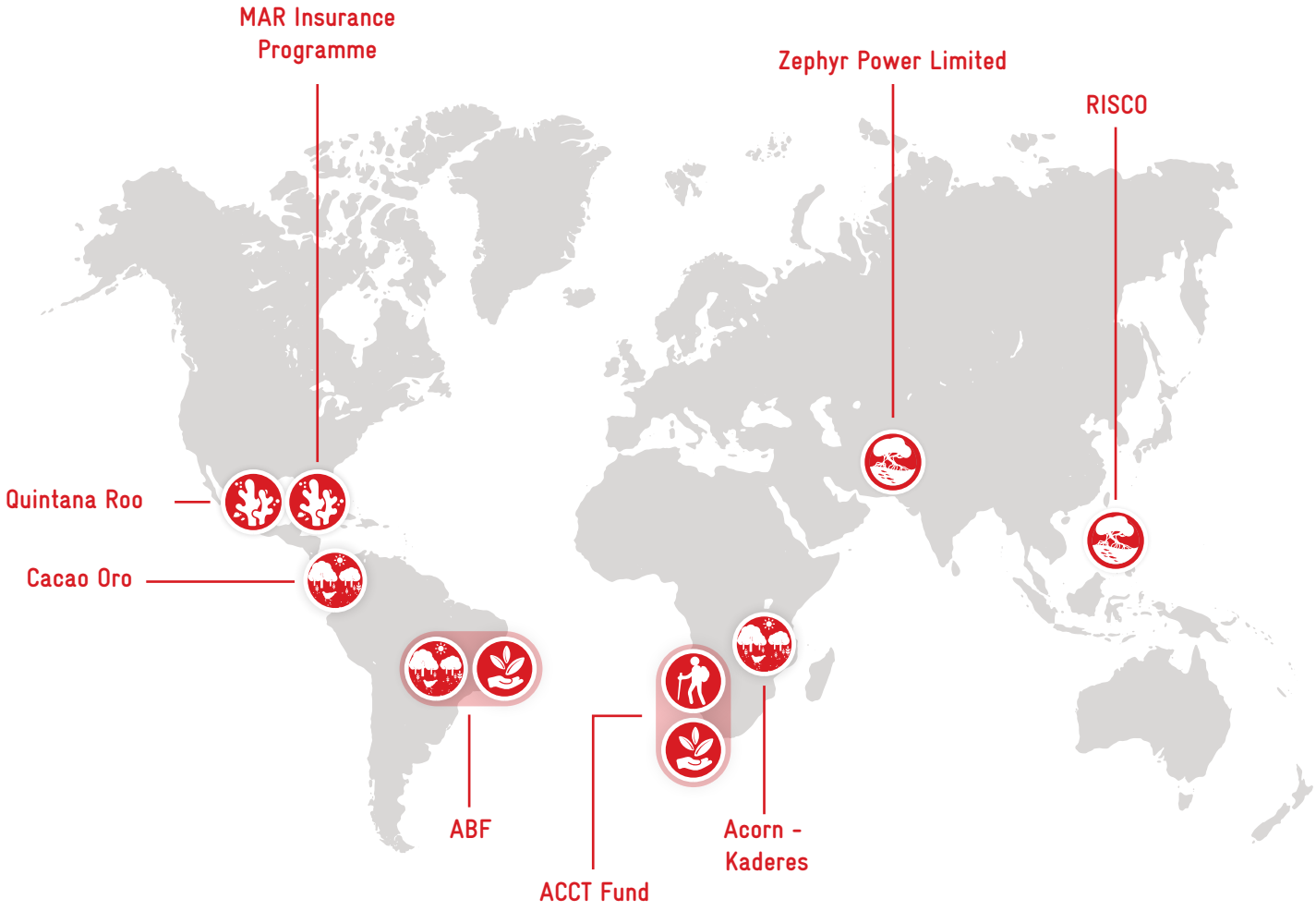
9 UNEP (1 December 2022).
Press release: "Doubling finance flows into nature-based solutions by 2025 to deal with global crises – UN report". Retrieved from https://www.unep.org/news-and-stories/press-release/doubling-finance-flows-nature-based-solutions-2025-deal-global.

10 Convention on Biological Diversity (CBD) (19 December 2022).
Press release: "By 2030: Protect 30% of Earth's lands, oceans, coastal areas, inland waters; Reduce by $500 billion annual harmful government subsidies; Cut food waste in half". Retrieved from https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022.

11 CBD (22 December 2022). COP15: Final Text of Kunming-Montreal Global Biodiversity Framework. Retrieved from https://www.cbd.int/article/cop15-final-text-kunming-montreal-gbf-221222.

2. Overview of the case studies

This report includes eight NbS business cases across a variety of countries and ecosystems in the Global South. The map below shows the geographical spread of the case studies and the type of NbS they provide.



Given that all the case studies are still in development, they are changing rapidly. Therefore, the information captured in this report represents a snapshot in time. The timelines presented in the various case studies provide insight into developments that may have occurred since the publication of this report.

The table below provides an overview of some of the key characteristics of the cases featured in this report.

NBS TYPE	CASE STUDY	TYPE OF ENTITY	FINANCIAL INSTRUMENT	BUSINESS CASE
	Acorn – Kaderes	Investment project	Concessional loan, grant	Benefit-sharing model of carbon credit revenue generated through the implementation of agroforestry systems by smallholder farmers. Farmers also benefit from productivity gains and higher prices for agricultural products.
	Cacao Oro de Nicaragua	Investment project	Profit-sharing loan	Productivity gains, higher prices, and reduced (input) costs through expansion of agroforestry-grown cacao and coffee.
	Zephyr Power Limited	Investment project	Debt, equity	Reduced asset replacement costs and other maintenance costs through mangrove restoration, which reduces risk exposure to damage from floods and other extreme weather events.
	Amazon Biodiversity Fund (ABF)	Investment fund	Convertible debt, loans (carbon-backed notes and revenue-based), equity, Portfolio Credit Guarantee	Revenues from upscaling food and beverage production, sales of agricultural products and Non-Timber Forest Products (NTFPs), as well as carbon credit generation.
	African Conser-vation and Com-munities Tourism (ACCT) Fund	Investment fund	Loans (mostly concessional debt), equity, grants	Safeguarding tourism operations and developing diversified revenue streams. Repayment tied to post-COVID performance.
	Quintana Roo Coral Reef Insurance	Insurance vehicle	Parametric insurance	Parametric insurance against hurricanes covering the Quintana Roo coral reef. Pay-outs are used for coral reef rehabilitation. The insurance premium is paid by the Coastal Zone Management Trust (CZMT) Fund, which generates fees through public and private sources, such as federal taxes paid by property owners that benefit from the reef.
	Meso-american Reef (MAR) Insurance Programme	Insurance vehicle	Gridded parametric insurance	Parametric insurance against hurricanes covering coral reef sites in four countries. Pay-outs are used for coral reef rehabilitation. The gridded parametric insurance mechanism lowers basis risk and its regional approach allows for pooling of risk. Premium support is provided by the InsuResilience Solutions Fund.
	Restoration Insurance Service Company (RISCO)	Insurance vehicle	Indemnity products, in process of exploring parametric insurance	Financing mangrove restoration through the sale of blue carbon credits and service fees from insurance companies that benefit from having their portfolios less exposed to flood damage. This creates the potential for reduced insurance premiums.

3. Methodological approach

For this report, eight case studies featuring the provision of private finance or insurance solutions for NbS across a variety of ecosystems and countries in the Global South were identified and analysed. A longlist of potential case studies was first compiled based on desk research, expert interviews, and existing research by GIZ and Nature^Squared. This was subsequently narrowed down to a shortlist based on predefined selection criteria, including involvement of private financial institutions, diversity of insurance and investment cases, diversity of geography and type of NbS, investment size, project maturity, potential for replication and scaling, and data availability.

The United Nations Environment Assembly (UNEA) definition of Nature-based Solutions has been adopted for this report. By NbS, we refer to:

> "ACTIONS TO PROTECT, CONSERVE, RESTORE, SUSTAINABLY USE AND MANAGE NATURAL OR MODIFIED TERRESTRIAL, FRESHWATER, COASTAL AND MARINE ECOSYSTEMS, WHICH ADDRESS SOCIAL, ECONOMIC AND ENVIRONMENTAL CHALLENGES EFFECTIVELY AND ADAPTIVELY, WHILE SIMULTANEOUSLY PROVIDING HUMAN WELL-BEING, ECOSYSTEM SERVICES AND RESILIENCE AND BIODIVERSITY BENEFITS.[12] "

Whilst the case studies are in line with the above definition – which focusses on conserving and restoring ecosystems whilst providing a variety of benefits to biodiversity, ecosystem services, businesses, and local communities – not all may meet every criterion of the IUCN Global Standard for Nature-based Solutions (2020)[13].

A key challenge in this research was the limited number of NbS business cases in the Global South that have successfully mobilised private finance. Whilst interest has picked up considerably, the financial sector is only beginning to engage with NbS.

To ensure the case studies were relevant to insurance and private investment communities, interviews were conducted with experts from (re)insurance companies, brokers, and investors, as well as case owners. These interviews informed the metrics used throughout the analysis of the selected case studies. The case studies provide relevant insights into the objectives of the selected projects, financial returns (where disclosable), their contexts, business models, current project phase, insurance/investment structure, (expected) social and environmental impacts, risks and safeguards, potential for replication and scaling, and key lessons learned. Close engagement with the case owners enabled a thorough and in-depth understanding of each of the business models and their nuances.

12 Nature-based Solutions Initiative (3 March 2022).
"United Nations Environment Assembly agrees Nature-based Solutions definition". Retrieved from https://www.naturebasedsolutionsinitiative.org/news/united-nations-environment-assembly-nature-based-solutions-definition/.
13 IUCN (2020). IUCN Global Standard for Nature-based Solutions.
Retrieved from https://portals.iucn.org/library/sites/library/files/documents/2020-020-En.pdf.

4. Key takeaways

This research presents eight case studies of NbS projects and vehicles that have mobilised private finance effectively. Some are in the start-up phase whilst others have begun to scale their operations and mobilise additional capital. Some of the key lessons from these case studies are consolidated and summarised below, including the challenges encountered when establishing an NbS business case, as well as crucial considerations that can help overcome these challenges. Importantly, we reflect on the potential for scaling and replicating successful approaches to transition from the pilot phase to upscaling and mainstreaming private capital in NbS.

THE CHALLENGES OF ESTABLISHING A BUSINESS CASE

1. Inadequate market mechanisms to monetise the positive externalities of NbS remain a barrier.

Due to incomplete markets, many of the environmental and social benefits of NbS projects cannot yet be fully reflected in business cases. Carbon sequestration is an exception, but even the true potential of carbon markets has not been fully tapped, hindered by the high certification, verification, and validation costs of carbon projects. Market mechanisms for other ecosystem services, such as water, biodiversity, and soil quality, are still in development, as are mechanisms for incorporating risk-reduction benefits in business cases. As a result, the financial valuations of NbS are lower than their true economic value.

2. New business cases require in-depth know-how of the local context and new capabilities and governance structures.

To invest in NbS or insure ecosystems themselves against climate and disaster risks, the financial sector must assess and address local complexities and set up intricate governance structures. For example, the Quintana Roo and Mesoamerican Reef (MAR) Insurance cases show that designing an insurance solution for ecosystems is more complex than for more conventional asset classes. Since coral reefs are a public good, many stakeholders with different roles and interests are involved, and much work is needed to design a governance structure that is fit for purpose in every context. For example, challenges can arise when creating a long-term strategy for financing the insurance premiums.

The RISCO case study demonstrates that it is critical to have a good understanding of the local context. A pilot programme in the Philippines has shown that RISCO's business model is sensitive to the already very low insurance premiums in the country, making it complicated to lower premiums even more by pricing in the risk-reduction benefits of mangroves. Having a clear understanding of local conditions helps to assess whether the business case is suitable for that location or whether adjustments need to be made. Similarly, in the case of Acorn, success has been dependent upon understanding local regulations, finding strong local partners, and identifying suitable native tree species.

3. Uncertainty about potential risks hinders investment.

There remains significant uncertainty about the risks associated with NbS investments. Since NbS are only now emerging as an asset class, business cases and their environmental and social impacts still need to be proven at scale. The Acorn platform, RISCO, and the Mesoamerican Reef (MAR) Fund have all started operating but are still testing some key assumptions related to their business cases and financing structures.

In addition, whilst NbS contribute to climate change mitigation and adaptation, their effectiveness is vulnerable to climate risks. For example, forest fires and flooding can have detrimental impacts on carbon sequestration, thereby posing a risk to business cases based on carbon credits. Furthermore, investments are exposed to political and governance risks, as exemplified in the case of the Amazon Biodiversity Fund (ABF), where an unstable regulatory and political environment has created uncertainties for restoration and conservation projects.

The variety of risks facing NbS are not necessarily different to those faced by more conventional investments. Yet, the financial sector is unsure about how these potential risks might materialise due to the limited track record of mature and bankable NbS projects. This combination of risk and uncertainty leads financial institutions to be cautious. As one interviewee from a commercial bank phrased it, "We can accept lower returns, but not higher risk."

However, uncertainties are being addressed through a surge in NbS pilot projects. These will provide valuable lessons about how risks materialise in such projects. In the meantime, there are vast opportunities for the insurance industry to step in, take risks on their balance sheets, and facilitate investment in NbS.

CRUCIAL CONSIDERATIONS TO HELP OVERCOME CHALLENGES AND ESTABLISH STRONG BUSINESS CASES

4. Diversified business models can strengthen business outcomes.

The numerous benefits of NbS offer great potential for developing diversified business models, as they incorporate various income-generating and cost-saving mechanisms. For instance, the ABF invests in agroforestry projects that have the potential to generate income through selling a variety of crops and Non-Timber Forest Products (NTFPs) such as honey, as well as through the sale of carbon credits. Mangrove and coral reef restoration projects can reduce risks and associated losses and damages whilst generating additional income for local industries (e.g., tourism, fishing) or through the sale of blue carbon credits. Integrating different mechanisms can also create more stable cashflows as they generate income or reduce costs at different times. In the case of Cacao Oro, agroforestry practices have improved the yields of both coffee and cacao, allowing farmers to benefit from the sale of multiple crops harvested at different times. In addition, a diversified business model helps safeguard against market shocks and underperforming activities.

5. Leveraging public and blended finance and the pooling of projects play a major role in de-risking insurance and investment projects.

Public capital and non-profit organisations play a key role in structuring investment and insurance solutions and making business cases more attractive for commercial stakeholders. This can be seen across several of the featured case studies. In the case of the MAR Insurance Programme, the insurance premium has until now been covered by the InsuResilience Solutions Fund (ISF), which is backed by the German government (BMZ). In the case of the ABF, the United States Agency for International Development (USAID) played an important role in setting up the fund by providing a grant to its cornerstone investor, the International Center for Tropical Agriculture (CIAT). Additionally, a Portfolio Credit Guarantee was provided by the Development Finance Corporation (DFC).

Grant funding is an effective instrument for designing and structuring a project or fund, as it can be used for impact measurement and capacity building activities, as well as for developing the business case. Concessional finance can also play a critical role in testing a business case, for instance, through financing pilot projects or start-up phases of business models. It can also be catalytic in scaling projects, improving their risk-return profiles, and preparing them for larger investments. Risk-sharing mechanisms, such as guarantees, and the structuring of different tranches with various risk-return profiles can further protect commercial investors.

The pooling of projects can play a major role in de-risking investment and insurance solutions and provides key opportunities to scale. This report highlights many examples of financial structures that mobilise finance across multiple projects and countries, including the MAR Insurance Programme, the Acorn platform, the African Conservation and Communities Tourism (ACCT) Fund, and the ABF.

6. Pre-investment engagement is essential and can be supported by the public sector.

NbS investment and insurance vehicles can have long lead times and private financial institutions may not have the capacity required to oversee their development. Generally, commercial financial actors want a "prepackaged" solution that has already proven itself worthy of investment. Long-term engagement between the investor and investee before financial close and throughout a project's lifetime is more likely to be driven by the public sector.

However, it is vital that even when private financial institutions do not engage directly in the early stages, their knowledge and needs are still reflected in the design of financial structures, as this will ensure these structures are suitable and pave the way for future investment. This could also be achieved by the public actors and non-profit organisations engaged in these processes hiring professionals with a financial background. Public-private partnerships (PPPs) are another beneficial way to bring in complementary expertise and capacity from both sides.

Several of the case studies exemplify close engagement between the financial partner and the project owner, both before and throughout a project. For example, in the case of Zephyr Power Limited (ZPL), engagement with the development finance institution, British International Investment (BII), began years before the investment structure was finalised. Moreover, in the cases of ZPL and Cacao Oro, close investor involvement throughout project implementation has helped ensure that they have the knowledge and capacity needed to support the business case and become successful.

7. Involving local communities in project design is key to reducing risks and maximising the benefits of NbS.

Engaging with local communities when designing and implementing a project is good practice to ensure a proper understanding of their needs, to learn from their experiences, and to guarantee that incentives are in place to realise the business model and the intended impacts of the project. For instance, community and farmer engagement have been instrumental to the success of Acorn and Kaderes. When farmers clearly benefit from implementing agroforestry systems, more carbon credits are expected to be generated, thus strengthening the financial performance of the project. When the link with the business case is so clear, these engagement costs are covered by carbon credit revenues generated through the Acorn platform. In other investment cases, such as Cacao Oro, grant finance is used to fund community engagement and capacity building initiatives, as these processes can be lengthy and expensive. Despite the costs and complexity of such processes, they are critical to fostering trust and intrinsic engagement from local communities, which is key to realising long-term business performance and desired impacts.

8. Systematic collection and disclosure of financial project data could greatly reduce uncertainties around the business case.

Originally, the intention of this report was to include a financial analysis of several cases. However, the extent of the analysis was curtailed by a combination of limited project maturity, lack of available or collected data, and restrictions on data disclosure. Collecting and disclosing data on the financial viability of (planned) projects could provide a blueprint and reduce uncertainties for financial institutions. Data collection and analysis could be supported by research institutes and would benefit from greater data sharing from development banks, who have a longer track record of investing in Nature-based Solutions.

SCALING POTENTIAL

9. There is great potential to strengthen existing business cases for NbS.

The carbon market is the most mature market for monetising environmental benefits. If carbon prices increase, many projects could leverage carbon as an additional revenue stream. Where carbon credits are already part of a business model, this revenue stream can be strengthened and generate higher value for the project. However, concerns about the additionality, permanence, and validity of carbon credits, as well as the downside risks to the price of carbon, can have serious implications for business cases built solely on carbon revenue, as in the case of Acorn. Whether current initiatives to strengthen the credibility of voluntary carbon markets (VCMs) and discussions around their regulation will boost market development is yet to be seen.

Simultaneously, markets for other ecosystem services are emerging, bolstered by promising policy and regulatory commitments, such as the Kunming-Montreal Global Biodiversity Framework[14]. The agreement includes a target to scale global funding for nature to US $200 billion a year by the end of the decade, with companies and financial institutions expected to play a significant role[15]. This is promising for the development of market mechanisms for ecosystem services and might go beyond strengthening the carbon market to encouraging the development and widespread use of biodiversity credits to strengthen NbS business cases in the future. For example, Colombia is leading the way with habitat banking, which is a biodiversity credit system growing in popularity around the world[16].

10. There is significant potential to replicate NbS around the world; financing structures do not need to be complex but must be tailored to the local context.

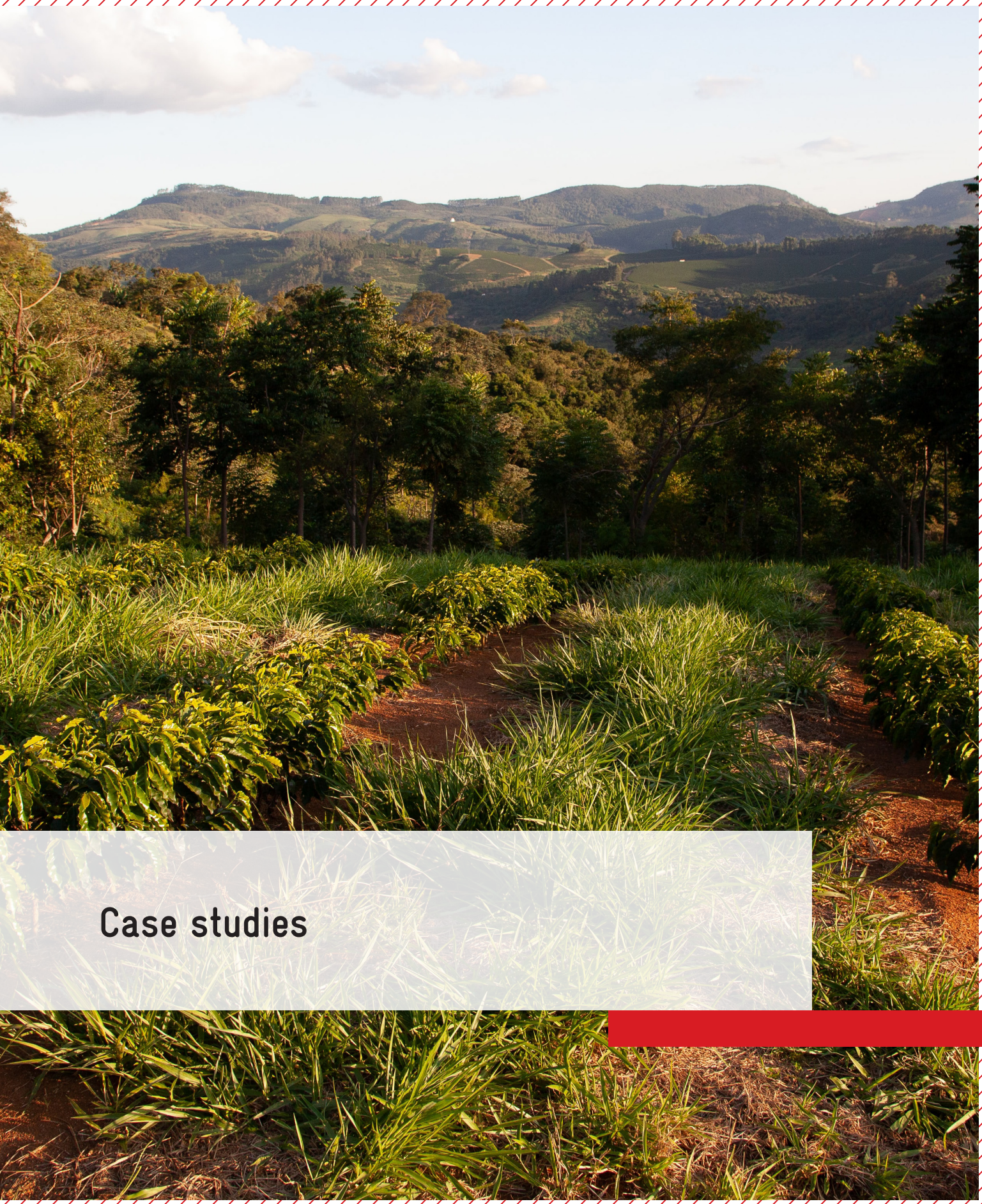
Whilst investing in NbS is new territory for private financial institutions, the case studies in this report show that the financing structures can be straightforward. In most cases, financing structures do not need to be innovative or complex to be appropriate for a project's context. Instead, a mix of equity investments and loans (in some instances repaid using carbon credits) are combined with public sector support (e.g., grants, guarantees, and junior debt tranches). The perception of complexity often associated with NbS financing may thus be unwarranted.

Furthermore, the case studies reflect the potential to embed NbS in normal business practices (e.g., Zephyr Power Limited, Acorn, the ABF). As such, there is potential to provide incentives or requirements for NbS implementation in financial institutions' existing relationships and agreements with businesses that are working in sectors most conducive to NbS.

In general, there is significant potential to scale and replicate existing instruments and NbS business models, making use of synergies, existing research, and lessons learned. For example, since the launch of the Quintana Roo and MAR Insurance Programmes, new vehicles for protecting and rehabilitating coral reefs are being developed around the world and opportunities are being explored to apply similar mechanisms to other types of ecosystems (e.g., mangroves). Leveraging and mainstreaming existing tools, metrics, and methodologies, and collaborating with academia, conservation, and restoration experts, can help facilitate the assessment, structuring, and financing of NbS projects and ensure holistic impact.

Whilst some knowledge can be shared easily across locations, other information is inherently context specific. Agroforestry projects can realise the greatest potential when the tree species that are selected and planted are native to an area and there are readily available markets for them. Tailoring NbS business models to specific contexts and leveraging local knowledge is instrumental in building sound business cases and maximising the impacts of these projects.

14 Convention on Biological Diversity (19 December 2022).
Decision Adopted by the Conference of the Parties to the Convention on Biological Diversity.
Retrieved from: https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf.
15 Campaign for Nature (2 December 2022).
Funding the Post-2020 Global Biodiversity Framework and 30x30.
Retrieved from https://www.campaignfornature.org/funding-the-gbf-and-30x30.
16 The Biodiversity Finance Initiative (BIOFIN). (n.d.). Colombia.
Retrieved from https://www.biofin.org/colombia.



Case studies

5. Case studies

5.1 ACORN – KADERES

AT A GLANCE

Smallholder coffee farmers in Kagera Region, Tanzania, face challenges with low productivity and loss of crops because of climate change. To secure their production and income, Karagwe Development and Relief Services (Kaderes) helps farmers transition from cultivated land to agroforestry systems. The resulting carbon credits are sold through Acorn – the world's first direct trade platform for agroforestry-derived carbon credits.

Kagera Region, Tanzania

Ongoing since 2021 (Acorn platform launched)

Investment project

Agroforestry

PROJECT DESCRIPTION

In 2021, Rabobank officially launched Acorn – the world's first direct trade platform for agroforestry-derived carbon credits[1]. The credits are sold on voluntary carbon markets (VCMs), enabling companies to offset their carbon emissions directly through smallholder agroforestry projects. Kaderes is one of 13 currently active projects certified by Plan Vivo, for which Acorn currently facilitates the trade of carbon credits[2]. Another 15–20 projects are in the process of being certified[3].

Karagwe Development and Relief Services (Kaderes) is an NGO that began operations in 1997 with the mission of empowering people and communities through sustainable land use and environmental protection[4]. Since 2017, Kaderes has been helping to facilitate the transition to agroforestry.

Kaderes provides educational and technical support to help smallholder farmers switch from cultivated land to agroforestry systems, first in the Karagwe and Kyerwa districts, before expanding the project across the Kagera Region[5].

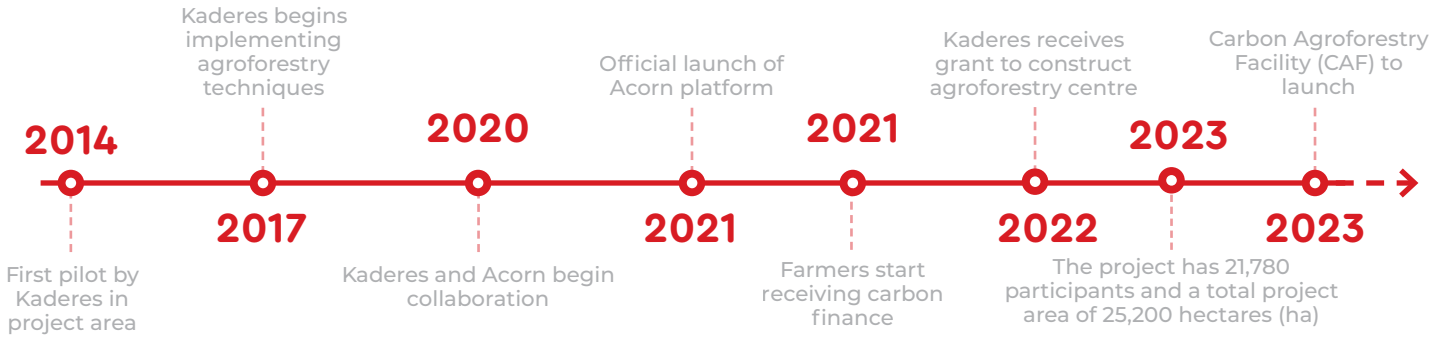
The Acorn platform supports the transition to agroforestry-based production systems by providing smallholder farmers[6] with access to VCMs. Farmers are then able to generate an additional income stream through the sale of carbon removal units (CRUs). Eighty percent of this revenue flows directly to smallholder farmers, helping them to diversify their incomes and the agricultural commodities they produce.

FINANCIAL CHARACTERISTICS

- **INVESTMENT SIZE**
  €875,000 to onboard 4,500 farmers
- **FINANCIAL INSTRUMENT**
  8-year concessional loan and a grant
- **BUSINESS MODEL**
  Farmers: higher yields and prices, additional income from crop diversification and carbon credit revenue.
  Kaderes: higher yields and prices, additional income from crop diversification and increased climate resilience, carbon credit revenue, lower input costs.
  Acorn: carbon credit revenue
- **FINANCIAL PERFORMANCE**
  Carbon credit sales via direct cash sweep and benefit-sharing model of 10% Acorn, 10% local partners, and 80% local farmers
- **RISK LEVEL**
  Above average

PROJECT PARTNERS

- **MAIN VEHICLE**
  Acorn, developed and financed by Rabobank
- **KEY FINANCIERS**
  Acorn, Achmea Foundation, Rabobank Foundation
- **LEAD IMPLEMENTER**
  Kaderes
- **BUYERS**
  Companies as purchasers of carbon credits



CONTEXT

The Kagera Region has a high poverty rate with a UNDP Human Development Indicator score of 0.529 out of 1 (2022 - scores may change over time)[7]. Many in the region are smallholder farmers who are living on less than US $7 a week and cannot afford a nutritious diet[8]. These challenges have been aggravated by climate change as farmers increasingly experience decreased productivity and crop losses[9]. To secure their livelihoods, farmers have been looking for alternative sources of income, with many turning to unsustainable practices, such as cutting down trees for charcoal, illegal logging, and land clearing for conversion to agricultural land[10]. Farmers in the region also face challenges related to accessing financial services such as savings accounts, loans, and prefinancing[11].

BUSINESS MODEL

Farmers

Due to crop diversification, the agroforestry project is expected to help increase farmers' income per hectare compared to monoculture systems[12]. Income diversification from growing additional crops such as bananas, beans, and native tree species (e.g. avocado), in addition to carbon credits, will help provide a financial buffer that encourages farmers to maintain their trees over time, rather than cutting them in times of high volatility of commodity prices[13 14]. Coffee remains the primary cash crop due to its high productivity and market value, as certification increases prices from €0.52/kg to €0.64/kg of coffee[15 16]. Kaderes expects a 70% increase in coffee productivity over a seven-year period due to the implementation of agroforestry systems[17]. Trees planted as part of agroforestry systems also provide shade and improve soil fertility, leading to enhanced, more stable yields year-on-year, as well as higher crop quality[18].

EUR 20-31
PER CARBON CREDIT SOLD

In addition to productivity gains, farmers can diversify their incomes through carbon credit sales that amount to about 5%–10% of their income[19]. Eighty percent of CRU revenue through the Acorn platform flows back to farmers in cash and in-kind contributions, including farming inputs such as additional seedlings and beehives and education on maintenance[20 21]. This is ultimately decided by the farmers themselves in project councils. Initial revenue from carbon credits is expected two to three years after the first trees are planted, and will then increase more than proportionally because of the progressive growth of the trees[22]. Farmers are expected to receive between €16 and €112 of carbon credit revenue per year (average of €67.80 annually over 20 years), assuming a price of €20 per CRU and an average farm size of 1 ha[23]. VCMs are also expected to grow, which will drive up the price of carbon credits[24]. In December 2022, the carbon price increased to €31 per CRU, although the market often fluctuates so this is not a reliable indication of potential future prices[25].

11,877
CRUs SOLD & RETIRED

Kaderes and Acorn

For every carbon credit transaction, 10% of revenue is retained by Acorn, which uses the income to cover costs related to monitoring, certification, the sale of credits, and platform maintenance, as well as covering a small margin for the platform itself[26]. In addition, 10% of CRU revenues are channelled to the local project partner, Kaderes, to ensure that Kaderes can finance the additional activities directly related to the Acorn project (data collection costs, farmer engagement, and onboarding to the Acorn platform).

INCREASED ANNUAL INCOMES BY
EUR 6,334
PER FARMER

INVESTMENT METRICS: KADERES

- **INVESTMENT SIZE**
  €875,000 to onboard 4,500 farmers
- **KEY FINANCIER**
  Acorn, Achmea Foundation, Rabobank Foundation
- **FINANCIAL INSTRUMENT**
  Concessional loan, grant
- **INTEREST RATE**
  1%
- **TIME FRAME**
  8-year loan with a 2-year grace period

CARBON AGROFORESTRY FACILITY (CAF)

Rabobank Foundation is currently designing a new financial structure that is expected to launch in 2023: the Carbon Agroforestry Facility (CAF) b.v..[34]

Through this facility, investors will provide prefinancing – mainly through concessional loans and grants – to local partners to cover upfront investment costs, such as purchasing seedlings and providing education[35]. In addition, a technical assistance facility will also be set up to support local partners in executing projects. The exact loan terms are still under discussion, but loans are expected to be provided against a 3%–8% interest rate and with a time horizon of 10–12 years[36]. There will be a grace period of two to three years, as trees will not yet be mature enough to generate CRUs in the first years of the project[37]. Once biomass is measured, CRUs are generated, marketed, and sold. Around 50% of the carbon pay-out will flow from Acorn to the CAF/investors to repay the loan[38]. This percentage could be slightly higher at the outset if the maximum loan term of 12 years will not otherwise be met[39]. Both Acorn and the local partner would continue to receive 10% each and farmers the remaining 30% of the CRU revenue until the loan is fully paid back, at which point farmers will receive 80% of carbon pay-outs.

The dedicated CAF will provide several benefits. First, it will enable projects to be funded through a combination of grants and concessional loans. Otherwise, projects would be unattractive to commercial banks, which do not usually provide finance to or invest in projects with similar risk-return profiles. Furthermore, the loans will eventually be repaid directly through proceeds from carbon credit sales.

CURRENT PROJECT PHASE

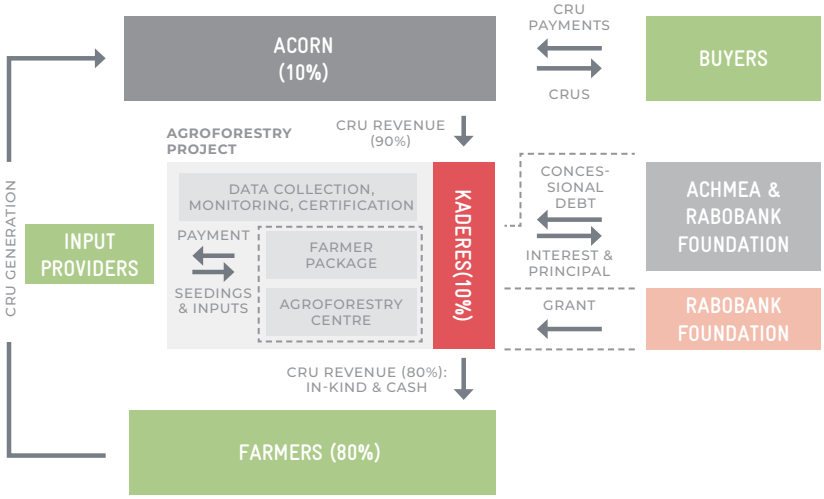
The Acorn platform was set up by Rabobank and officially launched in 2021. By the time of launch, Acorn had already engaged in pilot projects with hundreds of farmers in sub-Saharan Africa and Latin America. Kaderes initiated a tree planting pilot project in 2014 and began collaborating with the Acorn platform in 2020[27]. In 2021, participating farmers began receiving revenues from the sale of carbon credits. So far, 38,272 CRUs have been sold and retired[28].

As of April 2023, the project covered 21,780 farmers on an estimated project area of 25,200 ha[29]. The success of the first farmers in receiving carbon credit income has encouraged others to participate in the programme. Kaderes does not work with a fixed number of participants but with a steadily growing network of farmers.

INVESTMENT STRUCTURE

Kaderes received an €875,000 loan from Rabobank Foundation and Achmea Foundation to finance the onboarding of an additional 4,500 farmers to the project[30]. The additional revenue from carbon credit sales channelled through the Acorn platform helps to secure the investment and scale the project. To repay the loan, Kaderes withholds 50% of the revenue from carbon credits from the 80% that flows to newly onboarded farmers. Once the loan has been repaid in full, farmers will receive 80% of total revenues.

The loan covered a "farmer package", which includes training and assisting 4,500 new farmers transition to agroforestry systems, including through the provision and planting of additional seedlings and farming inputs such as fertilisers[31]. Since Kaderes already had a number of participants before receiving further financing, the loan was used to scale the project and its impacts. The loan for the farmer package has an 8-year term with a 2-year grace period and a 1% interest rate[32]. Acorn further supports Kaderes with data collection and monitoring through a grant that covers costs such as collecting farmers' data, monitoring and measuring of farms, and certification documentation[33].



Schematic representation of the investment structure

IMPACT

With certification by Plan Vivo, combined with a large number of participants and vast amount of available farmland, Kaderes is expected to have far-reaching and long-lasting impacts. So far, over 21,780 people have been supported by the project, transitioning 25,200 ha of cultivated land to agroforestry and sequestering over 38,272t CO_2[40]. Furthermore, agroforestry systems improve soil quality and biodiversity as combining different crops and trees helps create a better habitat for soil biodiversity and local wildlife species[41].

INCREASE IN AVAILABILITY OF NUTRITIOUS FRUIT BY 70%

21,780 CURRENT PARTICIPANTS

38,272T CO_2 CAPTURED

25,200 HA OF CULTIVATED LAND TRANSITIONED TO AGROFORESTRY

The project also provides important socio-economic benefits, such as enhanced crop yields, food security, and income diversification[42]. This, in turn, supports financial stability, which helps farmers become more resilient to climate change and consume more nutritious food. Many native tree species are suitable for agroforestry in this region, which offer the additional benefits of fruit and shade. To safeguard food security, at the start of the project, Acorn assessed the proposed agroforestry design to verify that no monocultures would be implemented and that no invasive or competing species would be introduced.

RISKS & SAFEGUARDS

Enabling environment & political context

In Tanzania there is a risk of political instability, which Acorn hedges against by pooling projects across several countries[43]. Acorn also faces regulatory risks since, under Tanzanian regulations, it is not yet possible to provide traditional loans to smallholder farmers[44]. The CAF will provide an effective safeguard against this risk by employing a repayment mechanism based on future carbon proceeds.

Social risk

Farmers are actively involved in the design of the agroforestry systems. The selection of tree species is not only based on the natural environment of the farm, but also on the value that these species provide to the farmer. This ensures that trees provide added benefits and create a strong incentive for farmers to keep trees standing or plant more trees. Furthermore, farmers participate in the project council[45], which meets twice a year and is required to involve them at a high decision-making level. These meetings are for giving feedback, airing grievances, and discussing the design of agroforestry systems and payment structures.

Environmental risk

A proper agroforestry design is crucial in preventing the introduction of pests due to an increase of shade and the use of organic practices instead of chemical pesticides. However, this risk can be mitigated by regular pruning, training farmers on pest control, and improving general farm sanitation. Extreme weather events related to climate change and the presence of wild animals could also cause damage to trees, resulting in fewer CRUs being issued. The global character of Acorn safeguards against this risk, whilst the 15% buffer mitigates risk for CRU buyers[46]. For each CRU generated, 1.15 tonnes (t) of carbon must be sequestered. 0.15 t of carbon is then stored in the buffer pool and not sold[47]. Should biomass be lost on plots where CRUs have already been sold, buyers can be compensated using this buffer pool.

Track record & reputation of partners

Kaderes started in 1997 and has significant experience with these types of projects[48]. Certification from Plan Vivo, a credible carbon project certification standard[49], and financing from Rabobank, a well-known international food and agricultural bank with a large international focus on agribusiness, can give potential buyers confidence in the carbon credits sold through the Acorn platform.

Market volatility

Price volatility of carbon credits is another risk as CRUs are the sole repayment stream for the project. However, it is expected that carbon credit prices will increase due to the rising demand of companies for high-quality carbon credits to offset their remaining and/or historical emissions[50]. Furthermore, Rabobank has stated that it will not sell carbon credits for below €20/credit[51]. With any carbon project there is always a risk of non-permanence of biomass. However, Acorn has a minimum durability period of 20 years from the issuance of the last CRU from the plot of land of a project[52].

POTENTIAL FOR REPLICATION & SCALABILITY

There are many eligible farmers and much eligible farmland within the existing project area. This creates significant potential to scale up the project, as Kaderes has demonstrated by steadily growing its network to 21,780 farmers - surpassing its initial goal of 20,000 farmers[53]. In 2023, Kaderes received an additional grant from Rabobank Foundation to construct an agroforestry centre[54]. This centre will help farmers grow their own seedlings in a more cost-efficient manner without having to purchase them, and ensure sufficient availability of high-quality species. This will help to scale the project further in the future.

This project shows that initiatives like Acorn can facilitate the trade in carbon credits to fight climate change effectively. More farmers around the world can be onboarded to platforms like Acorn to trade carbon credits and increase the number of farmers and projects with access to VCMs.

LESSONS LEARNED

The implementation of the project is time consuming. It includes choosing which farmers to engage in the project, explaining the benefits of the project, educating farmers on agroforestry practices, and securing funds to finance the purchase of trees. Changing the mindsets of farmers and communities about agricultural practices is also a gradual process. Such projects need to have long-term implementation plans as trees must remain standing for a very long time before they can provide adequate carbon sequestration benefits. Thus, capacity building and educating farmers will be essential in ensuring the long-term success of the project.

Finally, scaling the project by increasing the number of farmers engaged in the projects linked to Acorn, or onboarding other projects to the platform based in the same countries, will help to reduce the average costs of data collection and monitoring. Using satellite data and substantial ground-truthing have already been implemented in the areas where Acorn's projects are based, thus efforts and costs linked to on-the-ground support and data collection will be continuously reduced.

SAFEGUARDS AND PRINCIPLES FOR HIGH-QUALITY VCM PROJECTS

Although voluntary carbon markets (VCM) can provide an attractive revenue source for investments in nature, they have been subject to much criticism. Prominent concerns relate to additionality, permanence, leakage, and the (lack of) involvement of communities and handling of land rights issues. Additionality means that greenhouse gas (GHG) emission reductions or removals would not have occurred in the absence of the incentive created by carbon credit revenues. Permanence requires that carbon sequestration is permanent and not reversed in the future due to disasters or human activities. Leakage refers to the risk that GHG emissions or removals are not avoided but rather displaced (e.g., while the cutting down of one part of a forest is prevented, the planned deforestation simply takes place elsewhere).

To ensure high-quality carbon projects, adhering to strict guidelines, standards, or principles is indispensable. Several initiatives are under way to drive certainty on good practices and improve transparency in VCMs. The nine Core Carbon Principles (CCPs)[55] created by The Integrity Council for the Voluntary Carbon Market (ICVCM) are one example of this. According to these principles, projects must be **governed effectively**, and mitigation efforts need to be **tracked and transparent** as well as **robustly validated and verified by a third party**. Relevant internationally recognized certification standards are the Gold Standard (GS), the Verra Verified Carbon Standard (VCS) and Plan Vivo. CCPs also require the GHG emission reductions or removals to be **additional and permanent**. To account for the non-permanence risk, projects should apply a non-permanence risk buffer where credits are set aside and released after the project duration when permanence has proven to be sufficient. Moreover, projects must ensure **robust quantification of emission reductions or removals, no double counting, and no leakage**. Projects must adhere to strict social and environmental safeguards whilst delivering **positive sustainable development impacts**. Social safeguards should include benefit sharing mechanisms, continuous community involvement and ownership, and respecting land tenure rights. Lastly, carbon projects shall **contribute to a net zero transition**, i.e., avoid locking-in levels of GHG emissions, technologies, or carbon-intensive practices.

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5. Case studies

5.2 CACAO ORO DE NICARAGUA

AT A GLANCE

In 2020, the Land Degradation Neutrality (LDN) Fund invested in Cacao Oro de Nicaragua, a 3,000 ha agroforestry-based cocoa plantation with 2,000 ha of planted productive area and a 1,000 ha natural reserve and waterway protection zone. This investment funded the expansion of agroforestry systems by an additional 2,000 ha, bringing the plantation to a total of 5,000 ha. These agroforestry systems will help to restore severely degraded land and increase biodiversity in the project area. The investment will also cover the construction of a post-harvest facility.

The North Caribbean Coast Autonomous Region (RACCN), Nicaragua

Investment received in 2020

Investment project

Agroforestry

PROJECT DESCRIPTION

Cacao Oro de Nicaragua has produced Rainforest Alliance certified, agroforestry-grown cocoa since it was founded in 2014. By the end of 2018, Cacao Oro had planted the preliminary 2,000 ha over five productive units (roughly 400 ha each) and had conserved 1,000 ha as a natural reserve and protection zone for waterways[1].

In 2020, the Land Degradation Neutrality (LDN) Fund, managed by Mirova, invested in Cacao Oro. This investment covered the construction of a post-harvest facility and the expansion of the agroforestry plantation by an additional 2,000 ha on lands damaged by Hurricane Felix in 2007[2]. In partnership with an Indigenous community, Cacao Oro aims to reforest a severely degraded area, reduce deforestation pressures, and regenerate canopy coverage to protect and restore soil health[3].

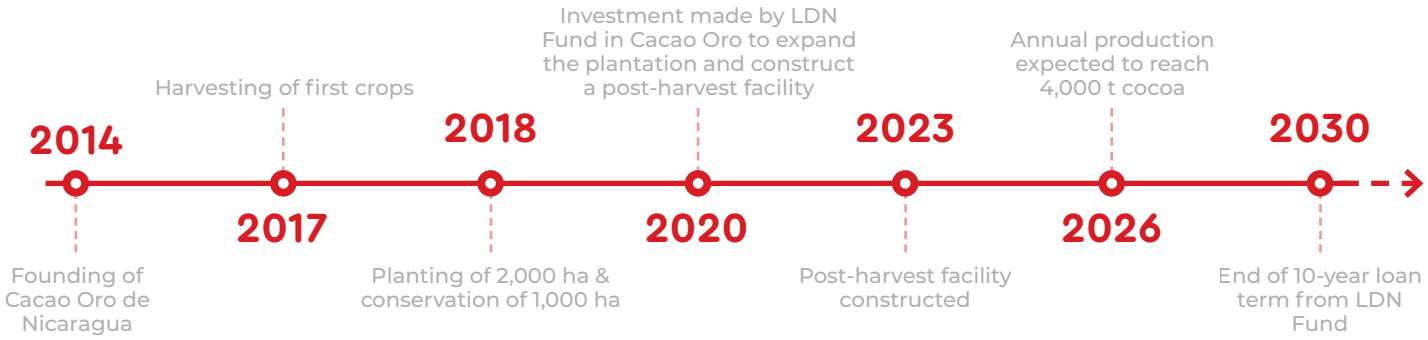
As part of the 2,000 ha expansion, the project will restore and reforest 1,250 ha of degraded and unproductive land owned by an Indigenous community[4]. Of the Indigenous community's land, 900 ha will be planted using a combination of native and commercial trees, coffee, and cacao crops, whilst 350 ha will be conserved. A further 150 ha of the expansion area that is not owned by the indigenous community will also be conserved. This is a typical investment for the LDN Fund, which mobilises public and private investment to support land degradation neutrality – a state in which the amount and quality of land resources remain constant, or increase, over time.

FINANCIAL CHARACTERISTICS

- **INVESTMENT SIZE**
  US $15 million
- **FINANCIAL INSTRUMENT**
  Profit sharing loan released over a 10-year period
- **BUSINESS MODEL**
  Higher yields and prices for certified cocoa and coffee grown in an agroforestry system; lower input costs
- **FINANCIAL PERFORMANCE**
  Low, double-digit internal rate of return (IRR) with a fixed interest rate and a benefit-sharing mechanism
- **RISK LEVEL**
  Medium

PROJECT PARTNERS

- **KEY FINANCIER**
  Land Degradation Neutrality (LDN) Fund (managed by Mirova)
- **LEAD IMPLEMENTER**
  Cacao Oro
- **LEGAL PARTNERS (LDN FUND)**
  García & Bodán, Gide
- **LEGAL PARTNER (CACAO ORO)**
  BLP Legal



CONTEXT

Over the past two decades, 25% of the world's arable land has been degraded or experienced high rates of degradation[5] [6]. Short-term economic benefits have been prioritised over long-term sustainability and the maintenance of healthy ecosystems. Exploitative modes of production have diminished soil quality and contributed to the degradation of 2 billion hectares of land worldwide[7].

The Cacao Oro project is in the Región Autónoma de la Costa Caribe Norte (RACCN), an autonomous region of Nicaragua. This location is geographically unique and home to a vast number of Indigenous territories, as well as the last natural rainforest of Nicaragua, which is northwest of the Cacao Oro farm and part of a biodiversity reserve. Much of the region's forests have disappeared in recent decades due to cattle ranching, agricultural production, private timber harvesting, illegal logging, and climate change[8]. Territorial conflicts between non-Indigenous populations who clear occupied land for commercial purposes and Indigenous communities have also affected the productivity and health of the land. The combination of these factors has led to wide-scale land and soil degradation[9].

BUSINESS MODEL

Cacao Oro produces certified agroforestry-based cacao and coffee sold on international markets, mainly in the United States and Europe. Their cacao and coffee fetch higher prices due to their high-quality and certification[10].

The LDN Fund's investment finances the overall development of Cacao Oro, including planting and maintenance of cacao and coffee on expanded area of the agroforestry plantation, construction of a post-harvest facility, and technical assistance. The investment also supports the harvesting of cacao and coffee and the corresponding logistics, sales, and marketing activities of Cacao Oro.

The original plantation was comprised of 1,800 ha of cacao and 200 ha of coffee[11], which will both increase with the farm expansion. Besides the plantation, a permanent seedling nursery has an annual potential production capacity of 1.5 million plants[12]. This nursery helps to lower input costs whilst ensuring high-quality cacao and coffee varieties are available. The costs of production per nursery tree have dropped from US $1.68 in 2015 to US $0.60 in 2022[13]. On Cacao Oro farm, the production of 1 t of fermented dried cocoa now stands at US $1,200, well below the Latin American average of US $1,700–$2,000/t for large-scale operations[14] [15]. The post-harvest facility will also safeguard the quality of crops, as produce can be stored and processed on-site.

Other native trees have been planted in the area surrounding coffee and cacao crops to provide shade, improve soil quality, and increase productivity. Currently, sustainable management practices have helped to increase yields to more than 1.5 t/ha per year[16]. By comparison, the global average for cocoa production is 438 kg/ha[17]. Total annual cocoa production of the core farm is expected to reach 4,000 t by 2026 at full production[18]. According to the LDN Fund, this investment will help to harness sustainable market potential over time whilst also restoring a degraded landscape.

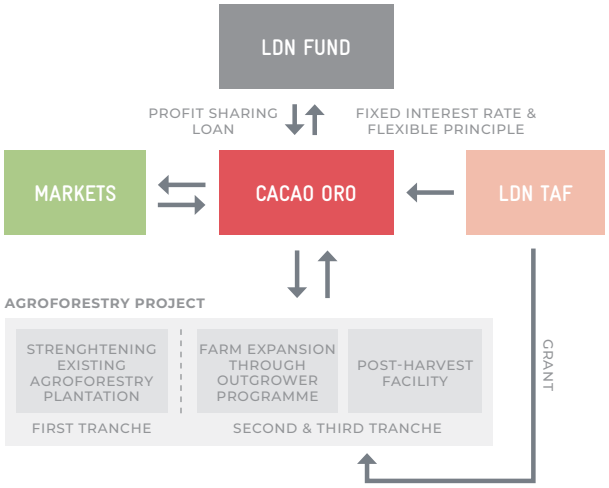
4,000
TONNES OF EXPECTED ANNUAL PRODUCTION

POSSIBILITY TO EXPAND TO AN ADDITIONAL
10,000 HA

ANNUAL PRODUCTION CAPACITY OF
1.5 MILLION
NURSERY PLANTS

INVESTMENT METRICS

- **INVESTMENT SIZE**
  US $15 million
- **KEY FINANCIER**
  LDN Fund
- **FINANCIAL INSTRUMENT**
  Profit-sharing loan with a fixed interest rate
- **FINANCIAL PERFORMANCE**
  Low, double-digit IRR with a fixed interest rate and a benefit-sharing component
- **TIME FRAME**
  10-year loan



Schematic representation of the investment structure

CURRENT PROJECT PHASE

Cacao Oro began operating on a farm of 3,000 ha, where the project planted 2,000 ha with cacao and coffee, conserved 1,000 ha, and constructed a tree nursery[19]. The first crops were harvested in 2017[20]. In 2020, the LDN Fund invested US $15 million in Cacao Oro to expand its agroforestry plantation by 2,000 ha and to construct a post-harvest facility that is expected to be completed in 2023[21].

Cacao Oro plans to scale up its production capacity through an innovative outgrower programme. This programme will not only provide tools to facilitate crop offtake but will also function as a renting scheme. Cacao Oro will rent land from the local Indigenous community and then provide employment opportunities to work on the plantation, first to community members and then to other locals.

However, Cacao Oro has faced some delays expanding onto the lands of local Indigenous communities. As part of the partnership agreement with communities, before planting can begin, a Free, Prior, and Informed Consent (FPIC) process must be completed to align all parties. This process is taking longer than anticipated. In the meantime, it is planting on neighbouring private lands where it has already completed such an assessment.

INVESTMENT STRUCTURE

The LDN Fund, managed by Mirova, an affiliate of Natixis Investment Managers, invested US $15 million in Cacao Oro through a profit-sharing loan that will be released in three tranches. The 10-year loan has a fixed interest rate and the LDN Fund receives a percentage of Cacao Oro's annual earnings during the investment period[22].

The investment in Cacao Oro is allocated for capital expenditures (CapEx), operational expenditures (OpEx), and for the expansion of agroforestry activities. All three tranches of the loan have now been released. The first tranche, released at financial close in 2020, was designated for strengthening operations on the original 2,000 ha plantation[23]. Technical assistance was provided in preparation for the release of the second and third tranches of funding. The second tranche was for expanding the farm through the outgrower programme and construction of the post-harvest facility[24]. This tranche was released upon Cacao Oro reaching pre-identified milestones, such as realising certain volumes and amounts of sales. The third tranche, which also contributed to farm expansion, was released when Cacao Oro finalised their Environmental and Social Action Plan (ESAP)[25]. Law firms García & Bodán and Gide provided consulting services to facilitate the investment. García & Bodán advised the LDN Fund on Nicaraguan law, including due diligence, wording, and formalisation. Gide advised the LDN Fund on structuring, financing, and arbitration. BLP Legal acted as legal counsel on behalf of Cacao Oro.

IMPACT

The project strives to achieve extensive environmental impacts. The 2,000 ha expansion will contribute to the restoration of an extremely degraded area of land, 500 ha of which will be used solely for conservation purposes[26]. The production of agricultural commodities, including cacao and coffee on the new plantation area, will also create a natural incentive against deforestation. This is because it creates an alternative income model for local communities not based on cutting of trees for fuelwood or timber sales. Furthermore, the plantation of hardwood species will help regenerate the forest canopy and improve soil conditions and water retention.

In addition to offering key environmental benefits, the project will improve the livelihoods of local Indigenous communities and promote gender equality. In the past, 500–600 community members depended on social welfare[27]. As a result of the Cacao Oro project's benefit-sharing model, more people will gain financial stability. An estimated 2,100 community members are expected to benefit from the project in the form of jobs, healthcare, and education[28]. In terms of gender equality, women make up roughly 35% of the overall workforce, whilst in key operations such as nursery management, they make up 70% of the workforce[29].

300+ CURRENT EMPLOYEES
EXPECTED TO DOUBLE IN FUTURE

WOMEN ACCOUNT FOR **70%** OF THE WORKFORCE IN KEY OPERATIONS

REFORESTATION & RESTORATION
OF EXTREMELY DEGRADED LAND

IMPROVED
BIODIVERSITY & SOIL QUALITY AND INCREASED WATER RETENTION

RISKS & SAFEGUARDS

Social risk

As there is a risk that the project could have a negative impact on local communities, a social and environmental impact assessment was conducted. This assessment aimed to understand the complex governance structures of the local Indigenous community and the historically problematic relationship they have had with forest concessions and co-operatives on their lands. Risk has been reduced through appropriate operational and environmental, social, and governance (ESG) risk management processes and the careful selection of implementation partners.

A strong FPIC process is also a precondition for the expansion of the project. The FPIC process undertaken by Cacao Oro conforms with the International Finance Corporation (IFC) Performance Standards, the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) of Land, Fisheries and Forests, and the national FPIC protocols of Nicaragua. In addition, Cacao Oro ensures that all parties have common and aligned interests when initiating a project together.

Environmental risk

Climate change, extreme weather, and other disasters, including hurricanes, are unavoidable risks for the project. In 2020, Hurricane Eta damaged part of the plantation, resulting in the loss of one year of harvest and the destruction of the nursery. Whilst the trees themselves were not damaged, the flowers, pods, and berries were lost. As a result, the expected increase in production was not realised and the nursery had to be rebuilt. Cacao Oro was nevertheless able to continue operations.

Track record and reputation of partners

The LDN Fund is co-promoted by the United Nations Convention to Combat Desertification (UNCCD) and Mirova. The LDN Fund has a track record of investments in profit-generating sustainable land management and restoration projects around the world.

Market volatility

Fluctuations in cacao and coffee prices are a risk for Cacao Oro's business model. Promisingly, cacao prices have increased in recent years. Although coffee prices are more volatile, coffee represents only a small part of the project's total production. Moreover, Cacao Oro has signed a three-year offtake agreement that will help reduce its exposure to price volatility[30].

POTENTIAL FOR REPLICATION & SCALABILITY

As Nicaragua has suffered from high rates of deforestation and land use change over the past three decades, the potential for land regeneration is significant. The agroforestry model could be expanded to another 10,000 ha depending on the availability of capital[31]. Hurricane Felix compounded land issues by flooding over 1.2 million acres of land in this region[32]. Thus, there are potentially millions of hectares of land that could be regenerated using sustainable production models.

The Cacao Oro project serves as proof of concept for other national initiatives. This includes the National Reforestation Crusade, which aims to reforest 30,000 ha annually, and the implementation of the ENDE-REDD+ Strategy, which is aimed at reducing deforestation and degradation-related emissions through active reforestation and restoration.

Depending on land rights, national infrastructure, legal structures, and the presence of experienced project operators, the Cacao Oro model could be replicated in other parts of the world.

LESSONS LEARNED

This project serves as proof of concept of a business and investment case for agroforestry-based agricultural systems.

For large-scale redevelopment projects to succeed, implementers need to engage experienced project operators on the ground who have a strong background in large-scale, technical agriculture, as well as familiarity with the context and climatic conditions of the region. A clear understanding of local and national governmental structures is also essential for successful implementation. Additionally, having an actively involved investor can benefit a project. The LDN Fund has been very active throughout its investment in Cacao Oro and continues to monitor the project closely, providing support whenever needed through its technical assistance facility managed by the Sustainable Trade Initiative (IDH).

Finally, it is wise to create flexible and modifiable repayment schedules for investees, as extreme weather events can have a major impact on production outputs and, in turn, the revenues of agricultural projects. Climate risk insurance could be an alternative solution, transferring the risk to the (re-)insurance market and hence, being able to stick to the initial repayment schedule.

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5. Case studies

5.3 ZEPHYR POWER LIMITED – MANGROVE RESTORATION

AT A GLANCE

Zephyr Power Limited (ZPL) developed a 50 MW Wind Independent Power Project (IPP) located in the delta of the Indus River in Gharo, Sindh Province of Pakistan. ZPL has used mangrove restoration and expansion on its site to offset its residual construction footprint on the environment whilst protecting its assets, enhancing resilience to climate change, and implementing its community social responsibility plan.

Gharo, Pakistan

Ongoing since 2017 (final close)

Investment project

Mangrove restoration

PROJECT DESCRIPTION

In 2017, Zephyr Power Limited (ZPL) started construction of a 50 MW wind power project to boost renewable energy production in Pakistan. When negotiating the financing of the project, British International Investment (BII) (formerly CDC Group) and FMO, the Dutch Entrepreneurial Development Bank (hereafter referred to as "Lenders"), made biodiversity conservation and social impact a key lending requirement, as did the shareholder groups, which also include BII.

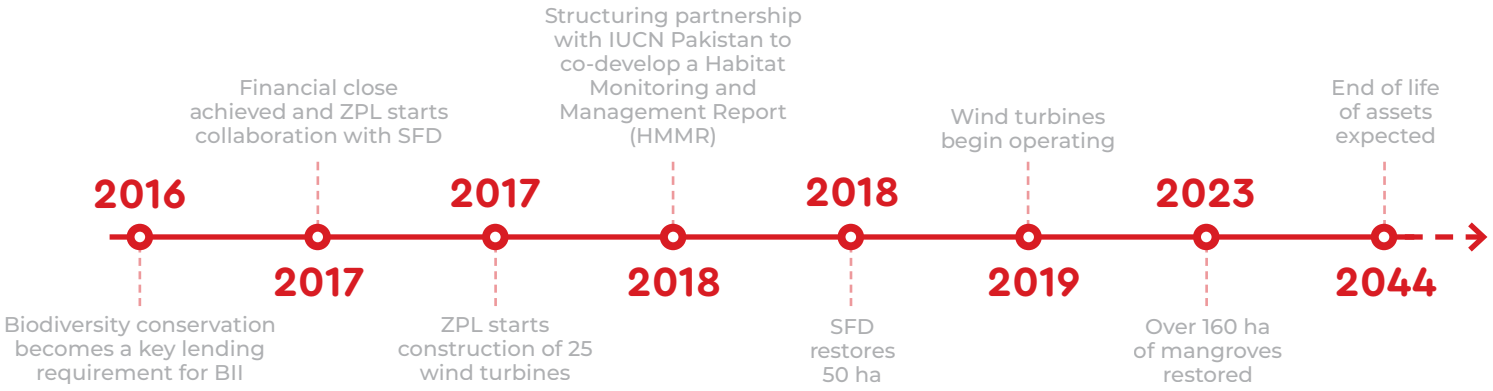
An Environment and Social Action Plan (ESAP) based on International Finance Corporation (IFC) guidelines was developed jointly by ZPL, Lenders, and the engineering, procurement, and construction (EPC) contractor, with advisory from Mott McDonald, to identify and offset any negative construction impacts and to increase the climate resiliency of the project. Under the ESAP, ZPL worked in coordination with Lenders, Mott McDonald, IUCN Pakistan, and the University of Karachi to create a Habitat Monitoring and Management Plan (HMMP) to offset the residual environmental impact on the site. ZPL is working with other stakeholders to exceed its pledge of restoring 14 ha under the HMMP[1]. As of 2023, the Government of Sindh's Forest Department (SFD), in coordination with ZPL, has successfully planted over 160 ha as part of a restoration programme for the area[2]. Under its offset obligations, ZPL is responsible for the plantation of the SFD, and maintenance, and monitoring of all propagated areas on its land, whilst new areas continue to be identified.

FINANCIAL CHARACTERISTICS

- **INVESTMENT SIZE**
  ~US $110 million for the entire project
- **FINANCIAL INSTRUMENT**
  Debt, equity
- **BUSINESS MODEL**
  Electricity sales, reduced asset replacement costs, reduced maintenance costs
- **FINANCIAL PERFORMANCE**
  Mangrove restoration provides US $7 million in cost savings from avoided civil infrastructure and project asset replacement and maintenance costs
- **RISK LEVEL**
  High, but risk mitigated to low through implementation of governance frameworks

PROJECT PARTNERS

- **KEY FINANCIERS: EQUITY**
  British International Investment (BII) (formerly CDC group), Khaleeli family, Gul Ahmed Metro Group, Mr. Sadek Dossa
- **KEY FINANCIERS: DEBT**
  BII, FMO, United Bank Limited
- **LEAD IMPLEMENTER**
  Zephyr Power Limited (ZPL)
- **OTHER IMPLEMENTATION PARTNERS**
  Sindh Forest Department (SFD), Mott McDonald, Business and Conservation Group, IUCN, University of Karachi



CONTEXT

There is a need to develop a more reliable, sustainable, balanced, and local energy supply in Pakistan. Since 2013, domestic power generation has increased whilst power blackouts, which used to be common due to a reliance on imported energy products, have been mitigated[3]. However, 63% of Pakistan's power is still generated using coal and fossil-based fuels[4]. The current government has revised Pakistan's Renewable Energy Policy and aims to generate 60% of energy using renewable sources (including hydropower) by 2030[5]. Thus, there is great potential for the development of renewable energy projects like ZPL.

The project area, which covers 1,028 ha, is located in the seventh largest mangrove ecosystem in the world and is part of the Indus River Delta – the world's fifth largest delta system[6]. Despite designing the wind Independent Power Project (IPP) with rising water levels in mind, accelerated climate change has increased the risk of flood damage to the project's infrastructure. Due to human interventions on the site, such as the cutting of mangroves for firewood, as well as fishing, crabbing, and camel grazing, the existing mangrove forest in the project area can no longer provide adequate protection against these risks[7].

BUSINESS MODEL

Due to the restoration of mangroves, the wind IPP infrastructure and access roads will be better protected in the future, leading to lower asset replacement and maintenance costs.

Earth Security, a consulting company specialising in Nature-based Solutions (NbS), estimates that the restoration of the 14 ha of mangroves as part of the wind IPPs offset obligations would return up to 20 times the value of the initial investment made in the civil infrastructure[8]. This return would be realised through US $7 million in cost savings for civil and project infrastructure over the 20-year lifespan of the project[9]. This consists of US $6 million in saved asset replacement and repair costs of roads and a submarine cable, and US $1 million (US $35,000–$40,000/year) in saved maintenance costs to other project infrastructure[10].

Whilst mangroves are known as the most effective carbon sink, storing 10 times more carbon than terrestrial forests, ZPL does not hold the rights to blue carbon credits[11]. Thus, despite the potential for carbon credits, they are not being leveraged as an additional revenue stream for this project. The restoration and protection of mangroves does, however, compensate for the construction footprint of the wind IPPs. ZPL has gone beyond the minimum 14 ha of mangrove restoration needed to mitigate the impact of construction, instead working with the SFD in the restoration of over 160 ha of mangroves whilst maintaining two mangrove nurseries on-site[12]. The nurseries are sufficient to plant newly identified areas on-site and for the ongoing maintenance and management of existing areas. As the nurseries are located in a floodplain, development and maintenance costs are remarkably low. Furthermore, the construction of the wind IPPs were planned around the natural system of the floodplain. Ensuring that the construction of the turbines would not block waterflows helps the restored mangroves to flourish and provides them with an environment where they can continue to restore themselves over time.

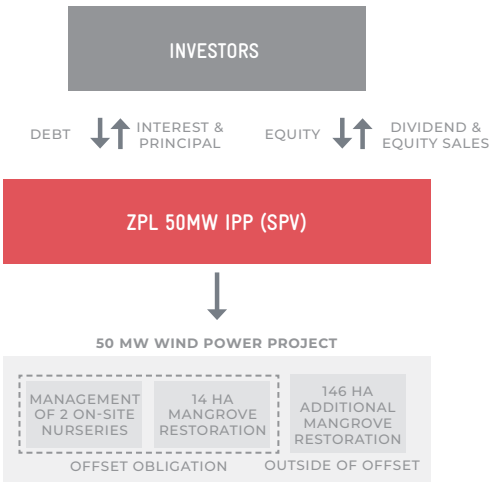
US $6 MILLION
IN COST SAVINGS TO CIVIL INFRASTRUCTURE

US $1 MILLION
IN SAVED MAINTENANCE COSTS OF PROJECT INFRASTRUCTURE

REDUCED FUTURE
RESTORATION COSTS
FROM ON-SITE NURSERIES

INVESTMENT METRICS

- **INVESTMENT SIZE**
  ~US $110 million
- **KEY FINANCIERS**
  Debt: BII (US $21 million), FMO (US $21 million), UBL (US $38 million)
  Equity: BII (US $15 million), Khaleeli Family, Gul Ahmed Metro Group, Mr. Sadek Dossa
- **FINANCIAL INSTRUMENT**
  Equity, debt
- **TIME FRAME**
  20 years (investment made in 2017)



Schematic representation of the investment structure

CURRENT PROJECT PHASE

BII was in conversation with ZPL for years before reaching financial close. BII played a key role in structuring the investment and, in 2016, made biodiversity conservation a key lending requirement. Whilst ZPL considered different options to meet the offset requirements, ZPL, BII, and FMO agreed that a mangrove restoration programme in coordination with an integrated community development programme would produce the most substantial environmental and community gains.

As part of the habitat mitigation programme, ZPL and SFD have set up mangrove nurseries to support the planting, restoration, and maintenance of the ecosystem. The total regenerated mangrove area is 160 ha, which was planted over five years[13]. The two mangrove nurseries in the project area are overseen by ZPL – one was initially planted by SFD and the other by ZPL. ZPL has identified several new areas for plantation, as well as areas to be replanted where original plantings fail.

INVESTMENT STRUCTURE

The total investment in the wind project amounts to ~US $110 million[14]. The wind IPP project has a lifespan of 20 years, whilst the project's infrastructure is expected to have a lifespan of over 25 years. Commitments to biodiversity conservation and community impact were a precondition for securing financing. BII was a cornerstone investor and the largest shareholder, with the remainder of shares held by a consortium of local partners, including the Khaleeli Family, the Gul Ahmed Metro Group, and Mr. Sadek Dossa[15]. As well as equity, BII supplied debt financing alongside FMO and United Bank Limited (UBL), which is one of the largest commercial banks in Pakistan[16]. BII owns ~25% debt and ~46.3% equity of ZPL[17]. This was the first time BII combined debt and equity products for an investee, providing a way to establish itself in Pakistan.

The restoration of mangroves on-site is covered as an operational expense and restoration activities were initiated midway through construction. Management and implementation of the restoration activities are relatively low cost as the two nurseries have reduced spending on mangrove shoots.

IMPACT

The protection and restoration of mangrove forests has been recognised as an effective adaptation strategy for increased flood risk, for reducing damage to civil and project infrastructure (i.e., roads and wind turbine platforms), and for carbon capture[18]. These benefits will be even more important as extreme weather events caused by climate change become more frequent and severe.

Mangroves also provide important breeding grounds for wildlife, helping to safeguard the incomes of local fishers and strengthen the aquaculture health of the delta, which benefits local communities and their livelihoods[19]. It is estimated that the restoration of 14 ha of mangroves on ZPL's project site will generate substantial economic benefits for local communities. For example, local fishers have reported a doubling of their shrimp catch from 5 kg to 10 kg a day[20]. This will generate US $270,000 annually or US $6.75 million over 20 years[21]. Another US $315,000 is expected to be generated through direct employment benefits to local communities[22]. In total, the restoration of mangroves is expected to generate US $7.065 million of additional economic value for local communities over 20 years[23].

By collaborating with the local government, the mangrove restoration project helps to raise awareness of the value of mangroves and the need for local communities to protect them. Local herders, for example, are encouraged to stop their animals from eating and destroying mangrove plants. Given the dynamic and rich nature of the site, ZPL's community development plan goes beyond mitigating negative impacts to proactively protecting natural assets and enhancing local livelihoods.

US $6.75 MILLION
INCREASED INCOME
FOR FISHERS OVER 20 YEARS

US $315,000
IN DIRECT EMPLOYMENT BENEFITS

DOUBLING
OF SHRIMP CATCH FROM 5 KG TO 10 KG PER DAY

160 HA OF
MANGROVES RESTORED
TO DATE

RISKS & SAFEGUARDS

Enabling environment

Although Pakistan is working to stimulate inward investment, it remains a challenging investment environment due to economic instability, lengthy dispute resolutions, weak legal enforcement, and unaligned regulations across the country.

Social risk

The lack of environmental awareness amongst local communities is a risk to the conservation of the mangroves that have been restored by the SFD and ZPL. The impact of mangrove restoration could be undone if locals disturb the propagules (via fishing, crabbing, netting, camel grazing, etc.) or cut mature mangroves for firewood. Thus, ZPL has collaborated with the SFD to raise environmental awareness amongst local communities and to discourage behaviour that could negatively affect the mangrove forest.

Environmental risk

Biodiversity was a key lending requirement for investment, with ZPL creating an ESAP to offset the negative impacts of construction and increase climate resilience. The project ensures that all wildlife and community impacts are monitored as part of the HMMP. The construction of its own mangrove nursery to harvest the mangrove plants for restoration efforts makes ZPL less dependent on the SFD, which also planted its own mangrove nursery. This increases the resilience of the project in the face of extreme weather events, as ZPL can supply its own mangrove propagules to replace damaged ones and increase the area of conserved and restored mangroves.

POTENTIAL FOR REPLICATION & SCALABILITY

ZPL has employed and trained local community members to maintain the already-planted mangrove propagules and the nurseries. The SFD maintains a close relationship with ZPL and aims to leverage this project to inspire other private actors in the future. Furthermore, BII organised a research project to demonstrate the benefits of nature-based approaches to others in the private sector. Its partner, Earth Security, is looking explicitly at how NbS can create economic value by making project assets more resilient to climate change.

LESSONS LEARNED

This case stresses the value and importance of nature to reducing risk and strengthening the climate resilience of infrastructure projects. Given the vast return on investment so far, there is evidence of a solid business case for mangrove restoration.

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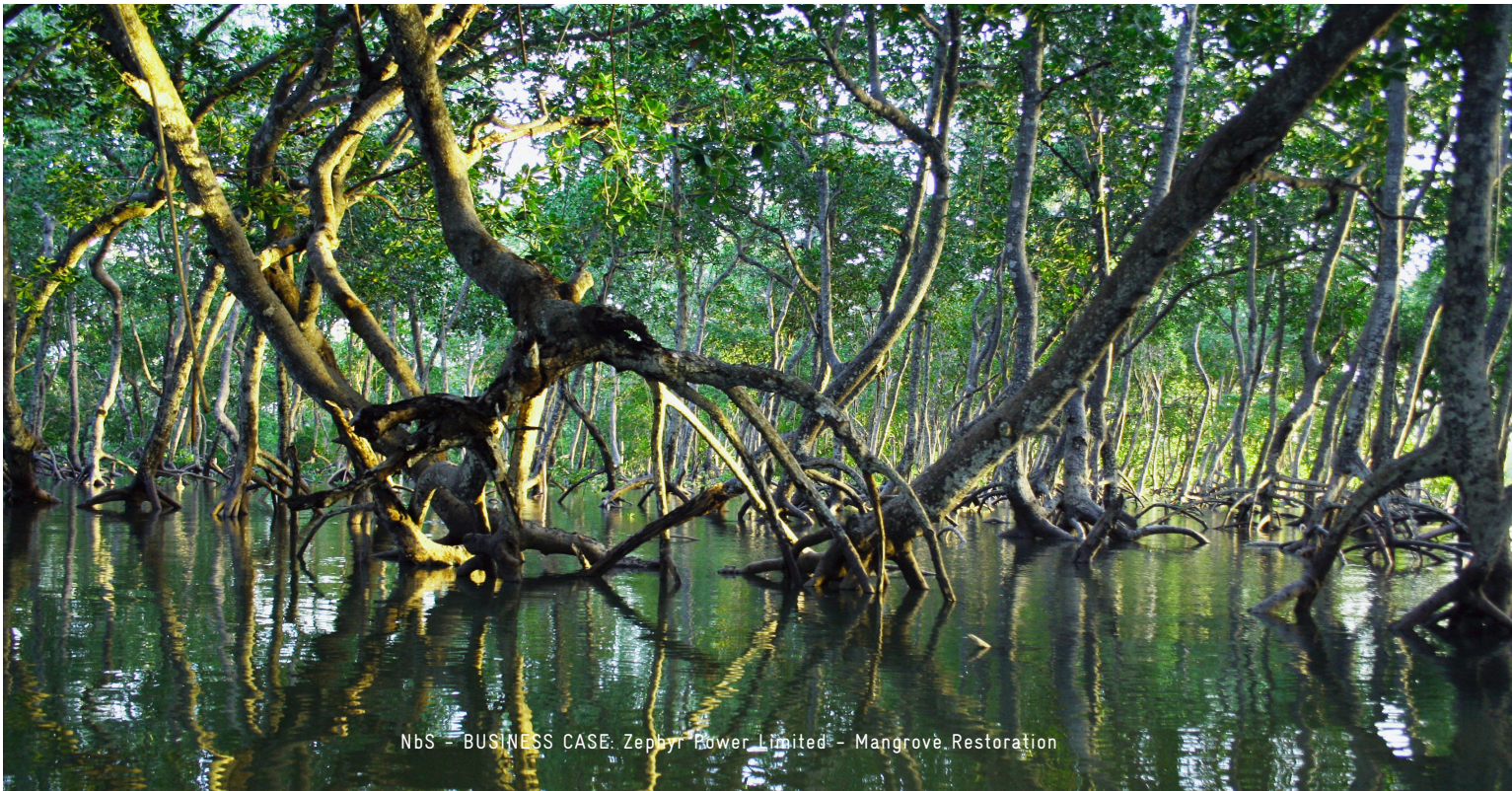


5. Case studies

5.4 AMAZON BIODIVERSITY FUND (ABF)

AT A GLANCE

The Amazon Biodiversity Fund (ABF) is an impact investment fund that invests in nature-based businesses in the Legal Amazon region of Brazil. The ABF selects and accelerates business models based on sustainable small-scale agricultural systems, restoration, reforestation, and conservation, and improving the quality of life of local communities. The ABF invests in projects that have the potential to create large-scale positive impacts on biodiversity.

Legal Amazon, Brazil

Ongoing since 2019

Investment Fund

Agroforestry, Nature restoration

PROJECT DESCRIPTION

The Amazon Biodiversity Fund (ABF) is advised by Impact Earth, a new venture focussed on impact investing and Nature-based Solutions (NbS). The ABF is the first private impact investment fund entirely dedicated to investing in projects that improve biodiversity in the Legal Amazon region of Brazil. The ABF invests in businesses and projects that apply sustainable agroforestry systems, conserve protected areas, or deliver services that support biodiversity. It plans to continue investing in Amazonian businesses and projects that engage in sustainable activities that protect, restore, or enhance biodiversity and the quality of life of local communities.

The ABF prioritises investments in four key areas:

1. Conservation and improvement of local communities' quality of life
2. Sustainable small-scale systems for producers and farmers
3. Sustainable agriculture, reforestation, and restoration projects
4. Innovative businesses in the fields of biodiversity, finance, and technology

FINANCIAL CHARACTERISTICS

- **FUND SIZE**
  Total target size of €50 million
- **FUND LOCATION**
  Brazil
- **FINANCIAL INSTRUMENT**
  Convertible debt, loans (carbon-backed notes and revenue-based), equity and Portfolio Credit Guarantee
- **BUSINESS MODEL**
  Revenues from sales of agricultural products and NTFPs. Environmental/biodiversity revenues including sales of voluntary carbon units (VCUs)
- **FINANCIAL PERFORMANCE**
  Market-based returns
- **RISK LEVEL**
  Low

PROJECT PARTNERS

- **FUND MANAGER**
  Impact Earth
- **FUND ADVISER**
  Impact Earth (spin-off of Mirova Natural Capital)
- **KEY FINANCIERS**
  International Center for Tropical Agriculture (CIAT), ASN Biodiversity Fund, and others
- **STRUCTURING PARTNERS**
  USAID, International Center for Tropical Agriculture (CIAT)
- **PORTFOLIO CREDIT GUARANTOR**
  Development Finance Corporation (DFC)

CONTEXT

Over the past 50 years, over 17% of the Amazon rainforest has been deforested[1]. This is particularly concerning as the Amazon rainforest is responsible for the annual absorption of a quarter of all carbon absorbed by land[2]. Continuing deforestation and degradation of ecosystems is driving the forest towards a potentially irreversible tipping point, with unpredictable and catastrophic consequences likely. This could trigger a devastating transformation from a rainforest ecosystem to a savanna ecosystem, which would cause large-scale drying across the entire region[3]. As a result, the rainforest's ability to capture carbon and stabilise the climate would be reduced, leading to a loss in resiliency of the Amazon[4].

The ABF focussed its strategy on Brazil to generate the greatest possible positive impacts for biodiversity, as the country is home to two-thirds of the Amazon rainforest[5]. The Legal Amazon is an important socio-geographic region of Brazil, containing nine Brazilian states, 24 million people, and encompassing 60% of the Amazon's total territory[6].

REVENUES FROM SALES OF CARBON CREDITS

REVENUES FROM SALES OF NATIVE AGRICULTURAL COMMODITIES

REVENUES FROM SALES OF NTFPs

BUSINESS MODEL

The ABF has invested in several businesses to date, ranging from agroforestry projects to food and beverage producers looking to scale up operations, to projects based on the sale of carbon credits.

The ABF provides loans to businesses and projects that face challenges in the early stages of their operations, such as with start-up and scaling costs. Through innovative blended finance models, the Fund provides flexible, long-term, impact-based investment to help businesses realise transformational and positive impacts within their local environments.

The investee companies generate returns in various ways. For example, in the cases of Amazon Agroflorestal, Inocas, and ReforesTerra, revenue streams include the

AMAZÔNIA agroflorestal

AMAZON AGROFLORESTAL

Amazon Agroflorestal is based on a successful pilot project, Cafe Apuí, and falls within a broader REDD+ carbon project. Amazon Agroflorestal provides 300 coffee farmers – two-thirds of whom are smallholders and over 90% small- and medium-sized farmers – with technical assistance and native trees[7] to shift from unsustainable farming practices to organic, agroforestry-based coffee production. This support will help farmers conserve an estimated 35,000 ha of standing forest habitat and biodiversity in the Amazon[8], and boost their incomes due to higher-quality coffee, greater yields, a reliable route to market, and payments for conservation via carbon credit sales.

Investment size: US $2,050,357[9]
Investment date: 2022
Industry: Coffee production
NbS mechanism: Coffee produced in agroforestry systems on a landscape scale
Revenue generation: Carbon credit revenue for avoided emissions, sales of certified organic coffee products
Impact: Engaging large numbers of smallholders in the implementation of agroforestry systems helps to increase overall yields and positive impacts on biodiversity. Producers must agree to not engage in any form of deforestation on their lands (in high-deforestation areas).

MANIOCA

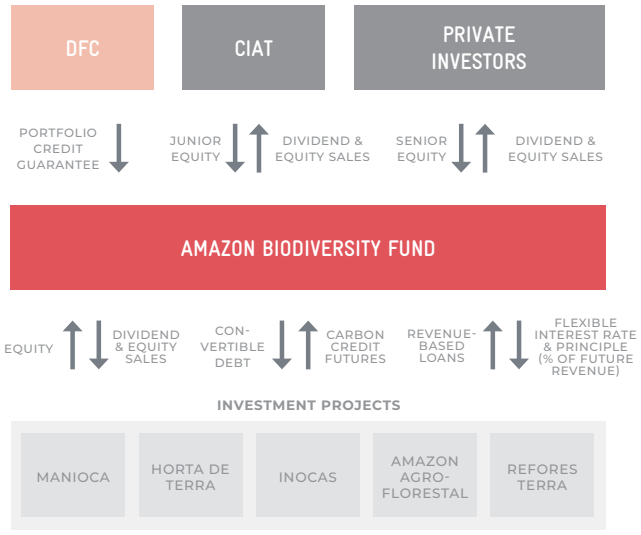
MANIOCA

Manioca was launched in 2014. The business produces and sells food products derived from manioc (cassava), using the biodiversity of the Amazon as the basis for its recipes. Manioca purchases the raw materials from family farmers using agroforestry systems, organic agriculture, and extractivism, and invests in these farmers with technical assistance[10]. It also purchases some ingredients from Indigenous and traditional families that are part of the Origins Brazil network. The ABF's investment promotes a productive supply chain of small producers that generate income from preserving standing forest and biodiversity and making these items accessible to consumers as 100% natural foods.

Investment date: 2021
Industry: Food and beverage products derived from manioc
NbS mechanism: Promotion of native products that do not require land transition or conversion. Manioc is sourced locally and sustainably.
Revenue generation: Sales of manioc products
Impact: Community empowerment, revenues for local producers and communities, and no land conversion. Manioca encourages farmers to transition to growing this native plant to secure its supply.

INVESTMENT METRICS

- **FUND ADVISER**
  Impact Earth
- **FUND SIZE**
  US $50 million
- **AVERAGE INVESTMENT SIZE**
  US $700,000–$2.5 million
- **KEY FINANCIERS**
  ASN Biodiversity Fund, CIAT
- **FINANCIAL INSTRUMENT**
  Convertible debt, loans (carbon-backed notes and revenue-based), equity, Portfolio Credit Guarantee
- **PORTFOLIO CREDIT GUARANTEE**
  DFC: up to 50% of principal for debt allocations
- **TIME FRAME**
  11 years (2019–2030)



Schematic representation of the investment structure

sales of carbon credits, which are generated by removing or avoiding carbon emissions. With these projects there are payments for ecosystem services (PES), or profit-sharing agreements, in place with local communities. These agreements ensure that, whilst the ABF receives revenues from the sale of carbon credits, they are shared in an equitable and transparent manner with local communities. Meanwhile, for projects such as Manioca and Horta de Terra, revenues are generated from the sale of agricultural commodities and Non-Timber Forestry Products (NTFPs).

CURRENT PROJECT PHASE

The ABF was established in 2019 with a bottom-up, flexible investment and management approach. It received an anchor investment from CIAT of US $15 million in the same year[11]. After beginning operations in 2020, it was taken under the wing of the newly established Impact Earth in 2022, which was created by former key persons of Mirova Natural Capital[12].

To date, the ABF has closed investments in five companies in the Legal Amazon that have sustainable business models and contribute to the conservation of biodiversity. The Fund aims to make 15–20 total investments by the end of the investment period in 2025, depending on the amount of capital it can mobilise[13]. Starting in 2021, the ABF invested in businesses that produce food and beverage commodities using crops that are native to the Amazon region. These investments included Manioca and Horta de Terra. The ABF invested in another such business in 2022: Inocas[14].

In 2022, the ABF also began investing in projects that involve the generation and sale of carbon credits, closing two investments in Amazon Agroflorestal and ReforesTerra[15].

INVESTMENT STRUCTURE

The ABF has an 11-year term (2019–2030), with the first five years serving as an investment period[16]. It is a blended finance fund that invests equity, convertible debt, and loans in businesses and projects in the venture stage of their operations. The ABF invests specifically in businesses that are in this stage because there are already many funds that target businesses in the growth phase and it is striving to fill funding gaps.

The total target size of the ABF is €50 million[17] and reached financial close in May 2023. The ABF makes investments of €700,000–€2.5 million in businesses and

projects[18], primarily by using carbon-backed notes and revenue-based loans. Carbon-backed notes can leverage sequestered CO2 to generate financial returns. Carbon emission removals have monetary value, making carbon credits a strong alternative form of currency that is expected to increase in value in the future. Revenue-based loans incur no fixed interest payments, instead depending on paying a percentage of a business' future turnover.

The Fund benefits from a "double-lock" risk mitigation instrument: the DFC provides a Portfolio Credit Guarantee of 50% of any losses of the portfolio, with a limit of US $100 million[19]. The ABF is a layered fund, having both junior and senior shares available for purchase, which helps to further mitigate risk as the junior share provides first-loss protection for senior shareholders. Through an investment of US $15 million in the junior tranche, CIAT reduced risk for investors in the senior tranche[20].

IMPACT

The ABF and its investments are expected to bring significant social and environmental benefits to local businesses and communities in the Legal Amazon. The conservation and restoration of native forest areas, and the implementation of more sustainable agricultural production and sourcing practices by food and beverage businesses, will create positive impacts for local biodiversity. The ABF is not allowed to make investments in monoculture plantations, instead targeting investments in projects that have positive impacts on ecosystems and biodiversity values.

IMPROVED QUALITY OF LOCAL BIODIVERSITY & ECOSYSTEMS

The Fund also focusses on assessing the additionality of the projects it invests in, paying close attention to the benefits of these projects for local communities and biodiversity. The ABF has strict key performance indicators (KPIs) linked to seven thematic areas, including biodiversity and climate[21]. These include measuring the presence of species in an area and the amount of "adequate" habitat that has been preserved or made available for species. Although investee businesses should typically try to meet all the KPIs, there are some that do not. Only certain biodiversity-related KPIs are compulsory; the most important thing for the ABF is that companies are transparent in their reporting and are striving to meet the KPIs.

MORE BUSINESSES IMPLEMENTING SUSTAINABLE AGRICULTURAL TECHNIQUES

REDUCED DEFORESTATION & DEGRADATION

RISKS & SAFEGUARDS

Enabling environment & political context

Since the start of Bolsonaro's presidency, legal protections for the Amazon and environmental safeguards and regulations have been rapidly slashed, resulting in increased deforestation rates. The unstable and unpredictable regulatory environment has made investors uncertain about investing in Brazil. However, with the re-election of President Lula, there have been signals that this trend will be reversed, as the new administration has indicated that preservation and protection of the Amazon will be a priority[22].

Social & environmental risk

The ABF is not investing in monoculture plantations. Moreover, before investing, it must follow and implement rigorous ESG and impact-screening procedures to guarantee the sustainable impacts and value for biodiversity expected from a project. Specific biodiversity indicators have been developed by USAID and CIAT to monitor the ABF on a continuous basis.

Projects such as ReforesTerra operate in areas with a high prevalence of slash-and-burn techniques – a practice that is hard to discourage. In areas with high levels of deforestation, there is a higher risk of non-compliance with no-deforestation agreements. The ABF seeks to reduce risks of deforestation by investing in projects where the implementation area is non-contiguous. Although one area of forest may be damaged by farmers who choose to use slash-and-burn techniques or convert land, other smallholders will be in unaffected parts of the landscape. This also helps to safeguard against risks of extreme weather events such as forest fires, flooding, or landslides, which are prevalent in project areas. Although a fire or flood may damage parts of a landscape, it is unlikely that an entire landscape would be affected, thus the non-contiguous nature of projects helps to reduce exposure to multiple risks.

POTENTIAL FOR REPLICATION & SCALABILITY

The ABF is aiming to demonstrate early proof of success so that a larger ABF 2 (and other funds) can be developed in the future. The Fund's performance and its ability to demonstrate that a biodiversity-positive economy in the Amazon is a viable endeavour would encourage more funds to be allocated. There is growing demand for such types of investments and projects.

Track-record & reputation

The ABF won the Fund of the Year award in 2020 at the Environmental Finance IMPACT Awards, which recognises and rewards impact investment projects and funds that showcase best practices and recognisable impacts[23].

Availability of risk capital

The DFC's Portfolio Credit Guarantee of up to 50% of portfolio losses helps to reduce risk for investors and make the ABF more attractive. Although it is unlikely that the guarantee would be activated, it is a very useful tool to manage risk for mainstream private investors who are entering unknown territory. The layered set-up of the fund, including junior and senior tranches, provides first-loss protection to senior shareholders.

LESSONS LEARNED

Impact Earth is leveraging a proven, flexible investment framework to tailor the ABF's investments to the individual needs of investee businesses and projects. The bottom-up approach of the Fund is designed to offer maximum additionality and fill funding gaps. By providing tailored solutions to projects and businesses using blended finance, it has increased opportunities to invest in different businesses and projects and has encountered limited competition to date.

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5. Case studies

5.5 AFRICA CONSERVATION AND COMMUNITIES TOURISM FUND (ACCT)

AT A GLANCE

The ACCT Fund was developed by The Nature Conservancy (TNC) and ThirdWay Partners in response to the detrimental effects of the COVID-19 pandemic on tourism operators in sub-Saharan Africa. It aims to support core tourism operators that contribute to conservation in critical landscapes and that benefit local communities. The Fund helps businesses to maintain their operations and meet their financial obligations to ensure they will survive and grow after the pandemic.

Sub-Saharan Africa: Botswana, Kenya, Namibia, Tanzania, South Africa, Zambia

Ongoing, first close in 2021, second close in 2023

Investment fund

Nature conservation & Nature tourism

THIS CASE STUDY HAS BEEN CREATED BASED ON DESK STUDY AND AN INTERVIEW WITH THIRDWAY PARTNERS. UNFORTUNATELY, A FINAL VALIDATION OF THE CASE STUDY BY THE CASE OWNER COULD NOT TAKE PLACE IN TIME FOR PUBLICATION.

PROJECT DESCRIPTION

The ACCT Fund was created in response to the negative economic effects of the COVID-19 pandemic on tourism operators. This included the loss of jobs and community benefits, as well as lost sources of income that do not rely on land conversion and environmentally harmful practices. ThirdWay Partners and The Nature Conservancy (TNC) developed the ACCT Fund to support tourism operators through the pandemic. This support was crucial in ensuring these operators would be able to continue meeting their monetary commitments, and for their businesses to survive, recover, and grow post-COVID.

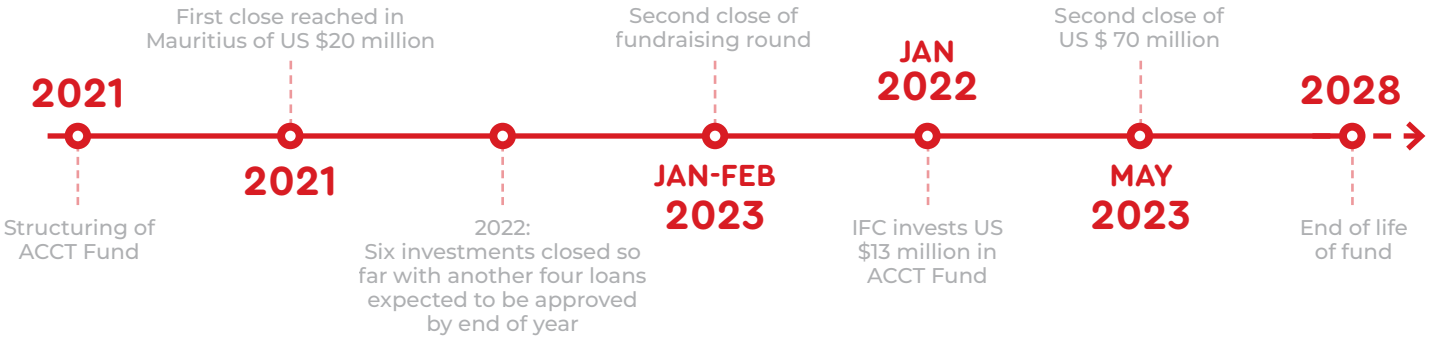
The Fund provides loans to operators with "boots on the ground" in priority countries in Africa. This includes countries with large safari destinations and where TNC has already established a strong presence. The Fund targets ecotourism operators, particularly of camps, lodges, beach resorts, and coastal destinations. Selected businesses are often at the core of their area or industry, which means they play a central role in upholding their industry where they operate through the provision of local jobs. Otherwise, the Fund aims to invest in tourism businesses that are involved in the conservation of critical areas, such as national parks and protected areas, where the withdrawal of funding could lead to the degradation of important ecological areas[1]. This ensures that the capital provided by the Fund helps to safeguard against the collapse of core operators or core conservation areas.

FINANCIAL CHARACTERISTICS

- **FUND SIZE**
  Final close of US $70 million
- **FUND LOCATION**
  Mauritius
- **MINIMUM INVESTMENT SIZE**
  US $500,000
- **FINANCIAL INSTRUMENT**
  Loans (mostly concessional debt), equity, grants
- **BUSINESS MODEL**
  Revenue generated from tourism operations
- **FINANCIAL PERFORMANCE**
  US $40 million in annual revenue (for conservation landscape owners, managers, and communities)

PROJECT PARTNERS

- **FUND MANAGER AND INVESTMENT ADVISER**
  ThirdWay Partners
- **KEY FINANCIERS**
  The Nature Conservancy (TNC), KfW Development Bank
- **CO-FINANCING PARTNERS**
  USAID, International Finance Corporation (IFC), ASN Biodiversity Fund, Ceniarth, Align Impact and other limited partnerships
- **STRUCTURING PARTNER**
  The Nature Conservancy (TNC)



CONTEXT

Following the 2019 outbreak of the COVID-19 pandemic and resulting widescale lockdowns, many tourism operators suffered from a loss of business. Many such businesses in sub-Saharan Africa have experienced financial stress as guest numbers fell by 85%–95%[2]. Loss of tourism revenues creates a variety of undesirable consequences: loss of income and jobs for locals, loss of community benefits, and a loss of incentives to protect and preserve ecosystems for their intrinsic value. This means that local communities and tourism operators will often revert to more lucrative sources of generating income that degrade nature, including land conversion and monocropping, as well as illegal poaching[3].

BUSINESS MODEL

With a minimum threshold of US $500,000, the ACCT Fund provides low-cost, flexible financing to large tourism operators that have positive impacts on nature and biodiversity, as well as local communities[4]. It provides steady capital to safeguard their operations where there is high potential to support critical landscapes and dependent communities[5]. The investments of the Fund will also help to generate US $4.9 million in annual revenue for managers and landscape owners in conservation areas[6]. Successful examples include investments in protected areas, large safari operators, and national parks. These investments ensure that tourism enterprises are better positioned to grow post-COVID-19 and strengthen their resilience to potential future economic shocks.

The ACCT Fund strives to ensure that operators develop diversified revenue streams from tourism operations such as safari tours, campsites, and park entrance fees, and is working towards climate adaptation and mitigation[7]. In the future, the Fund will explore the potential to leverage carbon sequestration as an additional revenue stream via carbon credit sales.

PROVIDING FINANCIAL INCENTIVES FOR CONSERVATION AND PROTECTION OF CRITICAL ECOSYSTEMS

INCREASED FINANCIAL RESILIENCE TO FUTURE ECONOMIC SHOCKS

MAINTENANCE OF OPERATIONS AND CONTINUED FINANCING TO HELP MEET FINANCIAL COMMITMENTS

INVESTMENT STRUCTURE

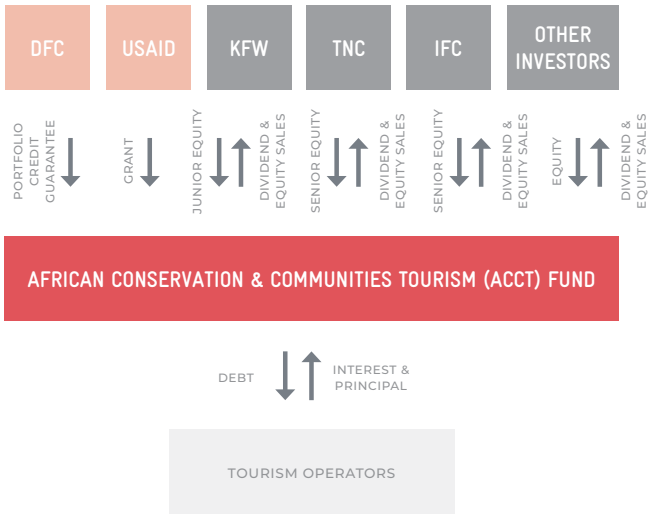
The ACCT Fund is a blended finance fund that channels capital to projects through grants and debt finance. Its first close of US $20 million was in 2021, and it reached a final close of US $70 million in May 2023[8].

The Fund received US $2.5 million in catalytic grant funding from USAID and another US $20 million in senior tranche capital from its anchor investor TNC[9] [10]. The KfW Development Bank has contributed US $25 million in the junior equity tranche[11]. In February 2023, the ACCT Fund received additional investment from the IFC, which approved the provision of US $13 million in equity to the senior equity tranche[12]. ThirdWay Partners has also raised contributions from ASN Biodiversity Fund, Ceniarth, Align Impact, as well as a number of limited partnerships (LPs).

The investment capital of the ACCT Fund will be deployed over the next several years, and the Fund itself has a seven-year lifespan (2021–2028). As the Fund was created in response to the COVID-19 pandemic, there was a relatively short initial deployment period, with investors wanting money to reach tourism operators as soon as possible. Thus, the first investments were made in 2021 soon after the first close.

INVESTMENT METRICS

- **FUND MANAGER**
  ThirdWay Partners
- **FUND ADVISOR**
  TNC
- **CORNERSTONE INVESTORS**
  TNC & KfW
- **CO-FINANCING PARTNERS**
  USAID, ASN Biodiversity Fund, Ceniarth, Align Impact, and other LPs
- **TICKET SIZE**
  Final close of US $70 million in 2023
- **AVERAGE TICKET SIZE**
  USD 2 to 3 million
- **TERM/TIMEFRAME**
  7 years (2021-2028)
- **FINANCIAL INSTRUMENT**
  Debt funding (mostly concessional), equity, grants



‹ Schematic representation of the fund structure

The ACCT Fund provides three tranches of capital: a grant tranche, a junior equity tranche, and a senior equity tranche[13]. Investments range from a minimum value of US $500,000, with the average investment being US $2–$3 million[14]. Cost and repayment profiles of loans are geared to the recovery of the business post-COVID. Loans are also directly linked to the achievement of measurable and verifiable community and conservation outcomes and the implementation of environmental and community covenants. Breaching a covenant will result in a 2% monetary penalty being added to the investee's annual interest rate[15]. Loan terms are also designed to be flexible to mitigate repayment risks and help tourism operators navigate the protracted economic downturn following COVID-19.

TNC acts as a cornerstone investor and conservation adviser for the ACCT Fund. In addition to providing start-up capital, TNC also helped to structure the Fund, drawing on its experience with the structuring of similar funds. ThirdWay Partners acts as the Fund's investment adviser. Furthermore, TNC monitors and reviews each potential investment for its prospective community and conservation value before approving a loan.

IMPACT

Given that the ACCT Fund invests in businesses with significant conservation or community impacts in their landscape of operation, it is creating benefits for both people and nature. The built-in ecological and community-based covenants that are part of every loan provide clear conservation and social terms that must be met to avoid monetary penalties. This helps to ensure that minimum conservation and community benefits are realised. Borrowers must therefore adhere to covenants on issues such as conservation practices, local sourcing, and local employment.

So far, the Fund has preserved, protected, or enhanced conservation practices over 84,000 km2 of land by providing significant finance flows for conservation activities in areas with valuable biodiversity and ecosystems[16]. In addition, the Fund's investments will support the creation and maintenance of thousands of jobs for local people and help local communities gain land ownership, leadership opportunities, and stable income streams[17]. To date, US $1.3 million has been driven towards local economies due to the Fund's investments. The Fund is also expected to bring benefits to the well-being and education of local community members[18].

SUPPORTING 84,000KM2 OF PROTECTED & CONSERVED AREAS

USD $1.3 MILLION DRIVEN INTO LOCAL ECONOMIES SO FAR

US $4.9 MILLION IN ANNUAL REVENUE FOR MANAGERS AND LANDSCAPE OWNERS

Examples of impact covenants:

CONSERVATION, ECOSYSTEM PROTECTION, AND MANAGEMENT COVENANTS

Committing to a minimum annual payment of $X for a set period of years for a manager of Protected Areas.

Committing additional finance of $X annually for protection and enhancement of conservation areas through defined actions.

COMMUNITY AND ECONOMY COVENANTS

Committing to providing a set number of permanent and temporary jobs for a specified number of years for locals.

Committing to investing $X annually in local communities[19].

RISKS & SAFEGUARDS

Environmental risk

To ensure positive environmental and social impacts, the Fund's loans have conservation and impact covenants tailored specifically to the context of each loan recipient.

All potential investments must receive prior approval from the Conservation Committee, which consists of five conservation experts: two TNC members, one from ThirdWay partners, and two independent experts[20]. The Committee's experts evaluate the conservation commitments of the businesses seeking to borrow money, as well as their capabilities for improving their current practices. TNC is responsible for monitoring and managing any environmental and social risks.

Track record and reputation

TNC is active in over 60 countries and has a strong, established presence in several of the countries where the Fund will invest. Meanwhile, ThirdWay Partners is an impact investment and advisory company that has experience in the area of sustainable development. It has a long history and high levels of expertise in impact investment and inclusive sustainable development models.

Availability of risk capital

The availability of grant funding can help to mobilise additional private investment and ensure the commercial viability of the Fund. Furthermore, it can reduce risk for private investors. The different tranches of risk and return profiles also attract commercial investors that are more risk averse.

POTENTIAL FOR REPLICATION & SCALABILITY

There is potential to develop a second, larger fund that is scaled to different geographies. ThirdWay Partners has identified Latin America as a potential future region for the focus of such a fund.

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5. Case studies

5.6 QUINTANA ROO CORAL REEF INSURANCE

AT A GLANCE

Hurricanes and other extreme weather events induced by climate change represent a serious threat to coral reef ecosystems. These risks have been recognised by the State Government of Quintana Roo, which has incentivised the creation of an insurance scheme for coral reefs. The insurance scheme provides an innovative financial solution against loss and damage to the coral reef, ensuring immediate pay-out after a hurricane. This helps to protect the coastal environment, local livelihoods, and the thriving tourism industry of Quintana Roo.

Quintana Roo, Mexico

Ongoing since 2018

Insurance vehicle

Coral reef rehabilitation

PROJECT DESCRIPTION

The project was first conceived by The Nature Conservancy (TNC), which found that the loss of the reef in Quintana Roo could triple damage costs to buildings along the coastline[1]. In 2018, an insurance solution was launched – a collaboration between Swiss Re, TNC, and the State Government of Quintana Roo – that insured the reef based on its economic value to the region. This insurance scheme was the first of its kind worldwide.

The coral reef insurance covers an area of 400 km along the coastline of Quintana Roo. It is a parametric insurance that provides payment when wind speeds reach 96 knots or above within 60 km of the reef[2]. Payments will be made within 30 days of confirmation of such an event[3]. These funds are then used by "the Brigade", a reef rehabilitation team of 80 trained members that includes tour guides, fishers, marine biologists, and other scientists, working primarily on a voluntary basis. The Brigade assesses the damage, rehabilitates the reef, and cleans up the beach after a hurricane.

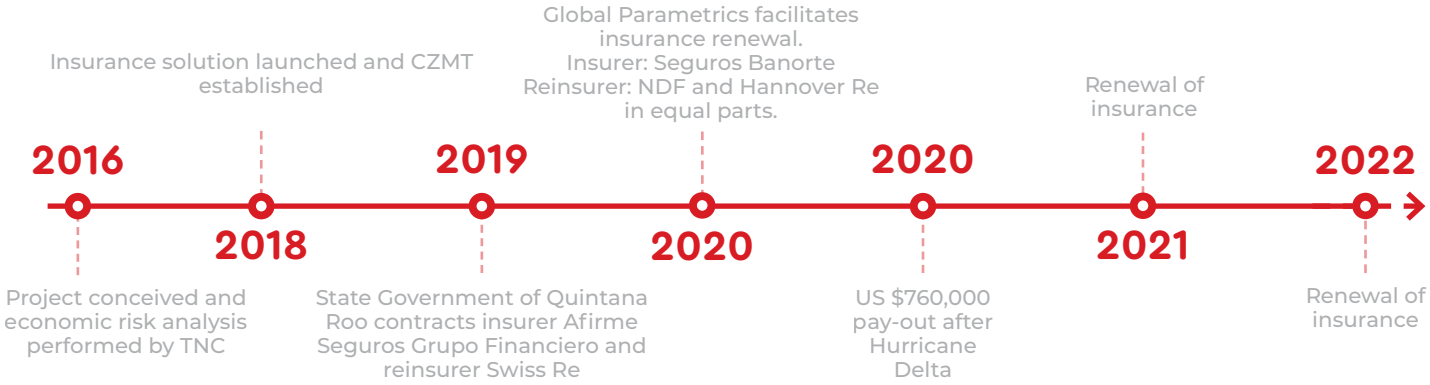
Compared to indemnity-based insurance, parametric insurance pays out more quickly as it does not require damage surveys. This is important as a rapid response helps to prevent further damage to the reef, promote quick recovery, and minimise damages to local communities and tourism businesses that may suffer from beach debris.

INSURANCE METRICS

- **TYPE OF INSURANCE**
  Parametric insurance
- **COVERAGE OBJECTIVE**
  Protection of coral reefs from hurricanes
- **INSURED AREA**
  400 km of the Mesoamerican Reef along the Yucatán Peninsula (2022)
- **POLICY HOLDER**
  State Government of Quintana Roo
- **INSURANCE LIMIT**
  US $3.8 million in 2019, 2022 limit is lower
- **BUSINESS MODEL**
  Insurance premium paid by the Coastal Zone Management Trust (CZMT) with fees generated through public and private sources

PROJECT PARTNERS

- **CREATOR OF COASTAL ZONE MANAGEMENT TRUST (CZMT)**
  State Government of Quintana Roo, The Nature Conservancy (TNC), and other partners
- **MAIN PARTNERS: INCEPTION OF PARAMETRIC INSURANCE POLICY**
  TNC, Afirme Seguros Grupo Financiero, Swiss Re
- **MAIN PARTNERS: RENEWAL OF PARAMETRIC INSURANCE POLICY**
  Global Parametrics, Grupo Financiero Banorte, Hannover Re, Natural Disaster Fund (NDF)
- **IMPLEMENTING PARTNER FOR REEF REHABILITATION**
  The Reef Rehabilitation Team: "the Brigade"



CONTEXT

The Mesoamerican Reef is the largest barrier reef in the western hemisphere, providing a habitat for some of the world's most important aquatic biodiversity[4]. The coral reefs of the Yucatán Peninsula also serve as a hub for tourism, generating economic value for the local community. The reef is pivotal in protecting the coastline and tourism infrastructure against extreme weather events and coastal erosion[5]. Yet, the reef remains under threat from the increasing frequency and strength of storms and hurricanes. Reefs can lose 20%–60% of their coral cover after a category 4 or 5 hurricane[6]. This risk has been heightened due to climate change. Climate adaptation in the form of rehabilitating coral reefs is therefore essential to protecting valuable ecosystems, livelihoods, and local economies.

The need for rapid rehabilitation of damaged coral reefs was recognised by the State Government of Quintana Roo, which partnered with TNC and Swiss Re to incentivise the creation of the first insurance solution for the preservation of an ecosystem.

BUSINESS MODEL

The entire Mesoamerican Reef has the capacity to reduce wave energy by up to 97%; the loss of one meter in reef height can triple damage costs[7]. Recent studies have highlighted that the 1,000 km reef mitigates annual damage costs to buildings by US $42 million and can prevent US $20.8 million in annual damage costs to local hotel infrastructure caused by storms and coastal erosion[8]. Thus, timely protection and rehabilitation of coral reefs after a tropical storm can significantly reduce costs and protect the US $10 billion tourism industry of Quintana Roo[9].

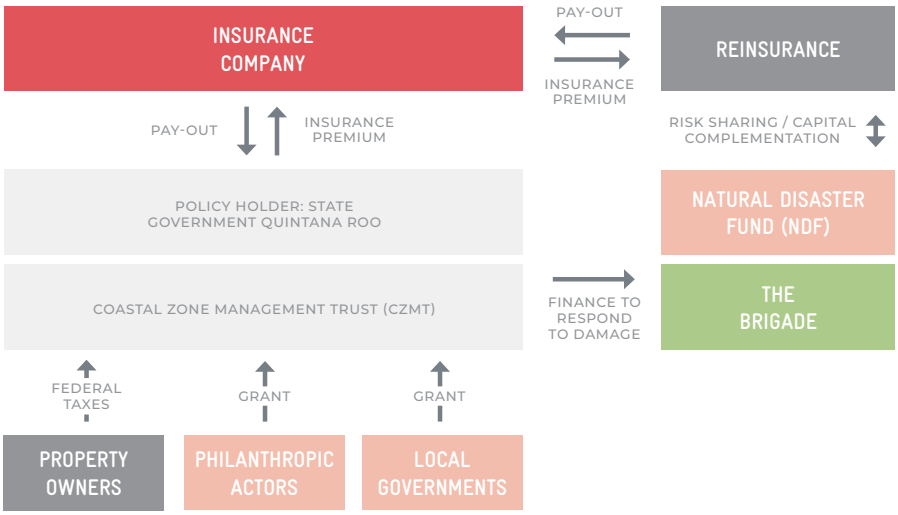
Whilst the insurance solution was being created, the State Government of Quintana Roo, together with stakeholders, created the Coastal Zone Management Trust (CZMT) which is dedicated to coral reef rehabilitation. Fees are generated from property owners, such as hotels, that pay annual federal taxes for the use of coastal areas. A portion of these fees go to the CZMT, which also receives government funding and philanthropic grants. The CZMT contracts the Brigade to assess and rehabilitate the coral reefs and coastal ecosystems.

INSURANCE METRICS

- **TYPE OF INSURANCE**
  Parametric insurance
- **COVERAGE OBJECTIVE**
  Protection of coral reefs from hurricanes (50% of pay-out for reef rehabilitation, 50% of pay-out for coastal ecosystem rehabilitation)
- **INSURED AREA**
  400 km of the Mesoamerican Reef along the Yucatán Peninsula
- **POLICYHOLDER**
  State Government of Quintana Roo
- **POLICY LIMIT**
  US $3.8 million in 2019, 2022 limit is lower
- **TRIGGER FOR PAY-OUT**
  Wind speed of 96 knots within 60 km of coastline, 40% for 110 knots, 80% for 130 knots, and 100% for 160 knots
- **TIME FRAME**
  Contract duration of one year, renewable

INSURANCE STRUCTURE

The programme is based on a local risk transfer agreement between Seguros Banorte and the CZMT. As the insurance policyholder, the State Government of Quintana Roo pays the insurance premium via the CZMT. The parametric insurance contract has a term of one year, after which it may be renewed[10]. Seguros Banorte is reinsured by the capacity of Hannover Re and the Natural Disaster Fund (NDF) in equal parts. The NDF, which is managed through Global Parametrics, is co-funded by the British and German governments and financially topped up by Hannover Re. Pay-outs vary according to wind strength, with the insurer paying a proportion of the policy limit whenever the parametric index is triggered by wind speeds reaching 96 knots or above within 60km of the reef[11]. The percentage of the pay-outs is determined by the probability of that wind speed occurring[12]. The State Government of Quintana Roo divides the pay-out 50-50 between rehabilitating coral reefs and coastal ecosystems[13].



Schematic representation of the insurance structure

CURRENT PROJECT PHASE

The parametric insurance solution and the CZMT were launched in 2018. In 2019, the Mexican insurance company, Seguros Banorte, provided the policy[14]. Swiss Re, one of the world's largest reinsurance companies, provided reinsurance capacity[15]. When the insurance policy was renewed in 2020, Seguros Banorte provided the insurance policy with reinsurance from Hannover Re and the NDF in equal parts[16]. This continuous renewal shows the market development for such an insurance solution.

In 2020, a pay-out of US $760,000 was triggered by Hurricane Delta, a category-3 storm[17]. This enabled the Brigade team to respond to the damage within one week[18]. The Brigade ultimately transplanted over 9,000 fragments of broken coral and helped stabilise 1,200 displaced coral colonies within the Puerto Morelos National Park[19].

IMPACT

Not only does the insurance mechanism protect the coral reef and its aquatic biodiversity against climate risks, but it also mitigates the impact of these risks on local communities and the local economy. The coral reefs of Quintana Roo are an important tourism attraction; Quintana Roo receives over 12 million tourists each year, generating an estimated US $10 billion in revenue and creating 148,300 jobs[20]. In the past, devastating hurricanes have caused hotel closures, affecting the local tourism industry. Immediate rehabilitation of coral reefs helps to reduce the costs of damage to critical tourism infrastructure. Incentivising the rehabilitation of coral reefs can thus be beneficial to local industries that rely on coral reefs for indirect protection.

400KM
OF CORAL REEF PROTECTED

4,600
HOMES INDIRECTLY PROTECTED

In addition to the economic benefits, the rehabilitation and protection of the reef may also benefit the homes of an estimated 4,600 people who live along the coastline, as it reduces their vulnerability to the impacts of tropical storms[21].

REDUCES VULNERABILITY TO STORM IMPACTS

RISKS & SAFEGUARDS

Enabling environment

Mexico provides a strong enabling environment for innovative insurance solutions. The country has a great deal of experience with parametric solutions, and there are no legal barriers to the development of a coral reef insurance solution.

Environmental risk

The risk of negative externalities from rehabilitation activities that are not undertaken correctly has been mitigated by providing professional training to the Brigade. TNC has created protocols, recruited reef Brigade members, and delivered intensive classroom and underwater training sessions.

Track record and reputation

The coral reef insurance solution was designed and structured in collaboration with several reputable companies and organisations and backed by the State Government of Quintana Roo. Having a public body as the policyholder considerably minimises the risk of failure to pay the insurance premium. The combined knowledge and experience of TNC and Swiss Re helped to create a sound insurance product. TNC has deep knowledge and experience conserving natural assets, whilst Swiss Re is experienced in comprehensive disaster risk financing and parametric insurance.

Risk-sharing mechanism

Hannover Re shares the risks associated with the parametric insurance mechanism through its partnership with the NDF. Seguros Banorte is reinsured with the capacity of NDF and Hannover Re in equal parts. As a government-funded entity, the NDF can facilitate smaller, impact-focussed deals and take on the riskier part of the deployment.

Pay-out vs actual damage

With parametric insurance mechanisms, there is a risk that the pay-out will not match the actual costs of damage ("basis risk"). Improvements in monitoring technologies, risk modelling, and scenario analysis helps to safeguard against this risk by creating a more realistic understanding of the expected damage costs and the insurance premium. When the pay-out is higher than the actual damage costs, the surplus can be reinvested in activities that help to improve the resilience of the reef and reduce future damage costs.

POTENTIAL FOR REPLICATION AND SCALABILITY

The world's first coral insurance policy has proven to be an effective Nature-based Solution to mitigate the impact of climate risks and natural disasters. In 2021, the Mesoamerican Reef (MAR) Fund adopted the same kind of policy across the entirety of the Mesoamerican Reef. The Nature Conservancy hopes the coral reef insurance model will serve as a blueprint for building new insurance markets.

Due to the flexible set-up of parametric insurance, a similar type of mechanism could also be designed for different contexts and to protect other types of ecosystems, such as mangroves. Mangroves also play a key role in protecting infrastructure. Their annual value is estimated at USD 65 billion in prevented property damage as a result of coastal storms[22].

LESSONS LEARNED

The experience of Hurricane Delta in 2020 showed that the coral reef insurance scheme worked effectively; the pay-out was timely and rehabilitation activities started within one week[23].

However, the scheme has changed since its launch in 2018. Contracts are now awarded through a public tender every year, which has reshaped the policy, budget, and area covered.

"THE EXPERIENCE OF HURRICANE DELTA SHOWED THAT THE CORAL REEF INSURANCE SCHEME WORKED EFFECTIVELY; THE PAY-OUT WAS TIMELY AND REHABILITATION ACTIVITIES WERE ALREADY STARTED WITHIN ONE WEEK."

The insurance policy has also changed since the COVID-19 pandemic, which had a significant negative impact on the number of visitors to Quintana Roo (only 6.3% of the usual reference period)[24]. This led to a drop in revenue from tourism, which affected the amount of fees collected for the scheme. As parametric insurance schemes are quite flexible and adaptable, they can be adjusted to new situations based on the available premium. For example, by reducing the total policy limit or changing pay-out thresholds. Since the launch of the insurance scheme in 2018, the insured area has been expanded whilst the premium and policy limit have been reduced.

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5. Case studies

5.7 MESOAMERICAN REEF (MAR) INSURANCE PROGRAMME

AT A GLANCE

The intensity and frequency of extreme weather events are threatening the survival of coral reef ecosystems. Along a 1,000 km stretch of the Mesoamerican Reef, a gridded parametric insurance product has been developed to support the timely and successful recovery of reef ecosystems damaged by hurricanes and storms. The regional approach of the insurance scheme enables the pooling of risk as it covers seven reef sites across four countries under one policy. The gridded nature of the insurance product considers the proximity of hurricanes to at-risk reefs, enabling pay-outs to be correlated more closely to expected damage to the reef.

Belize, Guatemala, Honduras, Mexico

Ongoing since 2021

Insurance vehicle

Coral reef rehabilitation

KEY FEATURES

Established governance structure

The Mesoamerican Reef (MAR) Insurance Programme is managed by its policyholder, the MAR Fund. It uses the MAR Fund's existing Emergency Fund to receive and disburse pay-outs if a triggering event occurs. The pay-outs are channelled to local partners to support pre-agreed reef response plans and protocols. This established regional governance and administration framework incentivises more robust contingency planning and facilitates the pay-out process. As a result, pay-outs can be disbursed more rapidly to the Emergency Response Groups at each of the covered reef sites[1].

Risk pooling through adopting a regional approach

The MAR Insurance Programme's regional approach covers seven reef sites across four countries under one insurance policy[2]. There are a number of benefits of pooling risks from multiple reef sites under a single insurance policy, including minimising insurance costs by reducing annual volatility in pay-outs[3]. This, in turn, lowers the amount of capital that risk-takers need to allocate to cover extreme years, making it possible to reduce the premium. Risk pooling also lowers frictional costs by having only one policy placement and administrative process[4]. Furthermore, the regional approach maximises collaborative action and peer learning related to reef response efforts, thus contributing to stronger regional conservation outcomes[5].

Gridded parametric insurance

The MAR Insurance Programme is underpinned by a more sophisticated parametric insurance product compared to Quintana Roo. For Quintana Roo, a pure parametric scheme is utilised; beaches and reefs along the coastline are covered in a more general way and the triggered pay-out is the same throughout the covered area. This broad coverage leads to a higher level of basis risk as the pay-out structure does not consider the spatial distribution of the hazard, reef, or impacts. The MAR

KEY INSURANCE METRICS

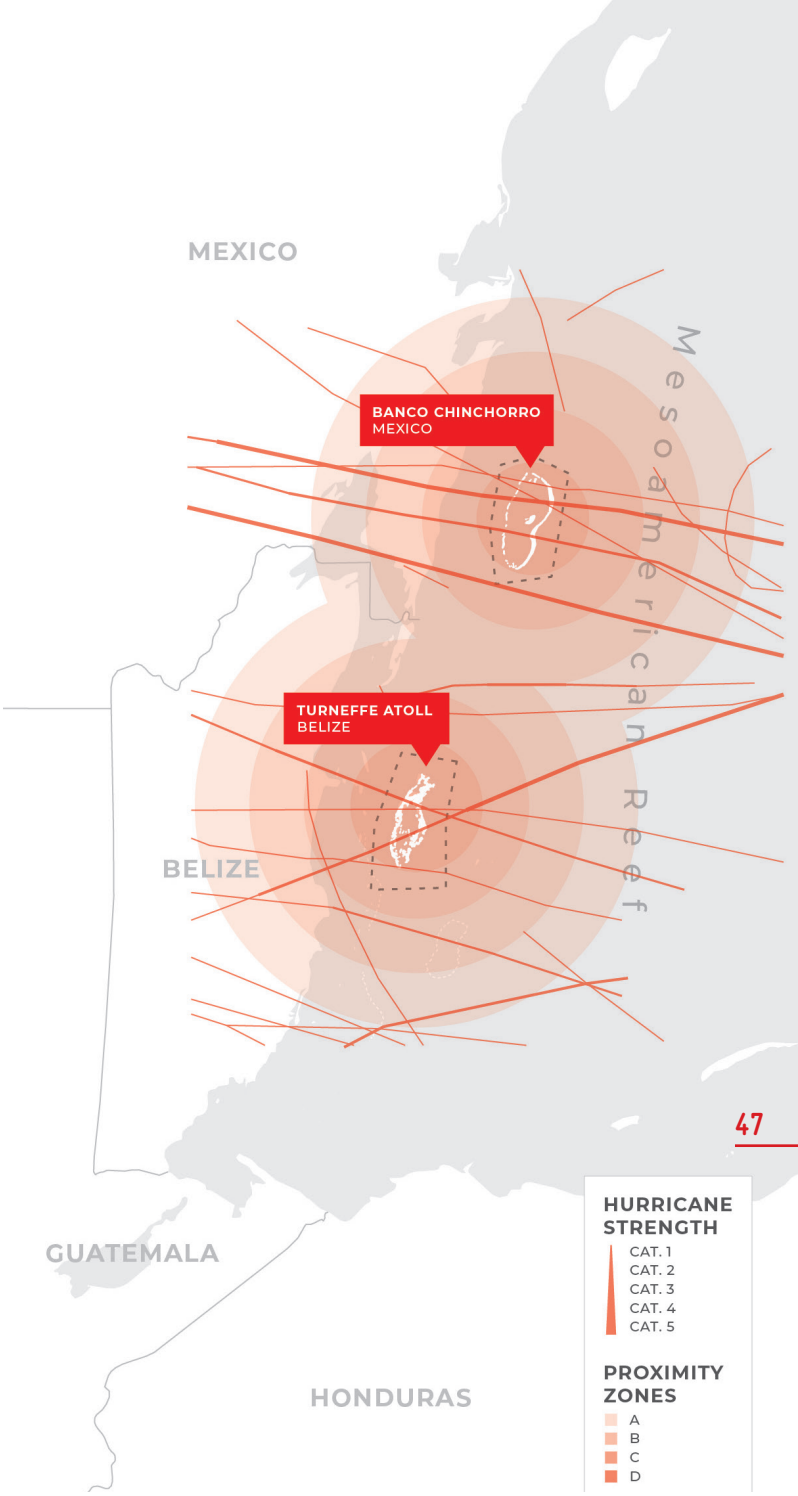
- **TYPE OF INSURANCE**
  Gridded parametric insurance
- **COVERAGE OBJECTIVE**
  Support immediate coral reef response efforts after hurricanes
- **INSURED AREA**
  1,000 km of the Mesoamerican Reef covering seven sites across four countries
- **POLICYHOLDER**
  Mesoamerican Reef (MAR) Fund
- **INSURANCE LIMIT**
  US $3 million in 2019 (entire programme)
- **TRIGGER FOR PAY-OUT**
  Wind speed of at least 64 knots (category 1 hurricane) within the coverage area
- **KEY PARTNERS**
  MAR Fund, WTW's Climate and Resilience Hub, InsuResilience Solutions Fund, AXA Climate, Munich Re

Insurance Programme, on the other hand, provides a gridded parametric insurance product that considers the proximity of the hurricane to the reef area; thus, pay-out amounts are correlated more closely to expected damage[6]. In addition to a programme aggregate limit, all sites have their own limits and the insurance pay-out depends on wind speed (associated with category 1–5 hurricanes) and proximity to the reef[7].

This can be seen in the map, where a set of four circles represent different zones of proximity: zone A is farthest from the reef, whilst zone D sits around the coral reef site. The insurance product is thus more sensitive to the spatial distribution of hurricane intensity, reef impacts, and response costs. This sophisticated approach ultimately enables lower-cost of reef insurance.

Premium financing covered by international aid

To date, the InsuResilience Solutions Fund (ISF) has provided the MAR Fund with support for the premium. This differs from the Quintana Roo programme where fees for the insurance premium are generated in part from taxes paid by property owners that benefit from the reef area[8]. The MAR Insurance Programme is currently developing a sustainable premium financing strategy that is not solely dependent on donor support[9].



MAIN DEVELOPMENTS

Successful pay-out in 2022

The MAR Insurance Programme passed its first test on 2nd November 2022, when Hurricane Lisa landed in the Turneffe Atoll of Belize and triggered the first pay-out[10]. This category 1 hurricane struck the zone closest to the reef, zone D, triggering a US $175,000 pay-out that financed coral reef recovery and rehabilitation[11]. The MAR Fund received the pay-out in full within only two weeks of this event[12]. The funds were transferred within 48 hours to a reef brigade team of 13 members, who were then deployed to two sites on the Turneffe Atoll to assess and respond to the damage[13].

Scaling and replication in the future

A long-term premium financing strategy is in development for the MAR Insurance Programme, with an aim to raise more funding to cover the insurance premiums of a diverse range of actors[14]. This could, as in the case of the Quintana Roo Coral Reef Insurance, include the national and local governments, businesses, and tourists that benefit from healthy coral reefs and, therefore, the insurance. The MAR Insurance Programme is investigating the feasibility and scale of different financing sources, as well as potential aggregation mechanisms[15].

The MAR Fund is exploring, alongside partners, opportunities to replicate similar models outside the Mesoamerican Reef. For a similar insurance scheme to work in other locations, capacity and experience with coral reef conservation and rehabilitation, or a willingness to learn, are required. In the case of the MAR Insurance Programme, there was already capacity in the region and the MAR Fund collaborated with strong local partners on the ground. Another precondition for replication is available data. Designing an effective parametric mechanism requires trusted, real-time data, as well as historical data, over a sufficient period (e.g., 20 years).

MAIN CHALLENGES AND OPPORTUNITIES WHEN DEVELOPING INSURANCE SOLUTIONS FOR PROTECTING AND REHABILITATING CORAL REEFS

Parametric insurance is a promising mechanism for supporting the restoration of natural assets following damaging events. It enables a rapid pay-out and response effort, which are necessary to maximise the chance of successful reef restoration outcomes, timely recovery of the reef, and mitigation of further damage to the reef and nearby communities. Still, it is a relatively new solution that needs to be tested in various locations over a longer period to demonstrate the business case and its impacts for investors and insurance product developers.

The case studies of Quintana Roo and the MAR Insurance Programme demonstrate that public finance and development finance are key in the pilot stage of coral reef parametric insurance solutions, either by complementing capital for pay-outs or by (partly) covering the premium. At the same time, these cases show there is demand from the risk-taking community for these types of policies and programmes.

With the MAR Insurance Programme, basis risk is reduced due to two important factors. First, the availability of specific and reliable data on the occurrence and intensity of hurricanes, which enables the informed design of a tailored and gridded parametric product that can be tested. Second, because the programme structure covers the entirety of the reef and extends 75 km around it, the potential damages caused by hurricanes to coral reefs can be captured[16]. The gridded parametric product enables this by accounting for the proximity of a hurricane to a reef area, allowing pay-outs to be tailored to expected levels of reef damage.

More affordable premiums have also been made possible by adopting a regional approach that pools risk. Whilst such an approach can provide major benefits, working in multiple countries presents challenges when identifying sustainable and fair local mechanisms for covering insurance premiums, as in the MAR case[17]. A multi-country approach means dealing with a wide variety of stakeholders and economic conditions, which makes it challenging to define who pays and how much.

Coral reef insurance solutions are gaining traction, and there are growing opportunities to replicate these solutions in other parts of the world. Since the inception of the Quintana Roo and MAR Insurance Programme schemes, new programmes that protect and restore coral reefs are being developed. Interesting examples to date include the coral reef insurance scheme launched in Hawaii in 2022 by WTW and TNC, and the exploratory work by the Asian Development Bank (ADB), Asia-Pacific Climate Finance Fund (ACliFF), and the Global Environment Facility (GEF) in Fiji, Indonesia, the Philippines, and Solomon Islands[18] [19] [20]. Whilst these are promising developments, it cannot be assumed that coral reef insurance will be appropriate in every context. Moreover, there is much potential to develop insurance schemes that cover other ecosystems, such as mangroves.

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5. Case studies

5.8 RESTORATION INSURANCE SERVICE COMPANY (RISCO)

AT A GLANCE

Storms and extreme flooding are increasing in frequency and intensity due to climate change and biodiversity loss, leading to large-scale damages to coastal assets and communities. The Restoration Insurance Service Company (RISCO) is envisioned as a social enterprise that will incentivise the conservation and restoration of mangroves in coastal areas by calculating the risk-reduction benefits of mangroves for coastal assets exposed to storms, typhoons, and flooding. By incorporating this information in insurance pricing, insurance companies could lower premiums for insurance products that cover nearby assets. RISCO is set up to generate additional revenue via the sale of carbon credits from mangrove restoration.

The Philippines (Pilot), Asia

Ongoing since 2019

Insurance vehicle

Mangrove restoration

KEY FEATURES

Risk reduction through mangrove restoration

Extreme flooding and storms are increasing in severity and frequency due to climate change, and this is exacerbated by biodiversity loss, resulting in large-scale damage to coastal assets and communities. Mangroves provide an important solution to reducing wave height and intensity, and therefore reducing coastal exposure to flood damage[1]. Annually, mangroves provide protection to over 15 million people and over US $65 billion in coastal assets worldwide[2]. Mangroves also provide huge potential for climate change mitigation, as they are capable of storing 10 times more carbon than some terrestrial forests[3]. Despite these benefits, around 50% of the world's mangroves have been deforested in the past 50 years[4].

The benefits of restoring and conserving mangrove forests have been recognised by Conservation International (CI), which have partnered with Swiss Re Foundation, amongst others, to develop methods to quantify and monetise the risk-reduction benefits of mangroves. The Restoration Insurance Service Company (RISCO) is envisioned as the world's first social enterprise instrument to finance mangrove conservation and restoration[5]. RISCO invests in areas with coastal assets and high exposure to storms, flooding, and typhoons. It partners with local insurance and coastal asset owners to develop insurance products that reflect the risk-reduction values that mangroves provide.

Business model

The business model of RISCO is based on cost savings from the risk-reduction benefits provided by mangroves. RISCO will receive service fees for quantifying these benefits monetarily, particularly for insurance companies and coastal asset owners[6]. It will generate additional income through the sale of blue carbon credits from the conservation and restoration of mangroves[7]. Using the

INSURANCE METRICS

- **TYPE OF INSURANCE**
  Indemnity products, in the process of exploring parametric insurance products
- **COVERAGE OBJECTIVE**
  Protection of coastal assets from storm and flood risk
- **POLICYHOLDER**
  Coastal asset owners
- **BUSINESS MODEL**
  Sales of blue carbon credits, service fees from insurance companies, and the potential for reduced insurance premiums

PROJECT PARTNERS

- **CREATOR OF RISCO VEHICLE**
  Conservation International (CI)
- **MAIN STRUCTURING PARTNER**
  Global Lab for Climate Finance
- **FINANCIAL PARTNERS**
  Convergence, impact investors, insurance companies, blue carbon credit buyers
- **IMPLEMENTATION VEHICLE**
  RISCO

fees received for their monetary valuation service, and the generation and sale of blue carbon credits, RISCO will cover project costs, repay investors, and invest in additional restoration and conservation activities.

Insurance scheme structure and rationale

RISCO intends to first apply its methodology to indemnity-based insurance in the form of property insurance for assets, including airports, hotels, ports, industrial estates, and residential properties[8]. By integrating the benefits of mangroves in the insurance pricing, lower premiums could be achieved, therefore, conservation or even restoration of mangroves is incentivised through insurance schemes.

Note: RISCO is under development and is subject to change.

MAIN DEVELOPMENTS

Learning from the pilot study

The RISCO model was first developed in 2019. Following a two-year period of research, feasibility testing, and mobilisation of investment, the project's first pilot locations were selected in the Philippines. In the Philippines, floods, typhoons, and storms are responsible for around 80% of disaster-related losses and damages[9]. However, the country also has significant experience with large-scale mangrove restoration, making it an attractive pilot location. The insurance products and business model are still under development for the Philippines and RISCO is establishing relationships with local insurance companies and coastal asset owners. This phase is expected to be completed in 2023. The pilot in the Philippines has faced several challenges thus far, particularly with the already very low insurance premiums in the country, which have complicated the further reduction of premiums from pricing in the risk-reduction benefits of mangroves[10].

RISCO expects to expand its model to other locations in the future, such as India and Thailand. For replication to be successful, future pilots must meet three key conditions: 1. Sites must have sufficiently large mangrove coverage to justify project development and have significant exposure to storms, flooding, and typhoons; 2. Selected regions and countries must have sufficiently developed non-life insurance markets; and 3. The legal and economic structures must be suitable for carbon credits and allow for crediting[11].

MAIN CHALLENGES AND OPPORTUNITIES WHEN CONSIDERING THE RISK-REDUCTION BENEFITS OF NATURE IN INSURANCE UNDERWRITING

Pricing in the risk-reduction benefits of NbS for nearby assets (e.g., hotel buildings) in insurance policies (e.g., property insurance) can result in a triple win. Reduced exposure and vulnerability, leading to lower average annual losses for (re-)insurance companies. This, in turn, enables lower premiums for policyholders and broad societal benefits of increased investment into NbS, incentivized through insurance policies.

Despite these opportunities, RISCO is still one of the only examples of this business model, and for scaling-up, a major hurdle still needs to be overcome. The challenge lies primarily in the current proprietary catastrophe (CAT) models used for insurance underwriting. Simply put, CAT models estimate expected damages and financial losses based on historical records of hazards, exposure, and vulnerability, as well as key input parameters that could include, for example, the presence of artificial flood barriers[12].

If healthy, protected ecosystems had existed in the same form over the past decades, their risk-reduction

benefit would be indirectly accounted for through the historical exposure and vulnerability data. However, if major restoration activities have taken place in the last few years, enhanced natural protection is excluded as a damage-attenuation factor[13]. Similarly, if mangroves are threatened and being deforested, insurance companies currently have no incentive to stop these threats, even if the loss of mangroves would significantly threaten the assets they insure[14].

Open-source models are already helping to include natural protection barriers as key input parameters for insurance products. However, to truly scale up successfully, proprietary CAT models developed by specialist international companies and licensed to insurers must follow, and more open-source models in general must be developed and used.

Quantifying risk-reduction benefits should no longer be a barrier. Sound methodologies, models, and convincing evidence have already been developed, at least for coastal ecosystems such as mangroves[15].

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6. Conclusion

The case studies collected in this report, selected for their breadth in type of instrument, geographic reach, type of Nature-based Solution (NbS), and investment size, illustrate how the financial sector is already supporting the scaling of NbS and where it sees business cases. While there are challenges (for example, incomplete markets, the need for developing in-depth knowledge and capabilities, and the uncertainty and risks associated with the projects), banks, asset managers, insurers, and project developers have found various ways to overcome them. This includes solutions such as leveraging public finance, pooling projects, diversifying business models, and involving local communities to maximise project impact and longevity. At the same time, the financing structures seen across cases, which combine debt and equity instruments with blended finance instruments, are not particularly complex. The insights from these case studies can be leveraged to scale the provision of finance and insurance for NbS, so that ecosystems and the crucial services that they provide can be protected and restored.

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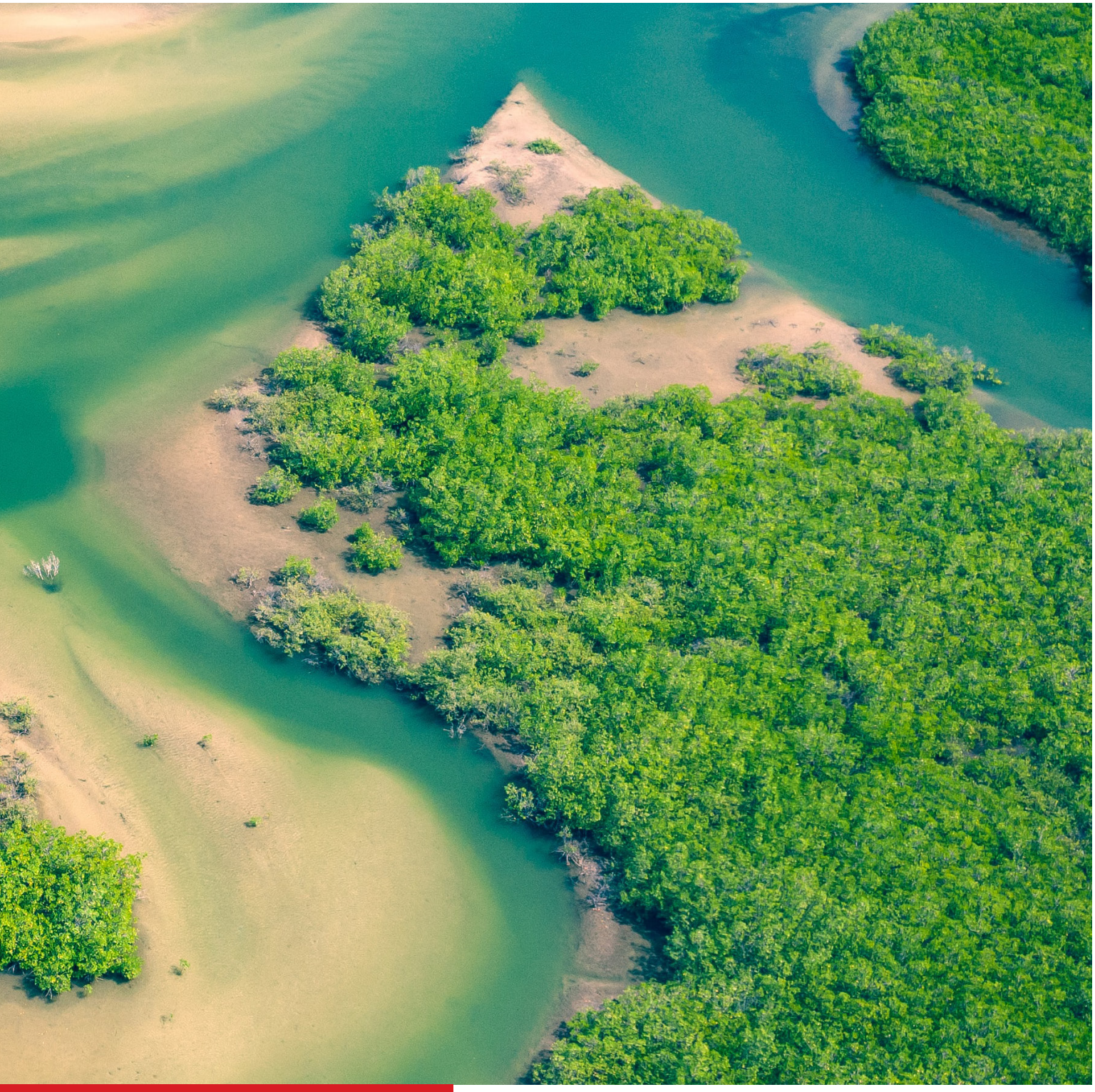

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