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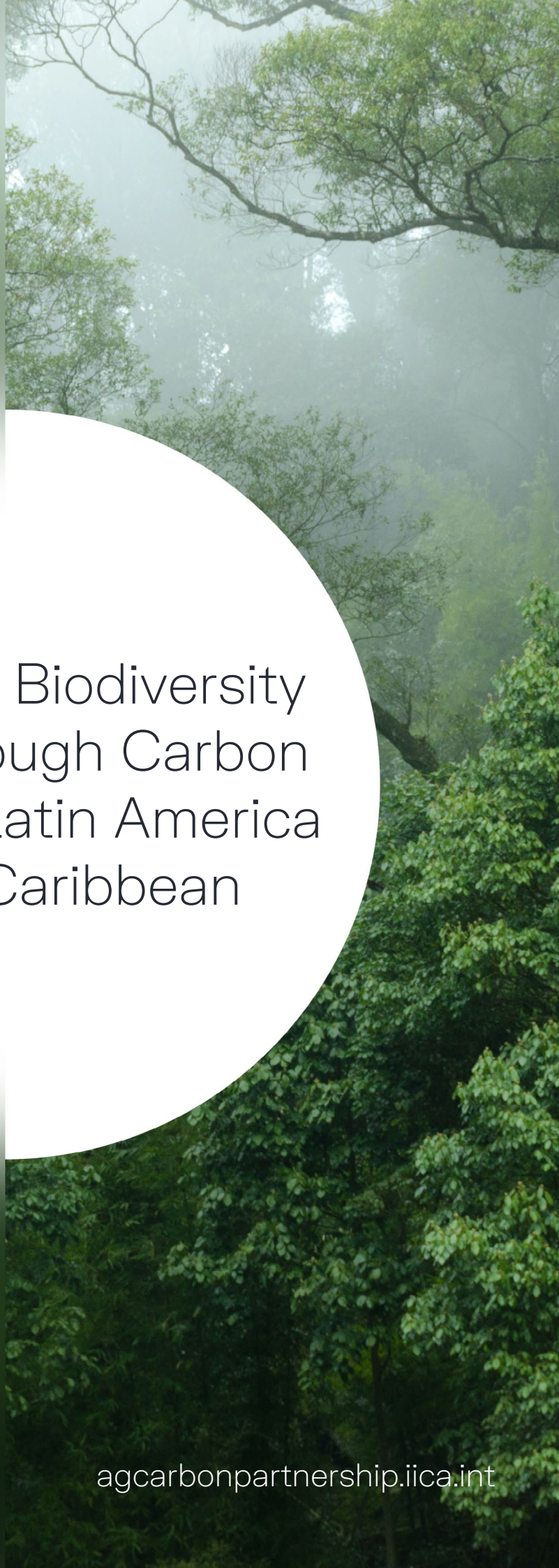
Enhancing Biodiversity Impact Through Carbon Markets in Latin America and the Caribbean



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This policy brief was drafted by the Michigan State University Forest Carbon and Climate Program acting as Partnership for Agricultural Carbon (PAC) interim secretariat, with support from the Voluntary Carbon Markets Integrity Initiative (VCMI) and the Inter-American Institute for Cooperation on Agriculture (IICA).

Authors:
Daniel Ortega-Pacheco
Lorenzo Wong
George Hodgetts

We are also grateful to valuable input from PAC partners, including Gold Standard, Rabobank, and Verra.

About VCMI

The Voluntary Carbon Markets Integrity Initiative (VCMI) is an international non-profit empowering companies, governments and non-state actors to realize the full potential of high-integrity voluntary carbon markets (VCMs). VCMI provides guidance on how different actors can make voluntary use of carbon credits to make a meaningful impact on climate action. The Claims Code of Practice enables companies to make 'Carbon Integrity' Claims, recognizing their achievements in going above and beyond science-aligned emissions cuts to accelerate global net zero. The Access Strategies Program supports host-country governments to establish policies and processes necessary to build and strengthen a cohesive governance of VCMs that underpin their country's participation in high-integrity voluntary carbon markets. Learn more on vcmintegrity.org.

About IICA

The Inter-American Institute for Cooperation on Agriculture (IICA) is the specialized agency for agriculture of the Inter-American System that supports the efforts of Member States to achieve agricultural development and rural well-being. The Institute provides cooperation services through close and permanent work with its 34 Member States, addressing their needs in a timely manner. Without a doubt, IICA's most valuable asset is the close relationship it maintains with the beneficiaries of its work. IICA has broad experience in areas such as technology and innovation for agriculture, agricultural health, safety and agrifood quality, international trade and regional integration, territorial development and family farming, natural resource management, climate action and the innovation and bioeconomy.

IICA works to promote a more active and informed participation of the agricultural sector in national and international climate processes. In addition to building capacity in agricultural negotiators and engaging with high level decision makers, the Institute works to drive finance towards the sector to enable climate action. In 2023, IICA held the Inter-American Board of Agriculture Meeting where ministers of the region required additional capacity building efforts to accelerate access to private climate finance including through carbon markets. Through PAC, IICA's goal is to assist ministries of agriculture and other sectoral actors in the Americas to better understand whether, when and how they can capitalize on voluntary carbon market opportunities to help achieve development and climate goals simultaneously.

VCMI Voluntary Carbon Markets Integrity Initiative

IICA

About the Partnership for Agricultural Carbon

Latin America and the Caribbean (LAC)'s agriculture sector can lead the way on climate and biodiversity action by leveraging the potential of carbon market mechanisms. The Partnership for Agricultural Carbon (PAC) was established to enable countries to tap into this potential. PAC's integrated approach to aligning carbon markets with sustainable agricultural practices makes it a suitable vehicle to drive high-integrity projects that deliver both climate mitigation and biodiversity conservation at scale.

By providing technical expertise and capacity-building support, PAC can support countries to ensure that their carbon projects achieve meaningful biodiversity outcomes. PAC's framework emphasizes biodiversity as a core benefit of carbon projects, allowing countries to attract premium-priced carbon credits while advancing their Nationally Determined Contributions (NDCs) and sustainable development goals.

PAC's contributions are readily available to countries in the region, offering a pathway to scale up nature-based solutions such as agroforestry, regenerative agriculture, and silvopasture. By prioritizing biodiversity and integrating sustainable land-use practices, PAC enables LAC countries to deliver transformative impacts that extend beyond carbon sequestration, supporting long-term ecological and economic resilience.

PAC serves as an essential partner for countries in the LAC region to harness the power of voluntary carbon markets (VCMs) and sustainable agriculture. By leveraging PAC's resources and expertise, countries can make significant strides toward their climate and biodiversity goals, mobilizing the private sector to drive sustainable change for both people and nature.

By leveraging PAC as a strategic platform, LAC countries can position themselves at the forefront of global efforts to harness the potential of VCMs and sustainable agriculture. This approach not only addresses the region's financing needs but also supports broader global climate and biodiversity objectives.

If you are interested in collaborating with PAC or would like to find out more information, please contact Daniel Ortega-Pacheco, lead coordinator of PAC, at dortega@biocarbon.com.ec.

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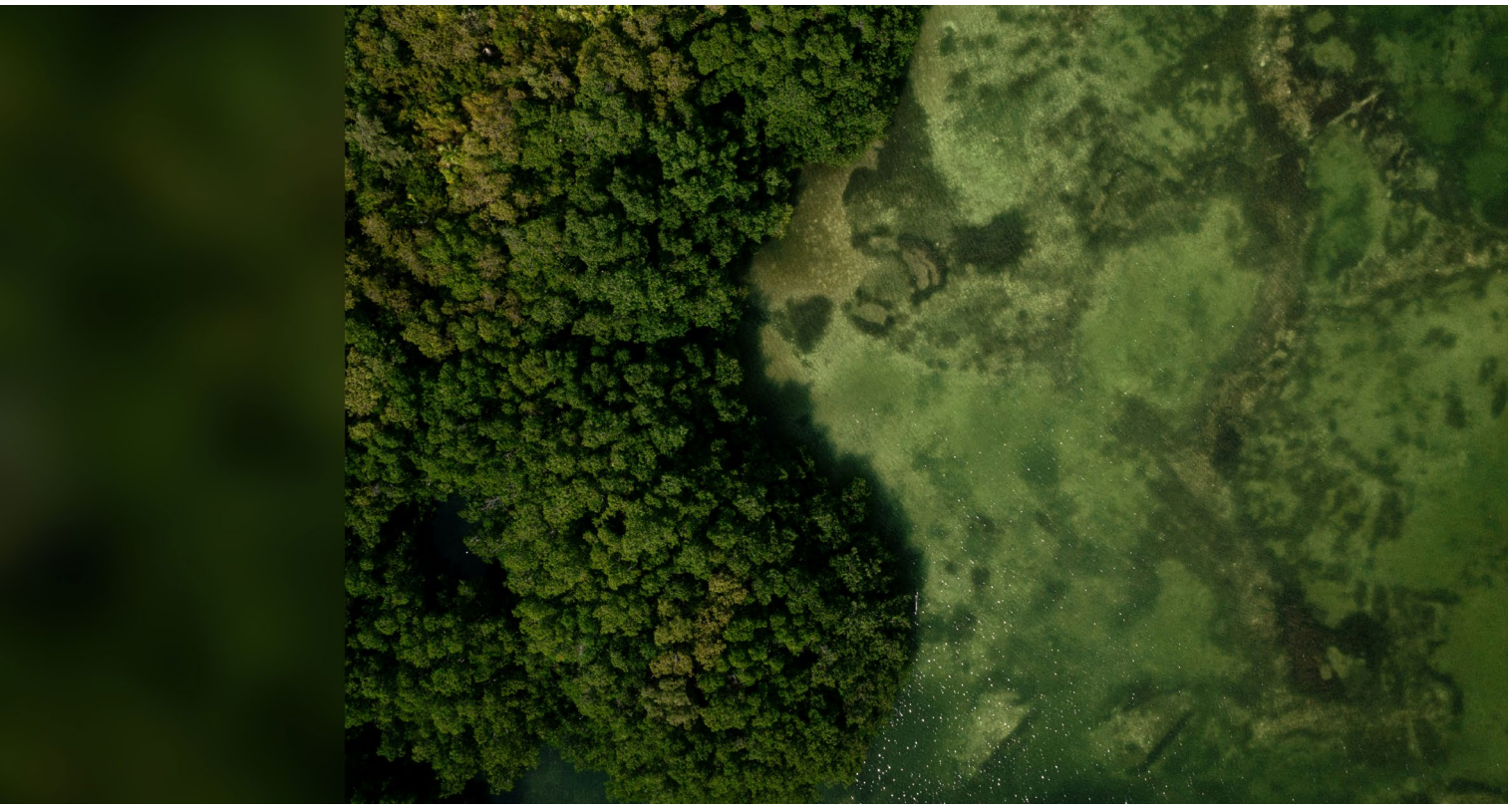


Executive Summary

Latin America and the Caribbean (LAC) host some of the world's most critical biodiversity hotspots, which also present significant opportunities for climate action. High-integrity carbon markets provide a transformative pathway through which public and private finance can be mobilized, driving ecosystem restoration, enhancing climate resilience, and supporting sustainable economic development.

Agriculture, a key economic sector in the region, accounts for over 25% of GHG emissions, presenting both a challenge and an opportunity for climate mitigation. Transitioning to sustainable agricultural practices that integrate biodiversity as a core benefit can address emissions while delivering ecological, social, and economic advantages. The region's voluntary carbon markets (VCMs) have emerged as effective tools for financing sustainable land use and biodiversity-positive initiatives.

The Partnership for Agricultural Carbon (PAC) is supporting LAC stakeholders to leverage carbon market mechanisms in support of sustainable agricultural practices that deliver measurable biodiversity and climate benefits. By positioning biodiversity as a core outcome, PAC can assist governments in accelerating access to private finance for projects generating high-quality carbon credits while advancing ecosystem conservation and improving rural livelihoods.

This report outlines how high-integrity carbon markets can deliver measurable biodiversity and climate outcomes in LAC's agricultural sector. It provides recommendations for scaling up these markets, details best practices for monitoring, reporting, and verification (MRV), and offers insights into policy frameworks that facilitate biodiversity-focused projects. By prioritizing biodiversity as a central goal, rather than treating it as a secondary advantage, carbon projects can deliver superior outcomes for nature, climate, and local communities.

The financial need to achieve LAC's Nationally Determined Contributions (NDCs) is substantial, with an estimated $700 billion annual funding gap by 2050. The PAC offers a pathway to close this gap by leveraging carbon markets to attract private finance into biodiversity-positive agricultural projects. The anticipated surge in demand for carbon credits—expected to reach 2 GtCO2eq annually by 2030—creates a market opportunity valued between $5 billion and $50 billion. Through high-integrity carbon markets, LAC countries can accelerate their transition to sustainable agricultural practices, attract investment, and strengthen their climate and biodiversity commitments.

"By prioritizing biodiversity as a central goal, rather than treating it as a secondary advantage, carbon projects can deliver superior outcomes for nature, climate, and local communities.."

Key Recommendations

1. Governments: Implement policies that mandate positive biodiversity outcomes in carbon projects and create regulatory frameworks to ensure transparency and accountability.

2. Investors: Target projects with verified biodiversity core benefits and seek premium-priced credits that deliver combined ecological and climate advantages.

3. Project Developers: Design projects with biodiversity as a primary objective, ensuring integration of MRV best practices and alignment with international standards.

1. Introduction

Context and Purpose

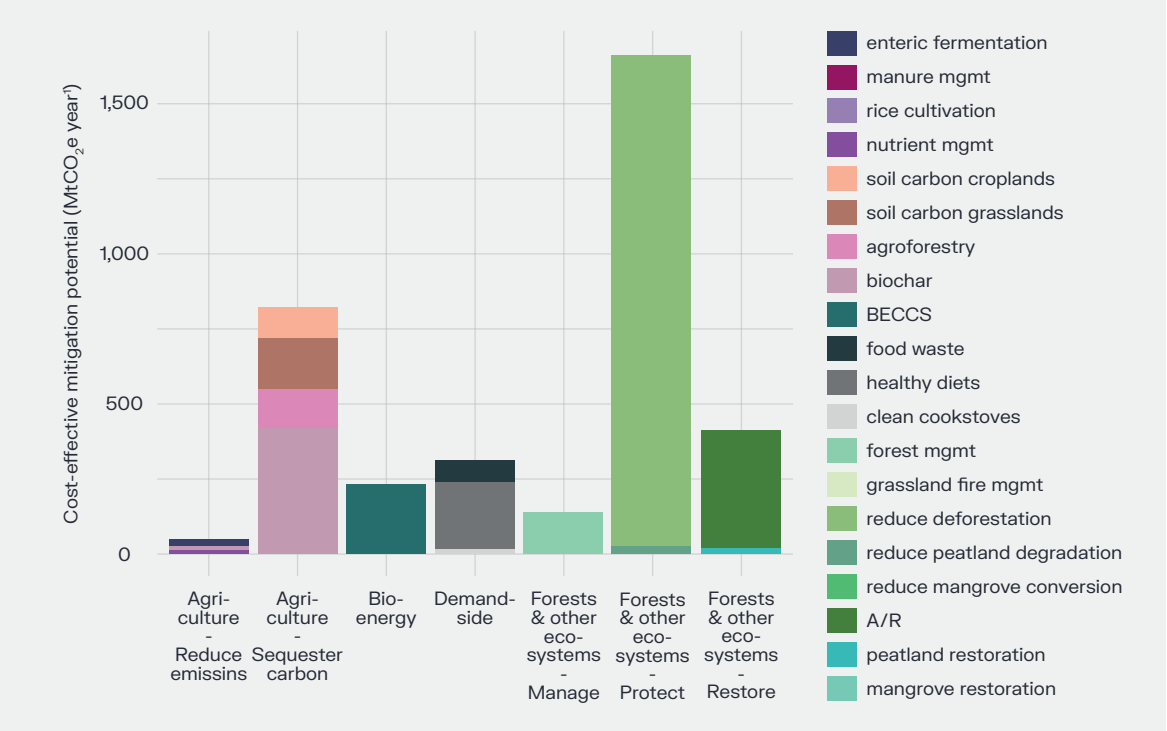
This report is intended to guide policymakers and decision-makers attending the 2024 UN Biodiversity COP in Cali on using high-integrity carbon markets to mobilize private finance for biodiversity conservation in LAC. The urgency of addressing climate change and biodiversity loss presents a unique opportunity to implement nature-based solutions that support sustainable economic growth and climate resilience (Bekessy & Wintle, 2008).

Overview of Biodiversity and Carbon Markets in LAC

LAC, which accounts for approximately 40% of global biodiversity, faces mounting threats from deforestation, agricultural expansion, and climate change. Agriculture is a major economic driver, contributing to over 6.5% of the region's GDP and employing about 13% of its workforce, yet it is also a significant source of GHG emissions (Bekessy & Wintle, 2008; Cao, Seol, & Yeo-Chang, 2012). Carbon markets are emerging as viable mechanisms to finance conservation initiatives and sustainable land use, offering dual benefits for biodiversity and climate mitigation when biodiversity is integrated as a core objective (Goldstein et al., 2020).

An estimated 50% of LAC's total agricultural production comes from the region's 14 million smallholder farmers (World Bank, 2020). Carbon markets can therefore play a crucial role in unlocking the biodiversity benefits of sustainable agriculture at the smallholder level where finance and expertise is often unavailable (Richards, Gregersen, & Smith, 2016).

Figure 1. Latin America & Caribbean (LAC) land-based mitigation potentials and feasibility. Roe et al. 2021



2. Background and context

The State of Biodiversity and Agriculture in LAC

LAC is experiencing accelerated biodiversity decline, with the loss of around 20% of original forest cover since 1990 (FAO, 2020). However, sustainable agricultural practices—such as agroforestry, regenerative agriculture, and integrated livestock management—offer an annual mitigation potential of approximately 0.9 GtCO2e (Roe et al., 2021). Implementing these practices can reverse negative biodiversity impacts by promoting ecosystem services like soil fertility, water retention, and natural pest control (Renwick et al., 2014; Deere et al., 2018).

Barriers to Scaling Climate Action in Agriculture

- **Financial Constraints:** High upfront costs and limited access to finance hinder the adoption of sustainable practices among smallholders (World Bank, 2021).
- **Policy Limitations:** Regulatory frameworks often lack minimum biodiversity standards to ensure core benefits are realized (Bekessy & Wintle, 2008).
- **Data Gaps:** There is a need for comprehensive data to fully understand biodiversity impacts across different landscapes and practices in LAC (Díaz et al., 2019).

3. Sustainable Agriculture and Biodiversity Conservation

Impact of Conventional Agriculture on Biodiversity

The expansion of agricultural land has resulted in habitat fragmentation and a decline in species diversity (Barona, Ramankutty, Hyman, & Coomes, 2010). Shifting to sustainable agricultural practices can help mitigate these impacts by embedding biodiversity enhancement as a core outcome, thereby improving ecosystem services (Foley et al., 2011).

Emerging Evidence on Biodiversity as a Core Benefit

- Species Recovery - Agroforestry: Projects that integrate trees with agricultural landscapes have been shown to enhance species richness and sequester substantial carbon (Plan Vivo, 2023).
- Enhanced Ecosystem Services - Regenerative Agriculture: Practices that reduce tillage, incorporate crop rotations, and use cover crops can restore soil health, improve microbial biodiversity, and lower carbon emissions (Deere et al., 2018).
- Increased Carbon Sequestration - Climate-Smart Livestock Management: Implementing rotational grazing and silvopasture creates habitats for wildlife while sequestering carbon and improving soil quality (Renwick et al., 2014).

Challenges in Implementation

- High Upfront Costs: Adopting sustainable practices requires significant investment in training, infrastructure, and technology (Pretty, Toulmin, & Williams, 2011).
- Land Tenure Issues: Unclear land ownership complicates project implementation (see Lipper, Dutilly-Diane, & McCarthy, 2010).
- Monitoring Requirements: Tracking biodiversity improvements necessitates robust data collection and analysis (Milne & Niesten, 2009).
- Measuring biodiversity: Establishing metrics for measuring biodiversity changes is complex given the wide range of species, habitats, and ecosystems (Bollarapu, Kuchibhotla, Kvsn, & Patel, 2024).

Figure 2. Eligible activities in agricultural projects and programs in the Voluntary Carbon Market. PAC, 2023

Agricultural projects and programs in the VCM generate carbon credits through a variety of management practices, including:

Activities that reduce emissions of methane and nitrous oxide, e.g., improved management of livestock, manures, fertilizer, and irrigation (e.g., in rice systems);

Regenerative agriculutre practices that sequester soil carbon (e.g., no-tillage, retention of post-harvest residue on the soil, cover crop rotation, and biochar application);

Agroforestry (i.e., planting trees on pastures and crop lands);

Replacement of fossil fuels with biogas (i.e., methane obtained from residual biomass and animal manure) for energy and heat generation;[9]

Sustainable management of semi-natural ecosystems, which are also used for agricultural (e.g., grasslands) and fisheries activities (e.g., mangrove forests), such as avoiding conversion to cropland, restoring degraded grasslands by optimizing livestock grazing intensity, managing for fire and drought, and enabling vegetation regrowth. [10]

4. Voluntary Carbon Markets (VCMs) and Biodiversity

Financing Challenges and the Role of Private Investment in Supporting Agriculture's Contribution to NDCs in LAC

Agriculture plays a crucial role in Latin America and the Caribbean's efforts to achieve the targets set in their Nationally Determined Contributions (NDCs). The sector presents a significant opportunity for climate action, accounting for approximately 4% of the global emissions gap. This highlights the region's potential to make a substantial contribution to global climate targets through sustainable practices such as agroforestry, improved livestock management, and soil carbon sequestration, particularly within key value chains like coffee, cocoa, livestock, and rice.

Achieving LAC's NDCs will require overcoming a considerable financing challenge, with an estimated funding gap of $700 billion annually by 2050 (UNDP, 2023). This challenge is exacerbated by public finance constraints, as deep fiscal pressures have led to a 30% decrease in agricultural budget allocations over the past decade (FAO, 2021). In Central America, agricultural budgets have declined by an average of 8.57% annually, with projections suggesting that these reductions could accelerate to 10-15% annually by 2030 (Pollination, 2024). Additionally, more than 50% of national budgets are currently allocated to debt servicing, limiting the capacity for further public investment in climate mitigation (World Bank, 2024). Given these fiscal constraints, Voluntary Carbon Markets (VCMs) offer a vital avenue for mobilizing private investments to help bridge the funding gap. The expected surge in demand for carbon credits—projected to reach 2 GtCO2eq annually by 2030—presents a market opportunity valued between $5 billion and $50 billion (World Bank, 2023). VCMs can channel private finance into sustainable agricultural practices, thereby unlocking the sector's full potential for climate mitigation. Nature-based solutions, such as agroforestry, are especially poised to play a pivotal role, offering both carbon sequestration benefits and significant biodiversity gains.

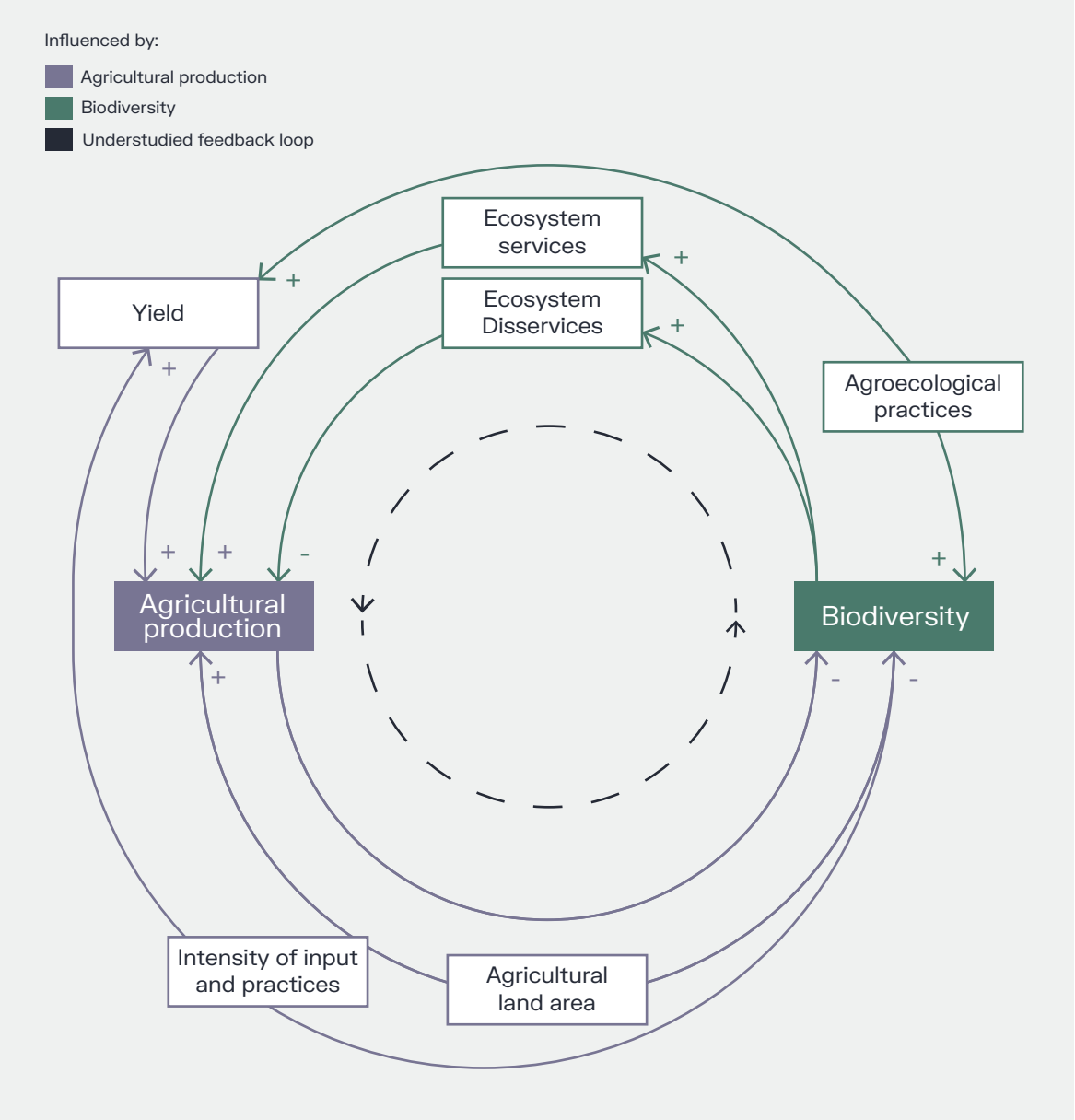
VCMs have the potential to drive substantial private sector investment towards sustainable agriculture in LAC. By facilitating the sale of carbon credits derived from activities like agroforestry and improved land management, VCMs can attract funds that would otherwise be unavailable. This can help finance the transition to climate-smart agriculture, supporting farmers in adopting sustainable practices that contribute directly to NDC targets. Furthermore, with the market for high-integrity carbon credits expected to expand rapidly, VCMs can enhance the economic viability of projects that deliver not only carbon reductions and removals but also biodiversity and socioeconomic co-benefits.

The Role of VCMs in Mobilizing Private Finance for Biodiversity

VCMs provide an effective channel for mobilizing private finance into biodiversity-positive projects (Shames, Scherr, & Gross, 2019). Nature-based solutions have gained traction, with an increasing share of new carbon credit issuances incorporating biodiversity as a core benefit (Ecosystem Marketplace, 2022).

Integrating biodiversity as a primary objective in carbon projects provides dual benefits, ensuring climate mitigation while enhancing ecosystem health. This approach shifts away from treating biodiversity as a mere "co-benefit" and towards embedding it as a fundamental outcome.

Figure 3. The feedback loop between biodiversity and agriculture. Ortiz et al. 2021



Case Study: Agroforestry in Colombia

Background: The Plan Vivo-certified agroforestry project in the departments of Risaralda, Caldas, Cauca, Huila, Tolima, Meta, Santander and Cesar, Colombia, supports around 27,000 smallholder coffee and cocoa farmers in adopting sustainable practices. The project involves planting native trees alongside coffee and cacao crops, enhancing soil health, providing shade, and promoting biodiversity (Plan Vivo, 2023).

Key Interventions:

- **Tree Planting:** Farmers are planting native species that provide shade and improved soil quality with the aim of improving resilience of coffee and cocoa plantations to climate change, and increasing carbon storage in trees at farms.
- **Farmer Training:** Farmers receive training in agroforestry techniques and sustainable land management.
- **Community Involvement:** Local communities are engaged in biodiversity monitoring and reforestation activities.

Outcomes and Impacts:

- **Biodiversity Recovery:** Pollinator diversity has increased, and bird species such as the Military Macaw (Ara militaris) have returned to the area.
- **Carbon Sequestration:** The project has sequestered an estimated 28,299 tons of CO_2 over the past decade.
- **Economic Benefits:** Participating farmers have seen improved crop yields and quality of produce due to better soil health.

Lessons Learned: Engaging communities in project activities and training has been essential for the long-term success and scalability of agroforestry initiatives.

Stakeholder Voices:

"Protecting biodiversity through carbon markets isn't just good for the environment; it's essential for sustainable economic development."

— Representative from a local farmer in the Rabobank Acorn project in Colombia.

High-Integrity Carbon Markets and Biodiversity Standards

- Quality Assurance Standards: Programs like the ICVCM's Core Carbon Principles and the VCMI Claims Code of Practice set rigorous requirements for MRV, ensuring that biodiversity outcomes are central to project design and delivery (ICVCM, 2023). In addition, Verra's Nature Framework ensures robust biodiversity outcome monitoring and reporting (Verra, 2024).

- Dual-Credit Systems: Projects that deliver both carbon sequestration and biodiversity benefits can attract higher prices due to their broader environmental impact (Renwick et al., 2014; Ecosystem Marketplace, 2023).

- Alignment with National Policies: Integrating VCMs with Nationally Determined Contributions (NDCs) enhances project visibility and investor confidence (Kreibich & Hermwille, 2021).

Challenges and Opportunities

- Lack of Standardization: The absence of universally accepted metrics for biodiversity core benefits complicates project comparisons (Bekessy & Wintle, 2008 and Mace, Norris, & Fitter, 2012).

- High Costs of Verification: Monitoring and verifying biodiversity impacts requires substantial investment in advanced technologies (Stephenson et al., 2017).

5. Monitoring, Reporting, and Verification (MRV) Systems

Best Practices for MRV in Biodiversity and Carbon Projects

Implementing robust MRV systems ensures transparency and accuracy in tracking biodiversity core benefits:

- Remote Sensing and Geospatial Tools: Integrating advanced technologies like remote sensing, standardized methodologies, and field-based data collection can ensure accurate and consistent monitoring (Dickson et al., 2014).
- Community-Based Monitoring: Engaging local communities in data collection can improve data accuracy and foster local stewardship (Danielsen, Burgess, & Balmford, 2005).
- Standardization of Biodiversity Metrics: Using internationally recognized biodiversity standards ensures consistency and credibility across projects (Addison, Bull, & Milner-Gulland, 2018).

Examples of MRV Implementation

- Peru: Agroforestry projects combine remote sensing and community-led biodiversity monitoring to track gains (Plan Vivo, 2023).
- Kenya: Smallholder agroforestry projects employ drones and satellite imagery to assess biodiversity and carbon stocks, demonstrating a robust approach to MRV in agricultural carbon projects (Vågen et al., 2016).
- Costa Rica: National reforestation programs utilize geospatial tools and local monitoring to measure progress on biodiversity outcomes (Deere et al., 2018).

6. Policy Framework for Scaling High-Integrity Carbon Markets in LAC

Recommendations for Governments

- Regulatory Measures: Establish legal requirements that prioritize biodiversity as a core benefit in carbon projects (Duguma, Minang, van Noordwijk, & Mbow, 2019).
- Financial Incentives: Link tax breaks, grants, and favorable financing to projects delivering verifiable biodiversity outcomes (Wollenberg et al., 2016).
- Environmental Safeguards: Implement safeguards to prevent potential negative impacts such as biodiversity loss (Wilkes, Reisinger, Wollenberg, & van Dijk, 2017).

Roles of the Private Sector and NGOs

- Corporate Investment: Companies can drive demand for biodiversity-centric carbon credits (Lovell & MacKenzie, 2011 and Báez & Fernandez, 2019).
- Capacity Building by NGOs: Provide training and resources for biodiversity-positive project development and implementation to governments, farmers, and the private sector (Narloch, Drucker, & Pascual, 2011 and Reed, Deakin, & Sunderland, 2015).
- Awareness Initiatives: Promote the value of integrating biodiversity as a core outcome in carbon projects (Lipper, McCarthy, Zilberman, Asfaw, & Branca, 2017).

Financing Mechanisms

- Blended Finance: Combine public and private capital to de-risk investments in biodiversity-positive projects (Falzon & Batra, 2018 and Trujillo & Perron-Welch, 2020).
- Green Bonds and Impact Investments: Utilize these tools to fund projects with measurable biodiversity benefits (Buchner, Falconer, Trabacchi, & Wilkinson, 2015 and Granziera & Fedele, 2020).

7. Investment Attraction and Market Opportunities

Identifying Investment Hotspots

High-potential regions for biodiversity-focused carbon projects include:

- Amazon Basin: Rich in biodiversity and offers high carbon sequestration potential (Nunes, Oliveira, Siqueira-Gay, & Tejada, 2020).
- Andean Forests: Suitable for reforestation and agroforestry initiatives (Grau & Aide, 2008).
- Caribbean: Mangrove restoration projects can enhance marine biodiversity, sequester carbon, and protect coastal communities from storm surges (Acosta, 2023 and Herr & Landis, 2016).
- Mesoamerica: Agroforestry and silvopasture systems offer opportunities to restore degraded lands while providing economic benefits to local communities through sustainable farming practices (Shapiro-Garza, Calderon-Contreras, & Crow, 2020).

Leveraging Dual Credits

- Attractiveness for Investors: Dual credits that combine carbon and biodiversity outcomes appeal to impact investors seeking to achieve measurable environmental and social benefits (Renwick et al., 2014 and Busch & Amarjargal, 2020).
- Premium Pricing Trends: Biodiversity-centric credits command higher prices in the market due to their additional benefits, with increasing demand from companies aiming for nature-positive goals (Herrera & Pfaff, 2020).

Case for Premium Pricing of Biodiversity-Centric Carbon Credits

- Rising Corporate Demand: Companies with net-zero and nature-positive commitments are willing to pay a premium for credits that deliver measurable biodiversity core benefits, reflecting market trends (Hamrick & Gallant, 2017).
- Certification Standards: Programs such as the Verified Carbon Standard (VCS) and the Climate, Community & Biodiversity Standards (CCBS) ensure that projects meet rigorous biodiversity requirements, making them more attractive to investors (Goldstein, Turner, Spawn-Lee, & Anderson, 2019).

Case Study: Mangrove Restoration in Mexico

Background: In the Yucatan Peninsula, a project integrating carbon and biodiversity credits focuses on restoring mangrove ecosystems, which provide critical carbon storage and support marine biodiversity (Acosta, 2023).

Key Interventions:

- **Reforestation:** Mangrove saplings are planted in degraded coastal zones.
- **Monitoring:** Satellite imagery and community-led assessments track ecosystem health and carbon stocks.
- **Local Participation:** Communities are engaged in restoration activities and conservation education.

Outcomes and Impacts:

- **Habitat Restoration:** The project has restored over 5,000 hectares of mangrove forest, benefiting species such as the American Crocodile (Crocodylus acutus).
- **Carbon Sequestration:** The initiative sequesters approximately 200,000 tons of CO_2 annually.
- **Socioeconomic Benefits:** The project has created jobs and increased local awareness about conservation.

Lessons Learned: Dual-credit systems are effective in attracting diverse investments and supporting large-scale ecosystem restoration.

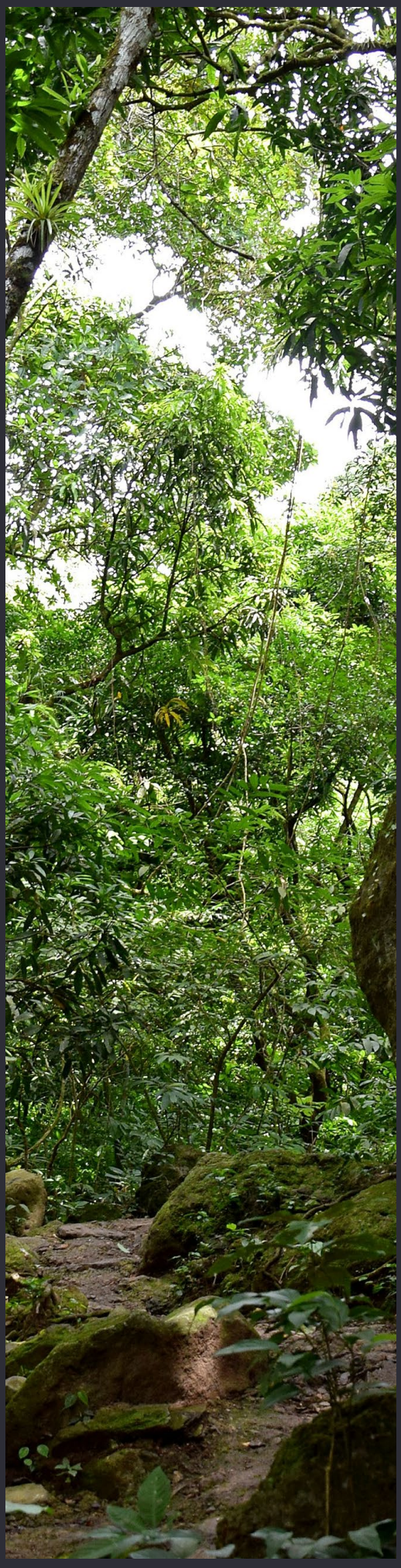
8. Capacity Building and Technical Assistance

Training Programs for Farmers and Communities

- Skills Development: Training on sustainable practices such as agroforestry, regenerative agriculture, and biodiversity monitoring can equip farmers and communities to implement climate-smart techniques that deliver biodiversity benefits (Shapiro-Garza & Gosnell, 2018).

- Access to Finance: Capacity-building efforts should include guidance on leveraging climate finance mechanisms to support the transition to more sustainable agricultural practices. For example, revenue from the sales of carbon credits can provide an economic incentive for smallholder farmers to consider new practices (Shapiro-Garza & Gosnell, 2018).

- Participatory Project Design: Involving local communities in the planning process ensures that projects address local priorities and reflect traditional ecological knowledge (Reed, Deakin, & Sunderland, 2015).



Case Study: Sustainable Forest Cover Establishment in Panama

Background: The ACP sustainable Forest Cover Establishment Project, developed by the Panama Central Authority (ACP), focuses on restoring degraded lands, enhancing biodiversity, and promoting sustainable land management in the Panama Canal watershed. The project aims to address environmental and economic challenges by integrating reforestation with agroforestry and silvopastoral systems. It is certified under the Gold Standard and engages local communities in sustainable forestry practices (SustainCERT, 2024).

Key Interventions:

- **Reforestation and Conservation:** The project has established over 2,985 hectares of forest cover using native and commercial tree species to restore ecosystems.
- **Agroforestry and Silvopasture:** Agroforestry practices integrate coffee cultivation, while silvopastoral systems combine livestock and tree planting to improve land productivity.
- **Community Involvement:** Local communities, including the Association of Coffee Producers of Ciri and Trinidad Rivers (ACACPA), participate in tree planting, agroforestry, and forest management activities.

Outcomes and Impacts

- **Biodiversity Recovery:** The project supports habitat restoration, improving connectivity between protected areas like Chagres and Soberania National Parks.
- **Carbon Sequestration:** It has sequestered approximately 132,246 tons of CO2 to date, with a total target of 340,559 tons over 30 years.
- **Economic Benefits:** Agroforestry and silvopasture practices provide additional income for local farmers, with coffee sales contributing to sustainable livelihoods.

Lessons Learned: Involving local communities in reforestation and agroforestry has been essential for the project's success, with community-led efforts proving crucial for maintaining project activities and scaling sustainable land manageent practices.

Stakeholder Voices:

"Policies that promote biodiversity in carbon markets can result in a win-win situation: projects more likely to achieve holistic benefits in a country, and to be valued more highly by buyers as a result."

— Hugh Salway, Gold Standard.

Technical Assistance for Governments and NGOs

- MRV Training: Provide comprehensive training on geospatial tools, remote sensing, and community-based monitoring techniques to support the effective implementation of biodiversity-positive carbon projects (Gibbs, Harris, & Baccini, 2018).
- Policy Development Support: Assist governments in developing regulatory frameworks that incentivize projects with biodiversity as a core benefit and align with international standards (Roe et al., 2021).
- Project Management Guidance: Provide best practice guidance to project developers and investors, including on project financing, implementation, and the integration of biodiversity outcomes into carbon market strategies (Shapiro-Garza, Perramond, & Wittman, 2020).

9. Conclusions and Recommendations

Latin America and the Caribbean's (LAC) agriculture sector is uniquely positioned to advance global climate and biodiversity goals by leveraging carbon market opportunities. As agriculture accounts for a substantial share of the region's greenhouse gas emissions, the transition to sustainable practices presents an opportunity to contribute meaningfully to the achievement of Nationally Determined Contributions (NDCs) while simultaneously addressing biodiversity loss. The integration of nature-based solutions—such as agroforestry, agrobiodiversity, regenerative agriculture, and silvopasture—can drive transformation in agricultural landscapes, offering substantial benefits for ecosystems and communities alike.

Key conclusions emerging from this analysis are:

1. Unlocking Agriculture's Mitigation and Biodiversity Potential

The agricultural sector in LAC has a mitigation potential estimated at 0.9 GtCO2eq per year, representing a significant contribution to closing the global emissions gap. Beyond carbon sequestration, sustainable agricultural practices can generate positive biodiversity impacts by enhancing habitat connectivity, increasing species richness, and restoring degraded ecosystems. Integrating biodiversity as a core outcome of carbon projects is essential to maximizing these dual benefits.

2. Addressing the Financing Gap for NDCs through VCMs

Achieving the region's NDC targets involves overcoming a considerable financing challenge, with a projected $700 billion annual funding gap by 2050. Given current fiscal constraints and declining public investment in agriculture, there is an urgent need for innovative financing mechanisms. High-integrity VCMs provide a promising solution to mobilize private capital into biodiversity-positive agricultural projects, helping to bridge the funding gap while advancing sustainable development goals.

3. Leveraging VCMs for Biodiversity-Positive Investments

VCMs present a unique opportunity to drive investments that deliver measurable biodiversity gains. The expected surge in demand for carbon credits, projected to reach 2 GtCO2eq annually by 2030, opens up a market valued between $5 billion and $50 billion. Projects that prioritize biodiversity as a core outcome, rather than treating it as a secondary benefit, can command higher prices and attract investors looking to achieve both climate and nature-positive impacts.

4. Scaling Nature-Based Solutions for Sustainable Agriculture and Biodiversity

The adoption of nature-based solutions within agriculture can generate significant ecological, social, and economic benefits. Practices such as agroforestry and silvopasture not only sequester carbon but also enhance soil health, restore ecosystems, and increase biodiversity. By scaling these approaches, LAC can achieve synergistic outcomes that align with climate goals and support long-term biodiversity conservation.

5. Strengthening MRV Systems to Ensure High-Integrity Outcomes

Robust Monitoring, Reporting, and Verification (MRV) systems are critical for verifying both carbon sequestration and biodiversity impacts. The integration of advanced technologies, including satellite monitoring, remote sensing, and community-based approaches, can improve the accuracy and reduce the costs of tracking outcomes. Developing strong MRV frameworks that capture biodiversity metrics alongside carbon metrics will be crucial for building investor confidence in high-quality carbon credits.

Key findings:

- High-integrity carbon markets represent a vital opportunity to scale biodiversity-positive projects and mobilize private finance for conservation in LAC.
- Prioritizing biodiversity as a core outcome in sustainable agriculture and ecosystem restoration projects enhances the environmental impact of voluntary carbon markets.
- Robust MRV systems, supportive policies, and targeted investments are essential for achieving biodiversity and climate goals at scale.

Actionable Recommendations:

- For Governments: Prioritize biodiversity in carbon projects through regulatory measures, financial incentives, and risk management safeguards to ensure core biodiversity benefits are delivered.
- For Investors: Focus on projects that provide dual benefits of carbon sequestration and biodiversity outcomes, seeking premium-priced credits with verified biodiversity impacts.
- For Project Developers: Design projects with biodiversity enhancement as a central goal and adopt best practices for MRV to ensure transparency and accountability in tracking biodiversity gains.

Glossary of Terms

Agroforestry:	An integrated land-use management system where trees and shrubs are grown alongside crops or pastureland to enhance biodiversity, carbon sequestration, and soil health.
Blended Finance:	A financial approach that combines public, philanthropic, and private sector investment to reduce risks for private investors and attract additional capital for biodiversity-positive projects.
Biodiversity Core Benefits:	Direct positive impacts on biodiversity that are central to the objectives of a climate mitigation or conservation project, such as habitat restoration, species recovery, or ecosystem health improvement.
Carbon Credit:	A tradable certificate that represents the right to emit one metric ton of carbon dioxide or an equivalent amount of another greenhouse gas, typically associated with carbon reduction or sequestration activities.
Climate-Smart Agriculture:	Agricultural practices that increase productivity sustainably, enhance resilience to climate change, and reduce greenhouse gas emissions, while delivering biodiversity benefits.
Dual Credits:	Carbon credits that are issued with additional certification for biodiversity benefits, reflecting the project's combined impact on carbon sequestration and biodiversity conservation.
High-Integrity Carbon Markets:	Carbon markets that adhere to rigorous standards for transparency, accountability, and quality of carbon credits, with a focus on achieving measurable biodiversity and climate outcomes.
Monitoring, Reporting, and Verification (MRV):	The processes used to measure, document, and confirm the outcomes of carbon sequestration and biodiversity enhancement efforts in carbon projects.
Nature-Based Solutions (NBS):	Strategies that involve the protection, restoration, or management of natural ecosystems to address societal challenges, such as climate change, water security, and biodiversity loss.
Nationally Determined Contributions (NDCs):	Climate action plans submitted by countries under the Paris Agreement, outlining their commitments to reduce greenhouse gas emissions and adapt to climate change impacts.
Participatory Monitoring:	A monitoring approach that involves local communities in data collection, helping to improve data accuracy, reduce costs, and promote local ownership of conservation projects.
Regenerative Agriculture:	Farming and grazing practices that aim to restore and enhance the health of the ecosystem by improving soil biodiversity, water retention, and carbon sequestration.
Silvopasture:	An agroforestry practice that integrates trees, pasture, and livestock in a single system, providing multiple benefits such as improved animal welfare, carbon sequestration, and biodiversity outcomes.
Voluntary Carbon Market (VCM):	A marketplace where carbon credits are bought and sold on a voluntary basis, as opposed to compliance markets regulated by government mandates.

List of Acronyms

1. CCBS: Climate, Community & Biodiversity Standards
2. GHG: Greenhouse Gas
3. ICVCM: Integrity Council for the Voluntary Carbon Market
4. LAC: Latin America and the Caribbean
5. MRV: Monitoring, Reporting, and Verification
6. NBS: Nature-Based Solutions
7. NDCs: Nationally Determined Contributions
8. NTFP: Non-Timber Forest Products
9. PAC: Partnership for Agricultural Carbon
10. VCM: Voluntary Carbon Market
11. VCMI: Voluntary Carbon Markets Integrity Initiative
12. VCS: Verified Carbon Standard

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