Biocredits to finance nature and people

Emerging lessons

Anna Ducros and Paul Steele

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About the authors

Anna Ducros is a researcher in IIED's Shaping Sustainable Markets Group. She is an environmental economist and her work focuses on climate and nature finance, small scale-fisheries and inclusive food systems.

Paul Steele is chief economist in IIED's Shaping Sustainable Markets Group. His work covers incentives for an inclusive, green economy with a focus on climate finance and biodiversity finance.

Corresponding authors: anna.ducros@iied.org
paul.steele@iied.org

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The Shaping Sustainable Markets Group works to make sure that local and global markets are fair and can help poor people and nature to thrive. Our research focuses on the mechanisms, structures and policies that lead to sustainable and inclusive economies. Our strength is in finding locally appropriate solutions to complex global and national problems.

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International Institute for Environment and Development
235 High Holborn, Holborn, London WC1V 7DN, UK
Tel: +44 (0)20 3463 7399
www.iied.org

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Biodiversity is degrading at alarming rates, and people living in biodiversity-rich areas often bear the heaviest costs of biodiversity loss and inequitable conservation efforts. Biodiversity credits, or 'biocredits', are emerging as a tradeable unit of biodiversity that can incentivise nature conservation and restoration to benefit marginalised groups living with nature. Biocredits can complement carbon credits but are most effective as their own new asset class. As a purely positive investment in nature, biocredits are distinct and are preferred to biodiversity offsets, which can cause net damage to biodiversity. Demand for biocredits is growing amongst private investors, individuals and governments who want to invest in the conservation and restoration of biodiversity. Biocredits supplied by Indigenous Peoples (IPs) and Local Communities (LCs) can create an innovative way to fund locally-led action.

Based on a review of three existing biocredit methodologies and learning from the pitfalls of the carbon market, we describe three challenges in designing and implementing an effective biocredit market: how to rigorously and equitably measure a unit of biodiversity; how to generate sufficient demand and sales of biocredits; and how the majority of the revenue from a biocredit scheme can be channelled back to IPs & LCs who will create biocredits for nature and climate outcomes.

Based on this review of the three biodiversity schemes we make three recommendations: to move beyond technocratic definitions of biocredits; to focus more on generating biocredit sales whilst avoiding greenwashing; and to ensure that benefits from biocredit transactions flow to IPs & LCs. Biocredits can generate the private and public finance needed to close the financing gap for inclusive nature outcomes to protect 30% of the world's terrestrial and marine habitats by 2030 and to more broadly fund the upcoming post-2020 Global Biodiversity Framework.

Contents

Abbreviations and acronyms

AI	artificial intelligence
CSR	corporate social responsibility
DLT	distributed ledger technology
IFC	International Finance Corporation (World Bank Group)
IMF	International Monetary Fund
INGO	international nongovernmental organisation
IPs & LCs	Indigenous Peoples and Local Communities
NBSAPs	National Biodiversity Strategies and Action Plans
NDVI	Normalized Difference Vegetation Index
NGO	nongovernmental organisation
RPI	retail price index
STAR	Species Threat Abatement and Restoration metric (IUCN)
TNFD	Taskforce on Nature-related Financial Disclosures
TPA	total project area
UNDP	United Nations Development Programme
VBC	voluntary biodiversity credit
VNBC	ValueNature Biodiversity Credit
VNS	ValueNature Score

Summary

Biodiversity is degrading at alarming rates, and people living in biodiversity-rich areas often bear the heaviest burden of biodiversity degradation and inequitable or mismanaged conservation efforts. Learning from the carbon markets, biocredits present a potential revenue stream available to finance biodiversity conservation and management. As a unit of biodiversity conservation effort, supported by an underlying scientific methodology, biocredits are traceable and tradeable, thus creating incentives for biodiversity conservation and management. When designed inclusively, with Indigenous Peoples and Local Communities (IPs & LCs) and other local actors actively engaged, they can deliver benefits to rural communities living and working in and around biodiversity-rich areas and support sustainable livelihoods.

This paper summarises the characteristics of emerging biocredit schemes, and discusses how the challenges that developers face in designing biocredit schemes can be addressed. There is ample opportunity for biocredit schemes to learn from one another and from other market-based conservation schemes, such as carbon credits and offsets. This paper highlights that learning.

The paper's recommendations stress the importance of biocredit schemes actively engaging with and involving local stakeholders, especially IPs & LCs, in the decision-making process and ensuring the schemes provide financial and social benefits to IPs & LCs, informed by their needs and priorities. Engaging IPs & LCs in the planning and operation of biocredit schemes is essential for their success and longevity, given that IPs & LCs live in some of the most biodiverse places on the planet and have deep, intergenerational and traditional knowledge of how best to manage biodiversity. There is a responsibility to include IPs & LCs in some cases due to land tenure rights. However, there also exists a moral responsibility to include those most affected by biodiversity degradation in conservation solutions. Finally, ensuring that IPs & LCs benefit from biocredits will provide important political support and legitimacy for the implementation of such schemes.

This paper also positions biocredits as a credible option for delivering on international and national biodiversity frameworks and plans, such as the post-2020 Global Biodiversity Framework under the UN Convention on Biological Diversity. Biodiversity frameworks and plans are often underfunded or compete for limited resources, and the private sector has struggled to find a clear entry point. Biocredits could provide an option to encourage stronger private sector financial flows towards meaningful and well-designed biodiversity conservation and management.

Chapter 1 of this report offers a definition of biocredits and discusses how voluntary biocredits are distinguished from biodiversity offsets. It gives an overview of three emerging ways in which biocredit schemes are being used to increase conservation funding: in areas that have been previously degraded and require restoration; in areas that are at risk of degradation and require protection; and in areas that are not at immediate risk, but where previous, significant effort has been made in their management, which needs to be rewarded and continued.

In Chapter 2 we describe three current challenges in designing and executing an effective biocredit market: the challenge of how a biocredit scheme can effectively and meaningfully measure a unit of biodiversity; of how a scheme can set up the market architecture for generating demand and sales of biocredits; and how the revenue from a biocredit scheme can be channelled to key stakeholders, especially IPs & LCs, to improve conservation outcomes.

Chapter 3 is a review of some of the most advanced existing biocredit schemes, namely Terrasos, ValueNature and the Wallacea Trust methodology. It reviews the scale at which the schemes are operating as well as their locations.

In Chapter 4 we show how the three previously described biocredit schemes are overcoming the challenges described in chapter 2 (measuring a biodiversity unit, setting up the market architecture and generating sales, and channelling finances to the local level).

Finally, Chapter 5 synthesises the challenges being addressed and presents recommendations for biocredit schemes, with a focus on how IPs & LCs can be engaged, contribute to decision making, and ultimately benefit from biocredit schemes. We conclude by looking forward at the potential for biocredit schemes to increase biodiversity funding and provide revenue for those most affected by biodiversity degradation and those most reliant on biodiversity for their livelihoods.

1. Introduction: what are biocredits?

Biodiversity credits, or 'biocredits', are an emerging mechanism to quantify and track biodiversity conservation and preservation efforts and outcomes. A biocredit represents a unit of biodiversity that is being restored or preserved. Biocredits are being developed to be bought and sold, and when designed carefully, they can channel financial flows towards effective biodiversity conservation and directly support locally-led action to ensure Indigenous Peoples and Local Communities (IPs & LCs) can fully participate in and realise the benefits of the mechanism.

Classification of biocredits

As biocredit schemes develop and become more common, biocredits are being applied broadly in three ways: to avoid biodiversity loss; measure improvement; or reward successful management of pristine sites. Each of these approaches has appropriate contextual applications as outlined below. Notably, the approaches are not exclusive and one biocredit scheme can provide benefits across more than one application.

- **Preserving or avoiding loss**: Biocredits are applied to an ecosystem, landscape or seascape that already has high levels of biodiversity and that is under threat. They are sometimes measured against a reference site, to correct for biodiversity loss caused by external factors such as changes in rainfall patterns or extreme weather events, or proposed development. In some versions of this application, a biocredit maintains value if the biodiversity indicators do not decrease below those of a reference site (ie biodiversity remains the same). Here, biocredits are used to maintain areas that have not been degraded, but are at risk of being degraded. However, biocredits can also track increases in biodiversity (ie the biodiversity indicators rise above those of the reference site).
- **Restoration:** Biocredits are applied to an ecosystem or landscape that requires restoration for biodiversity regeneration and enrichment, improved ecosystem services and/or landscape connectivity enhancement. Therefore, for the biocredit to maintain value, the biodiversity indicators must be increasing (ie biodiversity is increasing/being restored). Biodiversity indicators could include a rate of change. It is essential that a time frame is set out in which the indicators will be measured and over which the desired positive change is evaluated.
- **Supporting existing efforts:** Biocredits can also be used to reward the existing management efforts that go into conserving pristine sites. Here, biocredit schemes are used to generate investment to incentivise further conservation and create opportunities for countries and IPs & LCs that have succeeded in their conservation efforts to date to be rewarded for past efforts and supported to continue these efforts. This application of biocredit schemes suggests that, regardless of the risk profile, all landscapes and seascapes should be afforded the opportunity for investment.

Table 1. Comparison of applications of biocredits

	CONSERVATION	APPLICATION	VALUE
Avoided loss	Preservation	Ecosystem, landscape or seascape has high levels of biodiversity, is at risk of degradation and requires investment to fund protection	Maintaining biodiversity indicators equal to an identified reference site
Restoration	Restoration	Ecosystem, landscape or seascape is degraded and requires investment to fund restoration	Increasing biodiversity indicator relative to a previous measured level
Supporting existing efforts	Continued preservation	Ecosystem or landscape has high levels of biodiversity, is not at immediate risk of degradation and management of biodiversity is already taking place. Investment is required to support continued protection	Rewarding those who manage or own the land (governments, landowners, IPs & LCs) that have maintained biodiversity

Bringing together supply and demand

Biocredits can be supplied in a number of ways through various entities, including conservation organisations and enterprises, public landowning agencies and private landowners. Supply can come from any organisation, government or individual that is trying to restore or preserve biodiversity. Partnerships between local stakeholders and international organisations or international non-governmental organisations (INGOs) can also create a supply of biocredits. Building on a long and positive history of partnerships, collaboration can create quality supply and enhance the schemes' credibility. It is important to consider the role of IPs & LCs in the design and supply of biocredits – see 2.3 below.

Demand for biocredits can come from investors and private biocredit resellers and intermediaries, companies with commitments on corporate social responsibility (CSR) and committing to nature-related disclosures (such as under the emerging Taskforce on Nature-related Financial Disclosures (TNFD) Framework[1]), philanthropists and impact investors, and individuals interested in conservation. Private biocredit resellers and intermediaries may act as conveyors of demand. As with voluntary carbon markets, buyers will often be driven by corporate commitments to nature-positive targets. Here, voluntary biocredits can be used to implement their nature-positive commitments as long as their traceability is ensured. While private buyers are likely to be a key component in scaling up biocredit schemes, there remains the challenge of ensuring that a substantial part of the proceeds reaches IPs & LCs.

Registry-accounting systems can support biocredits markets, such as:[2]

- A biocredit inventory that records the physical units of biodiversity at key points in time, including the disaggregated data based on the methodology in use
- A biocredits register that records specific information on the biocredits and includes serial numbers for each biocredit
- A transaction registry (or an exchange) that has all the abilities of a register, with the additional capability of transferring biocredit units between market participants
- A data management system that records information about biocredits and more general information that wouldn't be stored in a transaction registry or register but is required for transparency purposes.

Aerial view of an area within a Terrasos habitat bank. Restoration and conservation action including propagation of plant material from native seedlings, camera trapping of fauna populations and analysis of metrics in the change in vegetation cover take place in this area. San Martin, Meta, Colombia. Photo credit: Terrasos. All rights reserved.

Transparent biocredit standards can also play a role in facilitating successful biocredit schemes. Transparency is key for both the supplier and the buyer to build trust in the biocredits market. New tools (eg blockchain) can also assist in reducing administrative costs of market trades, which has been identified as a barrier to establishing biodiversity trading markets, and increasing transparency (including traceability).

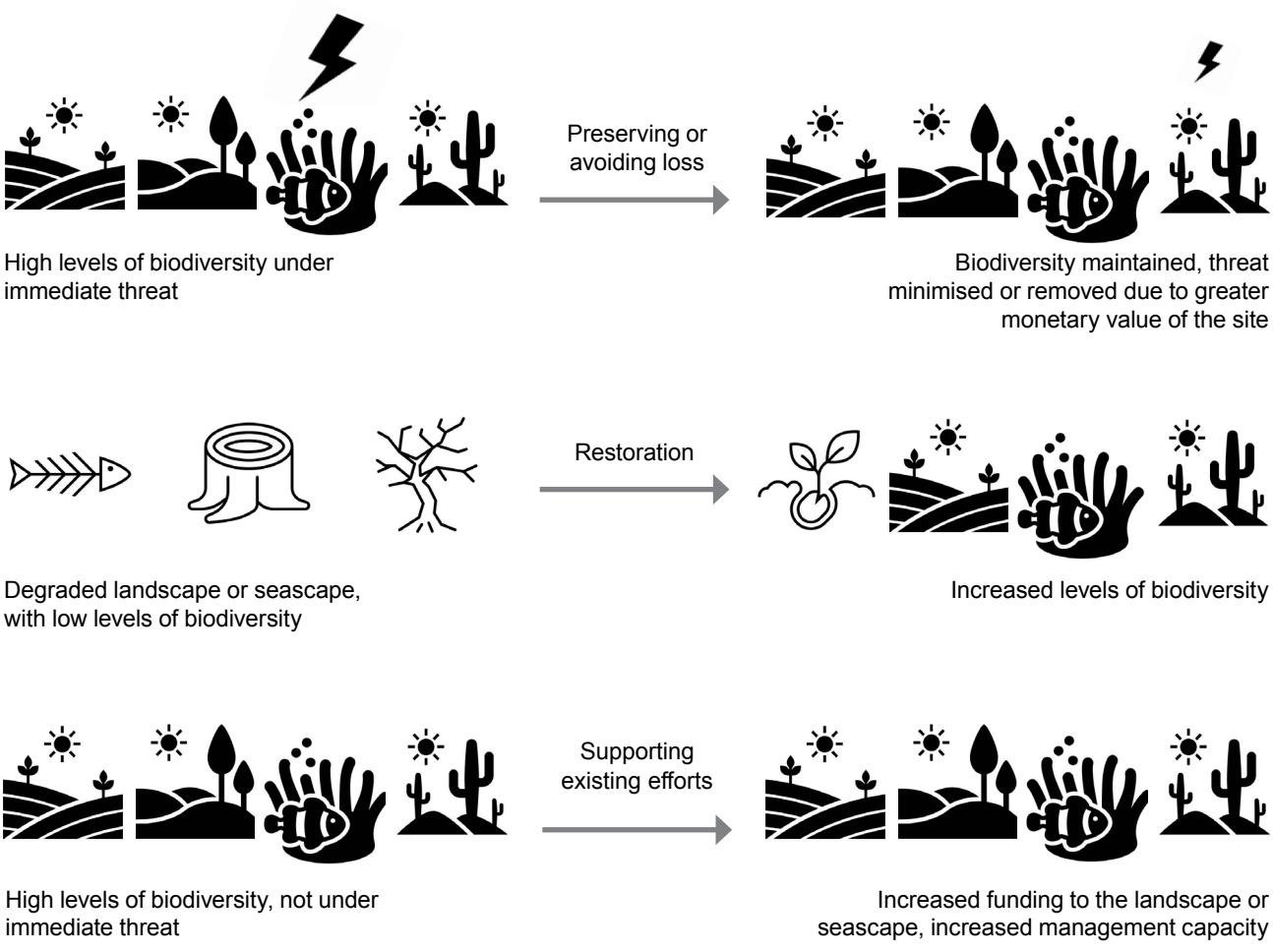
Although markets are key, governments and supra-national regulators can, and in some cases already do, play an important role in enabling policy to transparently and efficiently regulate and facilitate the market, based on clear and simple rules, especially in emerging markets. For a biocredit scheme to effectively channel finance to biodiversity conservation and support locally-led action by IPs & LCs, there needs to be sufficient demand. Governments can create momentum for biocredits by promoting, and even rewarding, long-term commitments from buyers. Attracting buyers also requires matching the price of credits with potential buyers' willingness to pay.

The scope of regulatory activity may include:

- Setting overall principles and minimum standards for projects that can issue biocredits
- Establishing rules for monitoring and reporting on biodiversity
- Creating registration and trading rules
- Validating biodiversity actions (this could equally be done by a third-party verifier)
- Actively seeking strategies to encourage and enable voluntary initiatives at national and sub-national levels.

By engaging with regulators (at national or supra-national level), biocredit schemes can be aligned with international and national frameworks and plans for biodiversity, such as the post-2020 Global Biodiversity Strategy and National Biodiversity Strategies and Action Plans (NBSAPs). A strong legislative system and meaningful regulations are required to ensure that there is documented evidence of biodiversity gain resulting from biocredit projects, that biocredits are not used for biodiversity offsets, and that there is 'no net loss' of biodiversity.

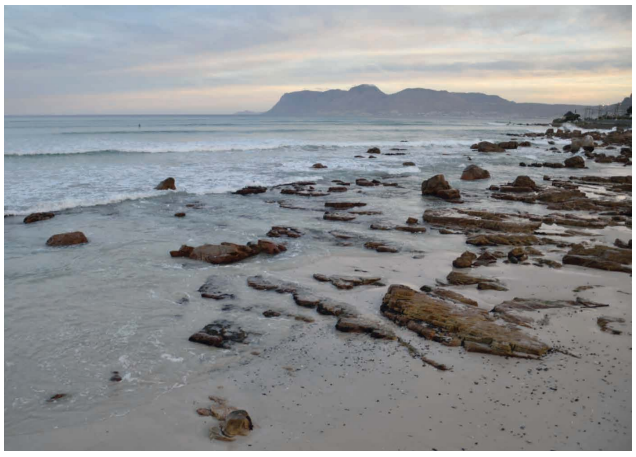
Figure 1. Classification and application of three types of biocredit schemes.



1.1 Differentiating voluntary biocredits from biodiversity offsets

In this report, we aim to provide a clear distinction between voluntary biocredits and biodiversity offsets. Both biodiversity offsets and voluntary biocredits have the ability to increase funding to biodiversity conservation, however, to avoid greenwashing, the limitations of each mechanism need to be clearly understood.

Biodiversity offsets are based on the assumption of 'equivalence', meaning that harm in one location is comparable to reparations elsewhere.[3] Because of this, some have argued that biodiversity offsets legitimise, rather than prevent, damage to biodiversity.[4] Because of technical and financial limitations in measuring nature, often it is difficult to measure equivalence and to ensure that offsets are truly providing a net gain. As a result, even when a biodiversity offset scheme targets achieving a net zero impact, there is still likelihood of damaging biodiversity. Indeed, compared to the relatively simple measure of a carbon credit (ie a metric tonne of CO2-equivalent), measuring a change in biodiversity often requires combining a number of biodiversity variables into an index. This complexity of measuring biodiversity makes it difficult to establish equivalence, and hence there is a probability of failure in achieving a net zero (or positive) impact. Market players need to appreciate these aspects. Many corporations are coming from the perspective of carbon markets, but, as we have demonstrated, the relatively simple logic of carbon equivalence does not apply when it comes to trading nature efforts.



Cape Town, South Africa. Photo credit: Jim/Flickr, CC BY-ND 2.0

In some cases biodiversity offsets can be useful at a local level, where equivalency error can be minimised and the approach, therefore, can be applied and leveraged to maintain and restore biodiversity. Biodiversity offsets may be particularly useful for compliance purposes, for example in cases when companies need to provide compensation for truly unavoidable impacts on biodiversity. This, however, does not relieve buyers of the need to prioritise impact mitigation practices. Incentives should exist to encourage companies and governments to invest in efforts to minimise or avoid impacts on biodiversity before compensating for the unavoidable impacts. A group of leading methodology developers, with assistance from UNDP and NatureFinance, are currently working on a set of guidelines to define when the use of biodiversity offsets is appropriate.

Given that biodiversity is highly variable globally and provides locally unique and varied benefits to ecosystems and people that are reliant on it, the assumption of equivalence leaves a huge gap in the effectiveness of efforts to conserve biodiversity and maintain its associated benefits at the global level. For cross-border trade in biodiversity gains, which is driven by the voluntary market, the task of establishing equivalence loses expediency and rationale. Voluntary biocredits can address this challenge as they represent a positive investment in biodiversity, and are not a way to offset damage to biodiversity done elsewhere. That is to say, they are not based on the principle of equivalency.

Complexity in measuring biodiversity is a challenge for both biodiversity offsets and biocredits, however, because voluntary biocredits are not tied to destruction elsewhere, gaps in measuring biodiversity are not simultaneously justifying biodiversity loss.

Voluntary biodiversity credits as defined in this paper are one of many tools that work to increase the financial flows to biodiversity management. Although voluntary biocredits and biodiversity offsets share the mutual goal of increasing financing to biodiversity, clear evaluation of the purpose, challenges, opportunities and applicability must be considered when choosing which mechanism to employ.

Hereinafter, this publication uses the word 'biocredits' to define voluntary biodiversity credits, unless specified otherwise, meaning that the biocredits defined and analysed throughout this paper are distinct from biodiversity offsets in that they do not imply loss to biodiversity elsewhere. Instead, they represent an entirely positive contribution to biodiversity.

2. Current challenges

This chapter describes three current challenges in designing and executing an effective biocredit scheme and market: how a biocredit scheme can effectively measure a unit of biodiversity; how a scheme can set up the market architecture for generating sales of biocredits; and how the revenue from a biocredit scheme can be channelled to key stakeholders.

2.1 How to define and quantify a unit of biodiversity

For the market to function, there must be clear and accepted metrics underlying biocredits. The three existing schemes examined within this report all work on a spatial quantity indicator (eg hectare or 10m^2 plot). Defining a biocredit also requires identifying the duration over which the biocredit will be maintained. Schemes reviewed in this paper vary from 10 years to 20+ years in duration. Valuing the duration of the biocredit is done in different ways across different methodologies.

Importantly, the metrics must be flexible enough to evolve with improved understanding of what quality biodiversity means and with revisions to frameworks such as the IUCN Red List of Threatened Species and the Global Biodiversity Framework. Quantifying biodiversity is a challenge in itself, but defining a unit of biodiversity in such a way that is marketable and tradable, while providing additionality, is even more difficult. The three schemes reviewed here all use a 'basket of metrics' approach that takes different variables (eg various biodiversity metrics, IUCN Red List, carbon storage indicators) and aggregates the variables to create one index. The basket-of-metrics approach creates flexibility in the quantification of a unit, so that the same methodology can be adapted for a variety of ecosystems and ecoregions. In-depth knowledge of the local ecosystem is required to effectively decide which metrics to include, which further emphasises the need to work closely with IPs & LCs in designing the biocredit projects. The method by which the variables are combined varies across methodologies and is described in chapter 3.

In order to assess net changes in biodiversity, biocredits need to be linked to a particular geographic location, be valid over a defined time period and be measurable against an established baseline. It is

Frog on an Wallacea Trust site in Honduras. Photo credit: Adam Radage. All rights reserved.

useful if biocredits can be compared across space and time and are suitable for collective aggregation to facilitate comparison of biodiversity stocks in different ecosystems and to provide an overall indication of the condition of biodiversity globally. This can be useful for various reasons, including aligning collective action with the Global Biodiversity Framework.

Providing additionality and the role of a baseline

To ensure that biocredit schemes provide both economic and environmental benefits to an ecosystem and people, they must provide additional value to the community and ecosystem they are working to improve.

We look at additionality more broadly than the traditional increase in biodiversity metrics. This includes but is not limited to:

- Increasing the amount of finance to sites where conservation efforts are already underway to a level that will allow for effective management and protection
- Increasing the strength of relevant institutions, organisations and stakeholders to access the resources they need to effectively conserve and manage biodiversity (including increase in land tenure rights)
- Altering the distribution of financial compensation for conservation to favour those that manage biodiversity most effectively, including IPs & LCs that are investing the most time and resources, and those most affected by biodiversity loss.

In order to measure and trace additionality, baseline information is required. This includes both baseline biodiversity data (ie the current state of one or multiple biodiversity indicators) and baseline socio-economic data (ie disaggregated household income data). Baseline data can come from multiple sources, including IPs & LCs' knowledge and records, alongside more technical data such as geospatial information. Baseline data would be used as a reference point to measure the value-added of a biocredit scheme and can potentially be used to evaluate the price of a biocredit. Qualitative data is also needed to determine how a biocredit scheme can contribute to overcoming technical, financial, institutional and cultural barriers to conservation, such as land tenure rights and decision-making power within the community.

In some cases, a reference site within the same geographical area and of similar size to the management site is used to continuously track additionality during the project. This ensures that any changes in biodiversity indicators are not due to external factors, such as change in rainfall patterns or extreme weather events, but to the increase in effort (or in some cases increase in financial flows due to past effort) dedicated to the site of a biocredit scheme. In some schemes, such as ValueNature, no improvements in biodiversity to the project site does not necessarily mean that no value has been added. For example, if the site was relatively intact to begin with, improvements in biodiversity would not be required to create a biocredit. In this case, additionality comes from improvements or changes in other aspects of biodiversity management, such as increased funding to the area, increased or more inclusive management efforts, or reduced threat to the area.

Preventing leakage

Leakage occurs when there is biodiversity loss at a neighbouring site due to biodiversity improvements or maintenance within the management site. For example, in the case of a site where biodiversity is being degraded due to deforestation, when the biocredit scheme is implemented, deforestation stops within the management site. However, the drivers of deforestation have not been addressed so there is nothing preventing logging companies from deforesting neighbouring areas. Leakage in this case is the result of increased deforestation *outside* the management site, due to increased conservation *within* the management site. It is key to consider leakage when designing a biocredit scheme. How leakage needs to be considered or adjusted for depends on the type of biocredit that is being implemented (see below on classification of biocredits). For example, for a site that is not under immediate threat and the biocredits scheme is working to reward conservation action, leakage may not be a consideration.

2.2 Ensuring cost-effective biocredits

As a public good, biodiversity is characterised by non-excludability (the market cannot provide property rights that prevent people from enjoying biodiversity) and non-rivalry (one person's enjoyment of biodiversity does not deplete its availability to others).[5] As with all public goods outside of existing market-based conservation schemes, 'consumers' of biodiversity lack the incentive to pay, therefore there is no incentive for 'producers' of biodiversity to supply.[6]

A biocredit scheme addresses this challenge by creating a unit of value that incentivises the supply and meets the demand of biodiversity conservation. Biocredit schemes also have the potential and opportunity to create the market architecture that

brings together supply and demand of biodiversity conservation and sustainable use. Additionally, a biocredit scheme adds value by increasing the monitoring and tracking of biodiversity conservation and degradation. However, this requires setting the price of a biocredit low enough to attract buyers and high enough to financially support meaningful biodiversity improvements and engagement with IPs & LCs.

Fast-developing technologies are likely to assist in making biocredit schemes cost-effective. This includes monitoring and evaluation technology, such as remote sensing, bioacoustics, metabarcoding and artificial intelligence (AI). Monitoring methodologies can combine expert judgements, traditional and cultural knowledge, satellite imagery and model-based and monitoring-based estimates. Technology needs to be employed in such a way as to account for species richness of the site, as well as the abundance of each of those species weighted by a measure of 'importance' in the ecoregion. Numerous payment-for-ecosystem-service models and conservation schemes are utilising distributed ledger technology (DLT) or blockchain approaches for registry accounting systems and for distributing revenue back to pre-agreed stakeholders.[7,8,9] Integration and digitisation of DLT can assist in lowering transaction costs and maintaining the simplicity of a biocredit scheme and therefore may be a useful way to proceed with biocredit design and implementation. DLT is practical for biocredits as it provides high-level measurement, reporting and verification, as well as high levels of transparency and trust.[10]

One challenge of ecosystem markets is the high cost of meeting both biodiversity and financial criteria, including the monitoring and verification that is required to do so.[11] Transaction costs (ie the costs involved in market exchange) for biocredits can vary and include, but are not limited to, monitoring and evaluation, the cost of writing and enforcing contracts and the cost of discovering market prices.[12] Transaction costs have long been a barrier to developing biocredit schemes because they reduce the amount of profit a biocredit scheme can generate. In general, transaction costs increase when there are many small stakeholders involved, when institutions and property rights are weak, and when the cost of monitoring is high.[13] In spite of higher transaction costs, engaging with multiple stakeholders can lead to stronger outcomes and therefore may be a worthwhile investment.

Ex-ante transaction costs are a type of transaction cost incurred due to the novelty of biocredit markets. These include the time and resources potential buyers spend finding a quality supply of credits, and the time and resources sellers spend expressing interest in appropriate methodology, including preparing the documentation to engage in such schemes and creating the biodiversity management project plans (eg proving landowner rights).[6]

Biodiversity management required before the biocredit scheme is in place and before a biocredit is sold is also an ex-ante transaction cost. This initial investment presents as a challenge and will probably continue to do so while the biocredit market is still

Wallacea Trust project site in Romania. Photo credit: Benjamin Sadd. All rights reserved.

new. As the market develops, methodologies are refined and trust in developers is built, finding the initial investment may become easier.

Though outside the scope of this paper, while setting the price of biocredits there is potential (as biocredit schemes mature) to have a minimum credit value to ensure sufficient reward for communities in different economic, social, cultural and environmental settings, and to develop a tool to evaluate and guarantee rewards.

2.3 Channelling finance to Indigenous Peoples and Local Communities

Ensuring that biodiversity finance flows to the local level to support locally-led action that prioritises the needs of IPs & LCs has been challenging in the past. High transaction costs and historic power imbalances, compounded by lack of transparency in how finance is flowing and weak and inequitable governance systems, have prevented IPs & LCs from benefiting from market-based conservation schemes.[14,15] Understanding land tenure rights, as well as inequalities in the area, is key to a holistic understanding of why biodiversity is at risk or has been degraded. It is also important to create a pre-agreed plan for who will be responsible for maintaining or restoring biodiversity when biocredit schemes are being put in place. Therefore, engaging IPs & LCs at every stage of the decision-making process is key to the success of a biocredit scheme. Long-term presence in a region or long-term and positive collaborations between NGOs, researchers and IPs & LCs can help facilitate an inclusive decision-making process. Biocredit schemes are also a unique opportunity to increase agency of IPs & LCs, including incorporating traditional knowledge, prioritising the needs and desires of IPs & LCs and validating land tenure rights.

As in any conservation scheme, it is important that IPs & LCs are equitably engaged in the design and delivery of the intervention to ensure it aligns with their needs and priorities, and to ensure they can realise the benefits of the scheme or are compensated for their losses. IP & LC engagement is crucial to ensuring well-designed biocredit units and increased longevity and effectiveness of a biocredit scheme. The eight Principles for Locally Led Adaptation can be a useful tool to guide buyers and sellers on how they may embed locally-led action through biocredits.[16]

Allocation of revenue should be agreed upon, and all stakeholders should be involved in the discussion and decisions around benefit distribution. Guaranteeing a fixed minimum percentage of sales allows IPs & LCs to budget and plan ahead appropriately, providing stability and assurance. Throughout the allocation process, it is important to consider and value how different stakeholders may be reliant on the ecosystem, landscapes and/or seascapes that are being managed. Biodiversity can hold a variety of types of value such as social, economic or cultural, and it is important to consider different uses and benefits when allocating revenues to stakeholders.

Increasing financial flows to rural areas can in some cases deepen power imbalances, lead to biodiversity mismanagement and/or result in conflict. In the areas in which biocredit schemes will be operating, the current governance structures may not be immediately equipped to deal with an increase in revenue flows. Capacity of local governance structures and even infrastructure (ie satellite/Wi-Fi connection) needs to be considered when evaluating the cost and the risk associated with implementing a biocredit scheme. Capacity building and technical support may be required, and site selection must be carefully carried out.

Conservation efforts such as biocredits have at times restricted access to livelihoods (forestry, fisheries, farming, etc). Biocredit schemes provide a safety net as they have the ability to raise funds, so that if access to livelihoods is restricted, compensation can be provided or a shift in livelihood can be financially supported. However, a shift in livelihood is an extreme case and how to address benefits and losses must be determined in close collaboration with IPs & LCs.

More broadly, market-based conservation and restoration incentives, including offset schemes, also faced criticism in the recent past due to their exclusion of the values, needs and desires of IPs & LCs, as well as the reductionist nature of commodifying nature.[17] Developers of biocredit schemes need to understand that the schemes may not be appropriate for IPs & LCs, and they must analyse and accept the contextual goals and needs of IPs & LCs and consider whether a biocredit scheme is the most suitable path to conservation and restoration outcomes. Again, engaging IPs & LCs at every stage of decision making can provide a more holistic approach.

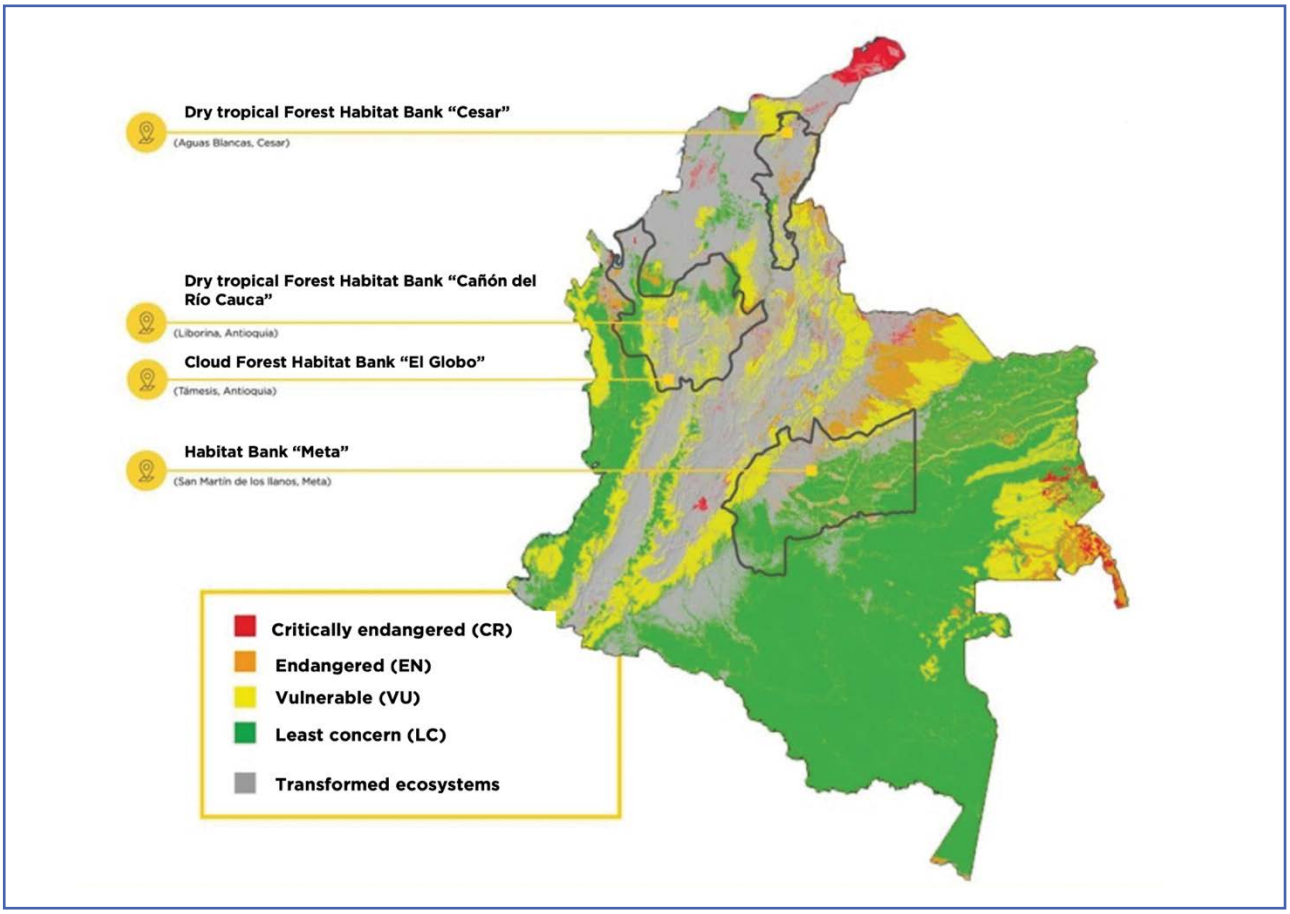
3. Emerging biocredit schemes: Terrasos, ValueNature and Wallacea Trust

3.1 Terrasos: Partnership for Forest Protocol for Voluntary Biodiversity Credits (VBC)

Terrasos is a company based in Colombia, South America, specialising in the structuring and operation of environmental investments. It works across four main areas: compensation and environmental offsets; design of financial instruments for biodiversity conservation; design and evaluation of environmental public policy; and knowledge management and innovation. It follows the guiding principles of traceability, continuity, technical rigour, transparency, additionality and complementarity. The company pioneered the habitat banking model in Colombia as a solution for delivering high-quality biodiversity offsets and is now expanding to issue biocredits for the voluntary market. It is part of the IDB Lab and Partnership for Forests project portfolio.

Terrasos operates across Colombia, but mainly in ecosystems most threatened according to the IUCN Red List. Currently Terrasos operates habitat banks in three provinces in Colombia – Cesar, Antioquia and Meta – covering a total area of 2,000 hectares. In Colombia, habitat banks must be registered and supervised by the Ministry of Environment. As of July 2022, Terrasos has sold approximately 60 VBCs with very little marketing, showing there is promising interest in the biocredit market.

Figure 2. Map of Colombia showing the provinces where Terrasos operates habitat banks – Cesar (top right), Antioquia (top left) and Meta (centre)[18]



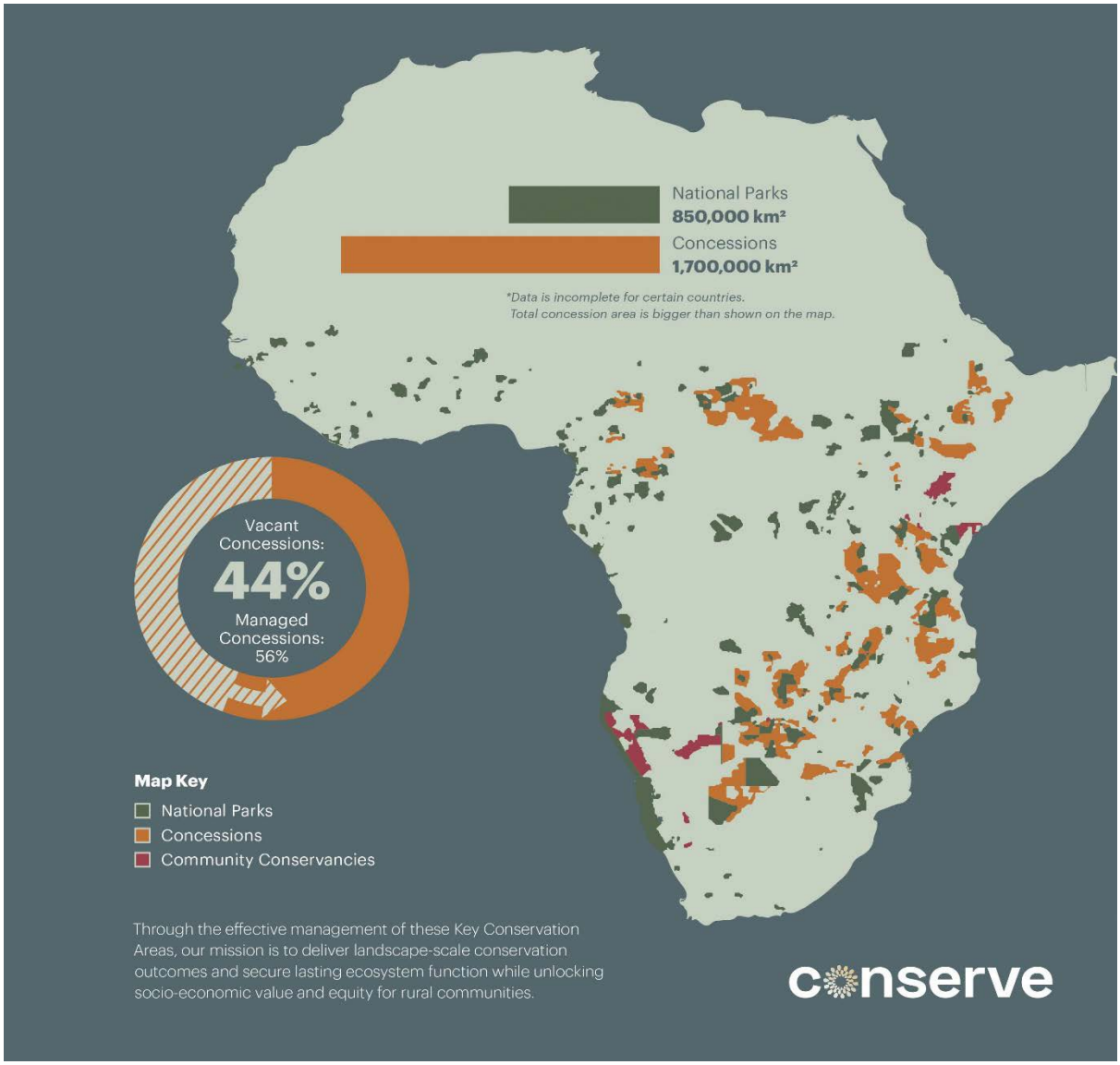
3.2 ValueNature

ValueNature is a start-up company in the development stage that aims to accelerate the protection and recognise the value of nature by providing a platform that uses technology to efficiently measure, value and trade biocredits. The founders of ValueNature identified a lack of transparency and effective use of technology in the voluntary carbon market, which resulted in exclusive and costly biodiversity conservation protection schemes. IPs & LCs consequently experienced difficulties in engaging in what have historically been highly bureaucratic conservation schemes.

They are partnered with an initial land manager, Conserve Global, who have identified 1.7 million km^2 of African conservation land that lies outside of nationally managed parks, and which could benefit from better conservation management through a biocredit scheme. ValueNature is working with Hedera Hashgraph, a digital ledger technology platform, to support its methodology. ValueNature biocredits will be created as digital certificates which will be auditable and discoverable on a public ledger allowing for traceability and transparency.

Currently, ValueNature is raising funds to implement their globally applicable biocredit scheme.

Figure 3. Map of sites recognised by Conserve Global, 1.7 million km^2 across Africa have been identified as areas that would benefit from more effective conservation management[19]



Biodiversity lies in the details – on a Wallacea Trust site in Fiji. Photo credit: Dr Greg Kerr. All rights reserved.

3.3 Wallacea Trust methodology

Wallacea Trust is a biodiversity and climate research organisation, which for 25 years has facilitated field expeditions to support academic research and give students opportunities to work with publishing scientists.

Unlike the other developers, Wallacea Trust has developed a methodology for partners to adopt. This biocredit methodology is open source and freely available (see Wallacea Trust methodology). It was developed by a 50+ strong working group under the auspices of the Wallacea Trust. The working group included representatives from the financial sector (World Bank, IFC, IMF, TNFD, etc), corporates with nature-positive targets (Anglo-American, GSK, NatWest Group, Sainsbury's, etc), consultancies (Naturemetrics, Space Intelligence, Nature Positive, Arup, etc) and academics with expertise in a wide range of ecoregions, taxa and biostatistics.

Wallacea Trust is designed to work in all 1,300 ecoregions and all habitats around the world. It defines a unit of biodiversity as a 1% increase or avoided loss in the median value of a basket of metrics (per hectare). The biocredit can be validated and verified by a third-party certification body, who issues the credits upon successful review. Plan Vivo have been working on developing a standard from the Wallacea Trust methodology and their system will be available from late 2022. Gold Standard is similarly working on a standard using the Wallacea Trust biocredit methodology.

As of August 2022, two organisations marketing biocredits (rePLANET and the Biodiversity Credit Company) have financial commitments for 1.2 million biocredits (to be put in place once the Plan Vivo standard is launched). Similarly, Wallacea Trust has a consortium of banks who have committed to buying a further 3 million biocredits from a series of new projects being developed in Central and South America.

4. Responding to challenges

The following section outlines how each of the biocredit schemes identified above are defining a unit of biodiversity, setting prices and generating sales, and distributing revenue to IPs & LCs.

4.1 Terrasos

4.1.1 Terrasos: unit of biodiversity

Terrasos has created a voluntary biodiversity credit (VBC) that is defined as:

> *A transactional unit that represents positive contributions to biodiversity in an area of at least 10m^2, within a preserved and or restored ecosystem, that is managed technically, financially and legally, for at least 20 years, achieving measurable results in terms of biodiversity.*

The VBC is used to measure the biodiversity of net gains of a project that develops preservation and restoration actions. Terrasos quantifies the VBC based on four factors via the Voluntary Biocredit Quantification calculation (see Figure 4). Each factor is given a score and normalised using the average of the given factor and summed to create the credit number. The factors are as follows:

1. **IUCN risk category of the ecosystem:** Higher risk equals higher score, ranging from 1–1.5.
2. **Preservation vs restoration:** Restoration scores higher (1.5) than preservation (1).
3. **Permanence:** Credits must have a minimum operation time of 20 years. An operation time of 20 years gives a continuity score of 0.1 and increases to 1.0 at an operation time of 30 years.
4. **Ecological connectivity:** If the biodiversity improvements generate no increase in connectivity, the credit scores 0. The score for this factor increases as connectivity increases (ie connecting previously unconnected areas = 1.3, connecting two previously unconnected protected areas = 1.5).

4.1.2 Terrasos: setting prices and generating sales

The market architecture of Terrasos has been created using a stepwise approach via a credit release schedule made up of management and ecological milestones. The starting price of a credit is determined by the net present value of all direct and indirect costs and expenses and the opportunity cost of capital and land over the lifetime of the project.

Management milestones include land acquisition and profit-sharing agreements with landowners, legal land use restrictions, financial assurances, fencing and planting. These are milestones that enable the conservation of biodiversity and ensure the longevity of conservation efforts.

Ecological milestones are based on a basket of metrics that includes species composition, structure and function, and mark progress towards desired biodiversity outcomes, such as replacement of artificial and degraded landcover with natural cover, strengthening ecological connections between forest remnants and increased habitat for fauna species. As these performance milestones begin to be met, they are approved by the auditor, and credits become available for purchase. It is a performance-based approach.

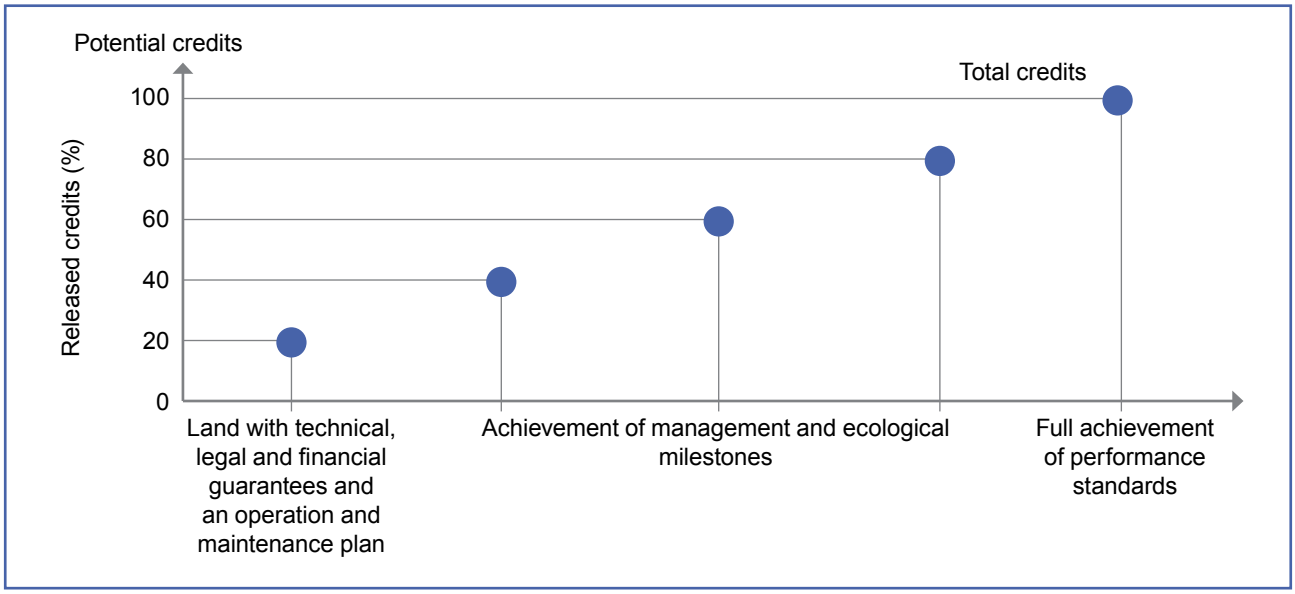
Figure 4. Calculation to quantify the voluntary biodiversity credit (VBC) by Terrasos

$$\#VBC = \frac{\text{Factor 1}}{\text{TPA* IUCN risk categories}} + \frac{\text{Factor 2}}{\text{Hectares* preservation}} + \frac{\text{Factor 2}}{\text{Hectares* restoration}} + \frac{\text{Factor 3}}{\text{TPA* years of operation}} + \frac{\text{Factor 4}}{\text{TPA* connectivity opportunities}}$$

$$\text{Factor 1 average} \qquad \text{Factor 2 average} \qquad \text{Factor 2 average} \qquad \text{Factor 3 average} \qquad \text{Factor 4 average}$$

*TPA refers to total project area

Figure 5. Credit release schedule of VBC



4.1.3 Terassos: channelling finance to Indigenous Peoples and Local Communities

Because the performance standards have to be met prior to the sale of the VBC, the supplying project developers and operators, as well as landowners could bear additional financial risks. Terrasos sets the cost of the biocredit to cover the costs that landowners accrue from the beginning of the project. These include the cost of working capital, the transaction costs to ensure landowners receive payments, and all the activities and management that need to take place before the performance milestones are met and payments are received. The investment in setting up a biocredit scheme can have long-term benefits for IPs & LCs, such as lease agreements and benefit-sharing mechanisms.

In addition to financial benefits, Terrasos has a holistic additionality criterion that encourages additional benefits of the biocredit scheme beyond biodiversity gains on site and prevented leakage. This criterion includes less-traditional factors of additionality such as reduction of barriers to investment, local traditions, increasing institutional capacity, strengthening land tenure rights, and increasing technological access (ie access to information, training and knowledge), alongside additionality in terms of environmental benefits such as prevention of biodiversity loss and additional preserved or restored areas**.** In this way Terrasos contributes to building capacity amongst IPs & LCs.

4.2 ValueNature

4.2.1 ValueNature: unit of biodiversity

Similarly to other schemes, the ValueNature biocredit methodology creates a composite biodiversity score called the ValueNature Score (VNS). The VNS is made up of equal parts of flora and fauna indicators of 'intactness' and is weighted by the carbon stocks present and the IUCN Species Threat Abatement and Restoration (STAR) metric, which assess the conservation value of a landscape or seascape from a threatened and endangered species perspective. Fauna and flora intactness is determined by comparing the measured indicators to an equivalent 'pristine' site that is used as a reference baseline. One ValueNature Biodiversity Credit (VNBC) represents one hectare of biodiversity protected from degradation for 10 years, with a minimum total permanence period of 30 years.

Flora intactness will be measured using remote sensing technologies, including the Normalized Difference Vegetation Index (NDVI) of satellite imagery to create a metric of vegetation health and land use change. Additionally, factors such as erosion and bare earth exposure in comparison to the reference site will be incorporated into the intactness measure.

Fauna intactness will be measured using camera traps and bioacoustics sensors deployed by locally employed 'biodiversity custodians'. Bioacoustics sensors will allow for the measurement of aggregated soundscape saturation across identified habitats and will be used to create a species diversity value for vocal animals like birds, bats, frogs and insects.

Camera trap photos will determine species richness of larger mammals (>1kg in weight).

The IUCN STAR metric will provide weighting for the conservation value of the site. The IUCN STAR score evaluates the potential benefit for threatened species of actions to reduce threats and restore habitat and is an illustration of where there are the greatest opportunities to reduce species extinction risk.

Carbon stocks will provide additional weighting for the value of the site. This will include above-ground, soil and/or wetland carbon, and will be calculated as metric tonnes per hectare. Where possible, satellite technology and geographic information systems will be used to remotely assess carbon stocks, reducing the need for expertise in the field.

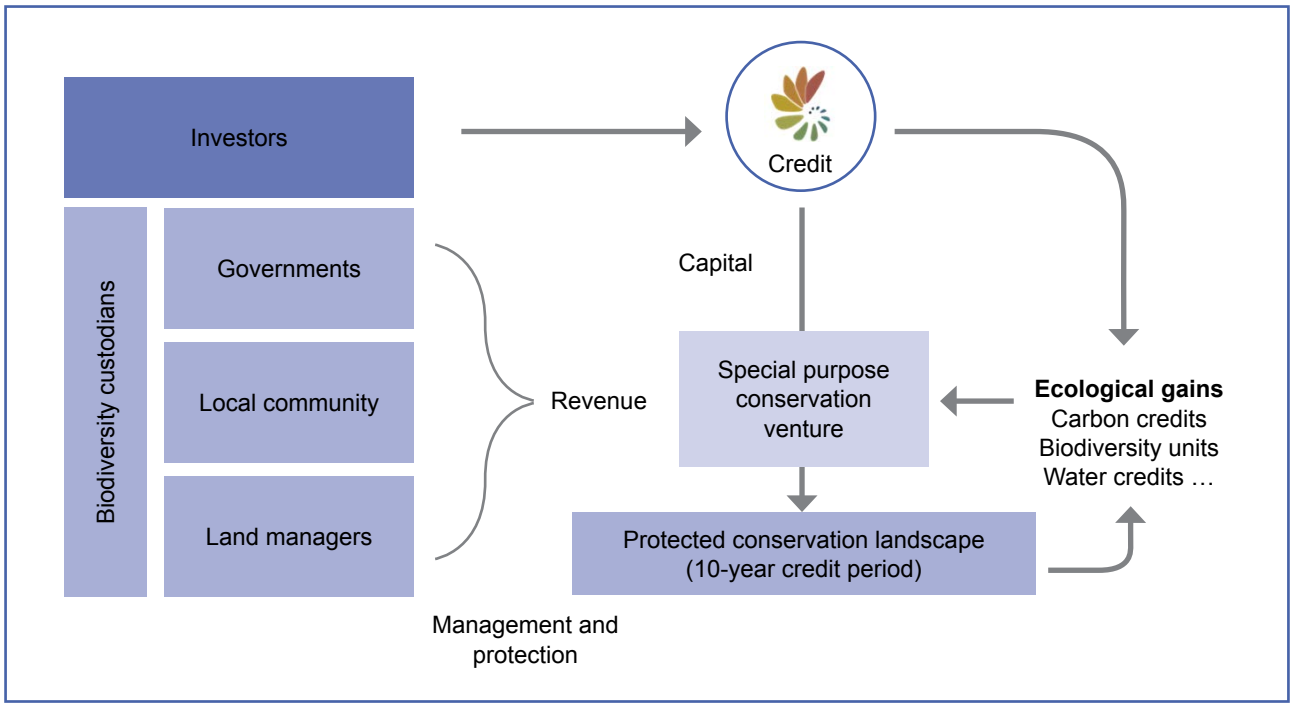
The VNS will then be inputted using a distributed ledger process of creating proofs and validations for each piece of data created across each category, speeding up validation and verification processes while ensuring immutability of the data. A digital certificate is created to represent the biocredit, reducing double accounting issues while also providing transparency and traceability. The credit will have an annual Environmental, social and governance reporting certificate issued that details the site characteristics, metrics and data that are used to calculate the VNS, the biodiversity custodians supported, including IPs & LCs, and the traceability of financial flows. At this point, before sale, credits have value in themselves as they act as proof of conservation work through the biodiversity score and associated metrics.

4.2.2 ValueNature: setting prices and generating sales

ValueNature determines the initial offering price by evaluating the minimum amount required to adequately ensure the persistence of biodiversity in the concession for that decade at a specific and documented management standard. Additional incentive payments are made to IPs & LCs who live in or around the landscape or seascape, and fees are paid to the government where required (for example, taxes or when the government is the landowner). Of the sale price, 80% goes to biodiversity custodians (land managers/owners, IPs & LCs and government), while the remaining 20% is reserved for biodiversity assessments, reporting and certification and trading of the digital certificates. The ValueNature trading scheme is still in development and biocredit sales prices will become more accurate as the market matures and price discovery becomes possible.

During the ten-year time span of the credit development, the acquirer (buyer) will be able to relist and sell the digital certificate if they choose to, and royalties will be allocated to the biodiversity custodians. At the end of the ten-year period, final assessments will be completed and the digital certificate for each hectare is 'minted' as the final biocredit, which is to be held by the final owner as an asset. Credit owners have first rights to purchase the next ten-year credit period, which ultimately has a rolling 30-year permanence window.

Figure 6. Summary of the ValueNature biocredit scheme[20]



Aerial view of the hydrological restoration taking place on an Operation Wallacea. A main channel has been excavated to feed water across the whole site. Gulf of Fonseca, Honduras. Photo credit: Operation Wallacea. All rights reserved.

Biocredits capitalise a Special Purpose Venture which will secure conservation of landscapes and seascapes and protect them. Credits have value themselves because of the proof of conservation work they provide through the biodiversity score and associated metrics.

4.2.3 ValueNature: channelling finance to Indigenous Peoples and Local Communities

By using automated biological assessment tools such as satellites, camera traps and bioacoustics, ValueNature has reduced the costs of monitoring and enabled the employment of local workers for sensor deployment. Additionally, this allows the scheme to deliver 80% of the biocredit price to biodiversity custodians, including governments, IPs & LCs and landowners. The digital platform used for management of these credits will allow for automated revenue allocations to take place directly and transparently to pre-identified participants.

To increase trust and transparency for both its buyers and sellers, ValueNature utilises blockchain technologies to register and provide traceability for its produced biocredits. This allows fast accreditation and transactions, allowing money earned to flow more quickly to biodiversity custodians.[7]

4.3 Wallacea Trust open source methodology

4.3.1 Wallacea Trust: unit of biodiversity

The Wallacea Trust uses the 'basket of metrics' approach that is commonly used in economics to create the retail price index (RPI). The RPI represents the price of a basket of goods and services that measures inflation levels in goods and services bought in any given country. Using the same approach for biodiversity, the Wallacea Trust bases their biocredit on a basket of a minimum of five biodiversity metrics that reflect conservation objectives for the region of the submitted site. Complete taxa (normally functional taxa such as breeding birds or soil invertebrates) are used for each of the metrics and these combine both species richness weighted by the importance value of each species on a five-point scale (eg IUCN-listed critically endangered species score a five, IUCN least concern species score one, etc) and abundance on a five-point logarithmic scale. This is because an increase in the abundance of an important species is as important as the addition of a new important species to the species list.

The biocredit is defined as a 1% restoration or avoided loss per hectare in the median value of the basket of metrics. Notably, this approach allows

biodiversity improvements or avoided loss to be quantified and compared across different ecoregions. Such comparison creates the benefit of collective aggregation of biodiversity stocks in a variety of ecosystems and allows buyers to quantify the impact of their investment in biodiversity improvements and/or avoided loss.

As a standard, metrics are evaluated every five years, though developers may choose to audit in a shorter period of time, meaning that they will be able to claim credits over shorter intervals. The sales of biocredits fund 25 years of site management, though the funding is also used to help local communities develop livelihoods associated with restored and/or protected areas, creating incentives to continue protecting the site after the 25-year period is over.

The Wallacea Trust has three types of biocredit to account for the needs of different ecoregions. The 'submitted site' refers to the area where biodiversity improvements or avoided loss are measured using the basket of metrics deemed suitable for that region.

1. **Ex-ante biodiversity uplift credits:** The submitted site is proposing to adopt a new management approach designed to improve biodiversity, and there is a reference site that has been using the proposed management plan for a known period of time. Measurements of the same basket of metrics are used onsite and also at a reference site to estimate the likely uplift of biodiversity at the submitted site.
2. **Ex-post biodiversity uplift credits:** The submitted site measures its biodiversity metrics at the beginning of a new management programme and then re-measures the same metrics after a known time interval.
3. **Ex-post avoided biodiversity loss credits:** The submitted site is of high biodiversity value but is under threat of development. A basket of metrics is created for the submitted site and compared against a paired development site with similar characteristics to the submitted site but which has undergone the development that is planned for the submitted site.

4.3.2 Wallacea Trust: setting prices and generating sales

The Wallacea Trust methodology uses the same architecture as the carbon credit market to build on the familiarity that the business sector has with carbon markets, including factors such as additionality, avoidance of double counting, leakage and retirement of credits.

Having the option of monetising biodiversity alongside carbon credits at the start of the project allows projects that wouldn't work on just carbon alone to be funded. The total cost of a 25-year project is first calculated and then the portion of that budget which can be covered by the sale of the carbon credit element is estimated (carbon prices are well known). The balance of the budget is then divided by the estimated number of biocredits that will be generated to calculate the costs of the biocredits.

4.3.3 Wallacea Trust: channelling finance to Indigenous Peoples and Local Communities

The Wallacea Trust pays a percentage of its revenue to IPs & LCs. In all the rePLANET and Biodiversity Credit Company projects where they sell carbon and biocredits stacked together, at least 60% of the issuance price of the credit is required to be paid to local stakeholders (owners, users and managers of the site). However, all sales contracts also have a 60% indexation clause so that any profits made from reselling the credits or from rises in world prices by the time the credits are retired and once the biodiversity improvement has been achieved, are paid back as bonus payments to the local stakeholders. This has the advantage to buyers of the credits that they can't be exposed in the media for 'gold mining' and exploiting the local communities by buying biodiversity benefit at exploitative prices. It also has the advantage of providing clear visibility to governments and local communities on the carbon and biodiversity justice that the projects are providing.

5. Looking forward: lessons learned and recommendations

5.1 Focus on technocratic definitions of biocredits

Currently within each of the three schemes reviewed, there remains a large focus on how to define a biocredit. This is justified given the complexity of this task, and the importance of having clear metrics for the biodiversity management and outcome improvements that the scheme is providing. However, it is important to respond to the needs of IPs & LCs and for the schemes to be accessible to buyers so they know what they are buying.

As outlined in Box 1, each biocredit scheme uses a multivariable index or basket of metrics to define a unit of biodiversity. A multivariable index begins to address the challenge of acknowledging the complexity of biodiversity while creating a tradable unit.

However, there are opportunities to incorporate social and cultural valuation of biodiversity, especially in terms of incorporating indigenous traditional and cultural knowledge. Lands managed by IPs & LCs have equal or higher levels of biodiversity than protected areas, and engaging the expertise of IPs & LCs can increase the amount and extent of biodiversity conservation. Given IPs' & LCs' well-founded scepticism about market-based conservation solutions, bridging different knowledge types can also act as a means to centre IPs & LCs and increase the international uptake of biocredit schemes.

Recommendation

- **Further incorporate a social and cultural valuation of biodiversity** including variables that acknowledge traditional and cultural knowledge and valuation of biodiversity. This includes working with IPs & LCs to determine how traditional and cultural knowledge can be translated into an indicator that can be used in a multivariable index or basket of metrics.

'Mico Maicero', or tufted capuchin (*Sapajus appella*) in a Terrasos habitat bank, Colombia. Photo credit: Terrasos – Colombia. All rights reserved.

BOX 1. MULTIVARIABLE INDEX TO DEFINE A BIOCREDIT

As described in chapter 4, each biocredit scheme has created a methodology to create a unit of biodiversity that is clearly defined (over space and time) and tradable on the market. All the schemes use a multivariable index to define a unit of biodiversity.

- Voluntary biodiversity credit (VBC) – Terrasos
- ValueNature Biodiversity Credit (VNBC) – ValueNature
- Basket of metrics – Wallacea Trust methodology.

Both Terrasos and ValueNature use an IUCN metric, albeit a different one, within their index to measure and evaluate the urgency of biodiversity action (through valuing risk of extinction or valuing the benefit that managing the species/region can provide). The difference in the IUCN metric used reflects that the Terrasos scheme is geared more towards reducing risk (of extinction), while the one used by the ValueNature scheme reflects the desire of the scheme to measure value added by biodiversity conservation.

Terrasos also incorporates varying benefits of restoration versus preservation in its index by valuing restoration higher than preservation, while considering the financial implications of one or the other and the impact on net gain. The Wallacea Trust, on the other hand, has different types of credits for restoration (uplift) and avoided loss.

Terrasos is the only scheme to evaluate connectivity. As one of the factors in the multivariable index, it values whether the increased conservation management has increased connectivity to surrounding areas.

ValueNature is the only scheme to include a carbon measure (ie stock or burial) within the biodiversity score. In this way, they are 'stacking' carbon and biocredits. This is encouraged for its benefits for climate change reduction, but also to capture buyers from existing carbon markets.

5.2 More focus on generating sales while avoiding greenwashing

Due to the novelty of biocredit markets and lack of maturity in the market, it is difficult to generate sales and set adequate prices, however this remains a crucial element of a successful biocredit scheme. An increase in sales might naturally occur as the methodologies are more widely understood and tested. There remains value in ensuring biocredit schemes are transparent and clearly explained by various stakeholders to promote trust-building in the biocredits market.

Recommendations

- **Targeted marketing.** Substantial effort will have to be made to target marketing to potential biocredit buyers. This can be done in a number of ways. One way would be to analyse the CSR policies and leverage goals that corporations have set for themselves. There is also the opportunity to learn from existing carbon credit marketing strategies. We recommend that developers take on this role so as not to exhaust the resources of biocredit suppliers (ie conservation organisations).
- **Screening buyers by third parties.** Although developers are eager to increase sales of their biocredit unit, it is important that the credits are sold once the buying company has been screened. For voluntary biocredits, the buyer will have to show that it is not using the credit to offset damage elsewhere and whether the investment in the purchase of the biocredits maximises the social and biological impact compared to other ways the company could invest the equivalent amount. Similarly for biocredits, the buyer will have to show how it is minimising and avoiding biodiversity damage. We recommend that a set of principles and screening tools be developed at the international level and that transactions are reviewed under these principles, to ensure biocredits are not being used for greenwashing.

5.3 Channelling benefits to Indigenous Peoples and Local Communities

All the schemes make efforts to channel finance and benefits to IPs & LCs. As noted above, equitably engaging IPs & LCs in the design and delivery of biocredits is key to ensuring their needs and priorities are met and to increasing the effectiveness of biodiversity conservation.

ValueNature and the Wallacea Trust channel funding to IPs & LCs by allocating them a percentage of the revenue from the scheme. This is a practical

solution for distributing benefits. However, IPs & LCs as a group are not homogenous. Individuals within IPs & LCs may be at a disadvantage in accessing the share of revenue allocated due to gender inequalities, lack of land tenure rights, being part of a marginalised sub-sector of the community, amongst other reasons. These may also be reflected in decision-making power within IPs & LCs that can affect the pre-agreed allocation of financial flows. Understanding these inequalities, and how this intersects with external processes, may also contribute to an understanding of what is driving biodiversity degradation (or potential degradation) to begin with.

Terrasos has set a high standard of including social and legal additionalities within its additionality criterion. Notably, this can provide benefits to IPs & LCs on top of increasing finance to communities and individuals. Increased capacity such as stronger land tenure rights, agency to employ traditional knowledge and access to helpful technology can provide positive knock-on effects and we recommend that they are included in the design of biocredit schemes.

Recommendations

- **Increased attention to the market structure and flows of finance in a biocredit scheme.** Though attention is needed in defining a unit of biodiversity, it is crucial that adequate analysis and efforts are used to engage buyers, ensure transparency of financial flows and create the appropriate market structure to support biocredit schemes.
- **Attentiveness to non-homogeneity among IPs & LCs** that may affect the pre-agreed allocation of funds at the community and individual level.
- **Transparency in flows of revenue.** Because not all the biocredit schemes are operating at scale yet, it is hard to say if the allocated revenue will be delivered to IPs & LCs. We recommend that a high degree of transparency is employed to show both the buyers and the sellers that the funding has been received by IPs & LCs in a timely manner.
- **Include capacity building in the design of biocredit schemes,** including strengthening land tenure rights, increasing agency to employ traditional knowledge and increasing access to helpful technology.

Malagasy fisherman. Northern Madagascar. Photo credit: Rod Waddington/Flickr, CC BY-ND 2.0

References

1 Taskforce on Nature Related Financial Disclosures. Introducing the TNFD Framework. https://framework.tnfd.global/introducing-the-tnfd-framework/

2 Porras, I and Steele, P (2020) Making the market work for nature. IIED, London https://pubs.iied.org/16664iied

3 Friends of the Earth (2021) A Dangerous Distraction. Why offsetting will worsen the climate and nature emergencies. https://policy.friendsoftheearth.uk/download/dangerous-distraction-offsetting-con

4 Friends of the Earth (2021) A Dangerous Distraction. Why offsetting will worsen the climate and nature emergencies. https://policy.friendsoftheearth.uk/download/dangerous-distraction-offsetting-con

5 Deutz, A, Heal, GM, Niu, R, Swanson, E, Townshend, T, Zhu, L, Delmar, A, Meghji, A, Sethi, SA and Tobinde la Puente, J (2020) Financing Nature: Closing the global biodiversity financing gap. The Paulson Institute, The Nature Conservancy and the Cornell Atkinson Center for Sustainability, Chicago.

6 Alvarado-Quesada, I, Hein, L and Weikard, HP (2014) Market-based mechanisms for biodiversity conservation: a review of existing schemes and an outline for a global mechanism. *Biodiversity and Conservation* 23, 1–21.

7 ValueNature (undated) ValueNature Concept. www.youtube.com/watch?v=2k8MSvZlE1w

8 WWF Living planet technology hub (undated) Blockchain technology. https://techhub.wwf.ca/technology/blockchain-applications/

9 Baumann, T (2018) Blockchain for Planetary Stewardship: Landscape of Initiatives in Climate and Sustainability, Blockchain Research Institute.

10 Born, R (2018) Distributed Ledger Technology for Climate Action Assessment. Climate-KIC. www.climate-kic.org/wp-content/uploads/2018/11/DLT-for-Climate-Action-Assessment-Nov-2018.pdf

11 Lambooy, T and Levashova, Y (2011) Opportunities and Challenges for Private Sector Entrepreneurship and Investment in Biodiversity, Ecosystem Services and Nature Conservation. *International Journal of Biodiversity Science, Ecosystem Services & Management* 7 (4) 301–318.

12 OECD. Transaction Costs. https://stats.oecd.org/glossary/detail.asp?ID=3324.

13 Wunder, S (2006) The Efficiency of Payments for Environmental Services in Tropical Conservation. *Conservation Biology* 2 (10) 48–58.

14 Brunner, S and Enting, K (2014). Climate finance: A transaction cost perspective on the structure of state-to-state transfers. *Global Environmental Change* 27: 138–143.

15 Colenbrander, S, Dodman, D and Mitlin, D (2017) Using climate finance to advance climate justice: the politics and practice of channelling resources to the local level. *Climate Policy* 18(7) 1–14.

16 Soanes, M, Bahadur, A, Shakya, C, Smith, B, Patel, S, Rumbaitis del Rio, C, Coger, T, Dinshaw, A, Patel, S, Huq, S, Musa, M, Rahman, M, Gupta, S, Dolcemascolo, G and Mann, T (2021) *Principles for locally led adaptation.* IIED, London. www.iied.org/10211iied

17 Wang, J (2021) Carbon Offsets: A New Form of Neoliberalism. Columbia Climate School. https://climatesociety.ei.columbia.edu/news/carbon-offsets-new-form-neocolonialism

18 Terrasos. Map of Terrasos Habitat Banks. 2022

19 Conserve Global. Map of sites recognised by Conserve Global. 2022

20 ValueNature. Summary of ValueNature Biocredit Scheme. 2022.

21 Schuster, R, Germain, R, Bennett, J, Reo, N, and Arcese, P (2019) Vertebrate biodiversity on indigenous-managed lands in Australia, Brazil, and Canada equals that in protected areas. *Environmental Science Policy* 101: 1–6. 21.

Knowledge Products

Toolkit
November 2022

Biodiversity; Sustainable markets

Keywords:
Biodiversity credits, economic incentives, biodiversity and conservation, natural resource investment, inclusive investment

Biodiversity is degrading at alarming rates, and people living in biodiversity-rich areas often bear the heaviest costs of biodiversity loss and inequitable conservation efforts. Biodiversity credits, or 'biocredits', are emerging as a tradeable unit of biodiversity that can incentivise nature conservation and restoration to benefit marginalised groups living with nature. Biocredits can complement carbon credits but are most effective as their own new asset class. As a purely positive investment in nature, biocredits are distinct and are preferred to biodiversity offsets, which can cause net damage to biodiversity. Demand for biocredits is growing amongst private investors, individuals and governments who want to invest in the conservation and restoration of biodiversity. Biocredits supplied by Indigenous Peoples (IPs) and Local Communities (LCs) can create an innovative way to fund locally-led action.

Based on a review of three existing biocredit methodologies and learning from the pitfalls of the carbon market, we describe three challenges in designing and implementing an effective biocredit market: how to rigorously and equitably measure a unit of biodiversity; how to generate sufficient demand and sales of biocredits; and how the majority of the revenue from a biocredit scheme can be channelled back to IPs & LCs who will create biocredits for nature and climate outcomes.

Based on this review of the three biodiversity schemes we make three recommendations: to move beyond technocratic definitions of biocredits; to focus more on generating biocredit sales whilst avoiding greenwashing; and to ensure that benefits from biocredit transactions flow to IPs & LCs. Biocredits can generate the private and public finance needed to close the financing gap for inclusive nature outcomes to protect 30% of the world's terrestrial and marine habitats by 2030 and to more broadly fund the upcoming post-2020 Global Biodiversity Framework.

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International Institute for Environment and Development
235 High Holborn, Holborn, London WC1V 7DN, UK

Tel: +44 (0)20 3463 7399
www.iied.org

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