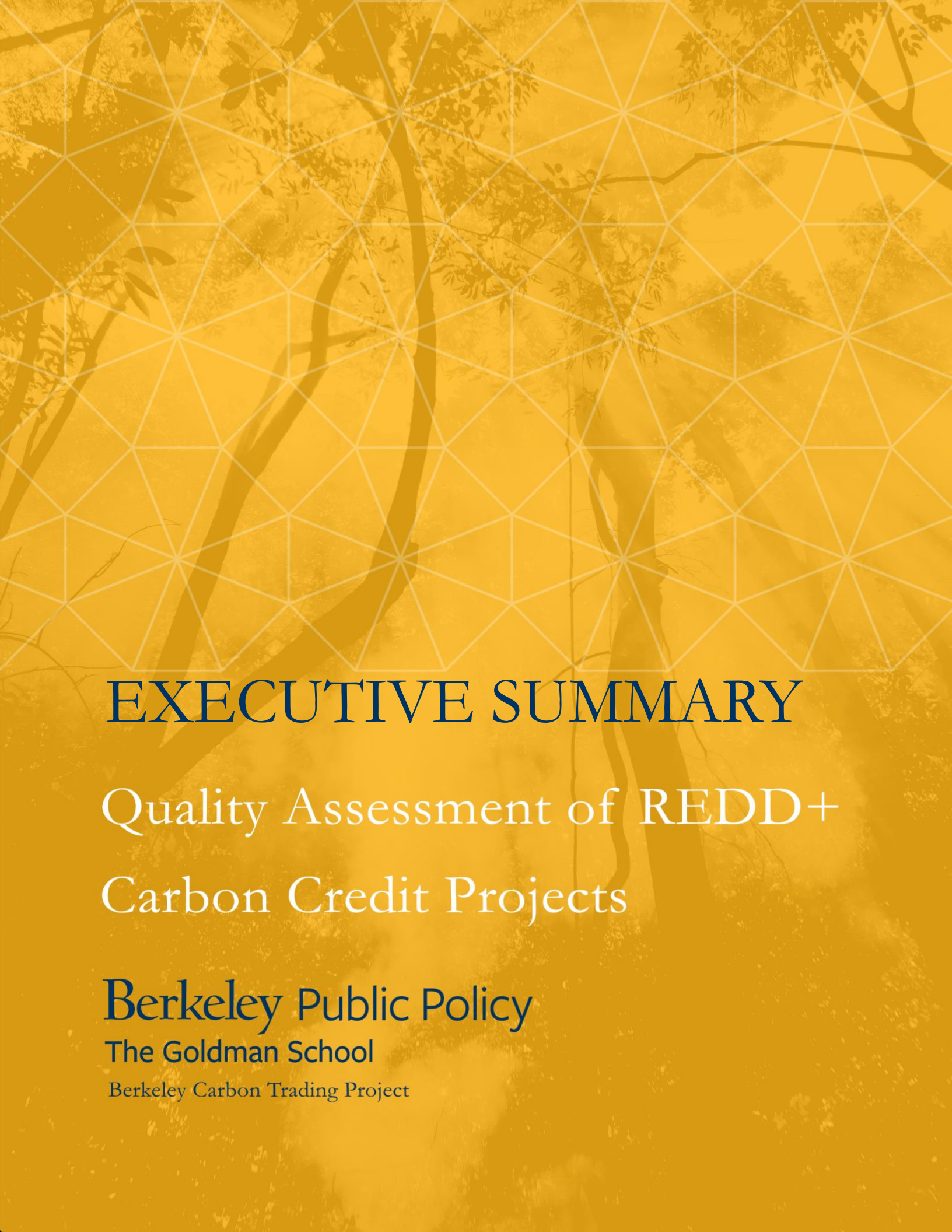

EXECUTIVE SUMMARY

Quality Assessment of REDD+ Carbon Credit Projects

Berkeley Public Policy
The Goldman School
Berkeley Carbon Trading Project

Quality Assessment of REDD+ Carbon Credit Projects

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Berkeley Public Policy
The Goldman School
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Executive Summary

Quality Assessment of REDD+ Carbon Credit Projects

Well over half of the world's largest public companies globally have taken on carbon emissions reduction goals and many expect to meet these targets, at least in part, by buying carbon credits to "offset" their continued emissions. These commitments are anticipated to direct significant investments from the private sector into external climate mitigation projects.

The voluntary carbon market generates credits, each nominally equivalent to one metric ton of carbon dioxide reduced or removed from the atmosphere, from a wide range of projects around the globe. Previous research has shown that these projects rarely represent their claimed climate benefit, and that it is not uncommon for programs to overestimate their impact manyfold (e.g., Badgley et al., 2022; Cames et al., 2015; Coffield et al., 2022; Gill-Wiehl et al., 2023; Haya, 2010, 2019; Stapp et al., in press).

Reducing Emissions from Deforestation and Forest Degradation (REDD+) is the project type that has the most credits on the voluntary carbon market—about a quarter of all credits to date. These projects pay governments, organizations, communities, and individuals in forest landscapes (primarily tropical ones in the Global South) for activities that preserve forests and avoid forest-related greenhouse gas (GHG) emissions.

Many see the private funds generated through REDD+ carbon crediting as critical to preserving tropical forests, home to a significant portion of the world's biodiversity, 40% of the world's vegetation carbon (over 180 billion metric tons of carbon), and innumerable forest communities. But despite more than US$3 billion in aid for REDD+ and close to a half billion carbon credits awarded over the last 20 years to most forested countries in the Global South, deforestation is still continuing at an alarming rate. A tremendous amount of trust and hope are being put into the voluntary carbon market and the small number of nonprofit organizations that create, manage, and self-regulate it.

In this report, we assess the effectiveness of REDD+ carbon crediting programs at reducing deforestation, generating high-quality carbon credits, and protecting forest communities. This analysis can inform the future direction of REDD+ crediting under both the voluntary carbon market and UN climate agreements. We focus on the four crediting methodologies that have generated almost all REDD+ carbon credits to date, all under Verra, the largest voluntary carbon market registry.

We found that current REDD+ methodologies generate credits that represent a small fraction of their claimed climate benefit. Estimates of emissions reductions were exaggerated across all quantification factors we reviewed when compared to the published literature and our independent quantitative assessment.

Almost all projects focus on changing the behavior of some of the world's poorest communities. REDD+ is not designed to address the most important commercial drivers of deforestation: politically and economically powerful large-scale agriculture, cattle ranching, logging, and mining. While many projects aim to better the lives of forest communities, some also restrict smallholder use of forest resources. These restrictions, when enforced, commonly fall hardest on more vulnerable households and communities, and in the worst cases, have resulted in displacement or dispossession. Safeguard policies, presented as ensuring "no net harm" to forest communities, in practice have been treated as voluntary guidance.

Companies buy these inflated carbon credits to sell "carbon neutral" flights and fuel, call themselves carbon neutral to investors, employees, and customers, and justify their own continued emissions. These credit purchases take funds and attention away from more effective climate mitigation and forest protection measures.

Our exploration of the underlying reasons REDD+ crediting projects deviate so dramatically from good practice in carbon accounting and safeguards found that Verra offers project developers significant flexibility in performing emissions reduction estimates and applying safeguards. Developers have used that flexibility to make methodological choices that lead to high estimates of project benefits, instead of conservative estimates as required. Project auditors, who are hired by the project developers and so have incentives to be lenient in order to be hired again, did not adequately enforce compliance with Verra's standards, including conservativeness in emissions reduction estimates.

Today, throughout the forests of the Global South, communities are being approached by REDD+ project developers to enroll new lands in carbon crediting projects. Rarely do project designs originate from the communities themselves. The power imbalances in these interactions are obvious. This is the opposite direction that REDD+ needs to go to successfully reign in deforestation and protect people.

When considering all evidence together, our overall conclusion is that REDD+ is ill-suited to the generation of carbon credits for use as offsets. The logic of the voluntary carbon market is to create a financial incentive for private actors to find the lowest-cost carbon emissions reductions and removals. But all decision-makers involved in the creation and use of carbon credits benefit financially from excess crediting. The methodologies used to estimate project benefits and credits awarded are developed by companies and organizations that go on to use them to develop projects and sell credits. Developers benefit from selling more credits for doing less, credit buyers seek inexpensive credits, and the auditors tasked with ensuring quality have conflicts of interest because they are hired directly by the project developers. Verra itself competes for market share with the other carbon credit registries. High levels of over-crediting come from the compounding of decisions made throughout the carbon credit lifecycle, all of which lean toward generating more credits.

This market system creates a race to the bottom that is hard to emerge from. Buyers seek the lowest-cost credits that are often the most over-credited, and the market values carbon over people by design.

In addition to the fundamental incentive structure, two other issues suggest that REDD+ credits should not be traded with, or treated as equivalent to, fossil fuel emissions. Programs that use reductions in forest carbon emissions to offset fossil fuel emissions effectively transfer carbon from permanent storage as unmined fossil fuels to the short-duration carbon cycle where it is at risk of release into the atmosphere. Furthermore, uncertainty in REDD+ baselines and leakage impacts are still too high for credits to be seen as offsetting a known amount of carbon emissions.

Research Questions and Methods

We reviewed the four most widely used REDD+ carbon crediting methodologies: Verra's VM0006 (Terra Global Capital, 2017), VM0007 (Avoided Deforestation Partners, 2020), VM0009 (Wildlife Works & ecoPartners, 2014), and VM0015 (Pedroni, 2012). Each methodology defines what projects are allowed to participate and generate credits and methods for monitoring and calculating the emissions reductions/removals from each project. Verra requires all projects and credit calculations to be audited by third-party auditors, and manages and oversees the auditing process.

In exploring the effectiveness of these methodologies, we focus on five quality factors:

- Baselines: deforestation that likely would have occurred in the absence of the project intervention that is reduced and credited by the project
- Leakage: the increase in carbon emissions outside project boundaries due to project activities, such as from conservation activities that displace rather than reduce production of a product, such as timber
- Forest carbon accounting: estimates of carbon per hectare in forests conserved
- Durability: the risk that forest carbon conserved by the project will be released into the atmosphere from natural disturbance, such as wildfire, or from human activities
- Safeguards: criteria and procedures for mitigating risks and minimizing harm to forest communities

For each factor, we assess the rules and procedures laid out in the methodologies and in Verra's overarching *Verified Carbon Standard* (VCS), their implementation by projects, and their enforcement by auditors. We compare the rules and their application by projects with published literature and perform our own project assessments.

Report Findings

Over-Crediting

We found evidence of widespread over-crediting across all four quantification factors covered in this report. Many REDD+ credits are created from unrealistically high baselines, unrealistically low estimates of leakage and durability risk, and high estimates of carbon stocks in forests. The carbon estimates used by projects to generate credits were significantly higher than results based on best-practice methods described in the literature and our own independent estimates.

Baselines

Verra's REDD+ methodologies estimate project impacts and credits as the difference between actual, monitored changes in forest carbon and the predicted loss of carbon stocks in a baseline scenario. The *baseline* should represent the deforestation and forest degradation rates that would likely have occurred without the REDD+ project. All methodologies forecast the baseline at the start of the project based on historical deforestation and degradation rates in the larger region.

Baselines that forecast higher rates of deforestation and forest degradation without the project intervention result in more credits when compared with monitored rates over time.

Previous research found that baselines used by projects are far higher than those constructed using best-practice baseline methods (Guizar-Coutiño et al., 2022; West et al., 2023; West et al, 2020). These studies use actual deforestation rates in well-matched control plots looking backwards in time over the reporting period rather than forecasting baselines at the start of the project. One study of 17 sample REDD+ projects in five countries (West et al., 2023) found that the credits issued to projects represented more than 13 times the study team's independent assessment of actual project impacts. The study also found more than half of the projects showed no reduction in deforestation, despite having generated credits. These findings are consistent with other studies of REDD+ projects that documented much lower impacts than credits issued or no impact at all (Seyller et al., 2016; Withey, 2021).

Leakage

When projects reduce the production of a traded commodity, such as timber or coffee, that production can shift to other non-protected areas—a process known as *leakage*. For example, if demand for timber remains the same, then reduced harvest in one forest may simply result in increased harvesting in another. All methodologies require developers to estimate and deduct the carbon impacts from leakage.

We identified a number of projects with substantial leakage risk that nevertheless applied zero leakage deductions. Verra's REDD+ methodologies include market leakage rates that reflect the academic literature—between 10% and 70%, depending on project conditions. However, in practice, more than half (59%) of Verra's REDD+ projects did not take any leakage deduction, and most of those that did applied total leakage rates under 25%. This suggests that the portfolio of projects is likely to over-credit by failing to deduct sufficient credits to cover leakage risk.

Forest Carbon Accounting

The carbon benefits of a project are calculated as the hectares of forest saved by the project multiplied by the carbon per hectare. Aboveground and belowground carbon in live trees are the largest carbon pools protected and credited by REDD+ projects.

Under Verra's REDD+ methodologies, most developers translate tree inventory data (e.g., tree height and diameter in sample plots) into carbon per hectare in live trees using equations published in scientific articles and reports. Our study sample of 11 projects found that developers chose allometric equations that, on average, resulted in credit generation 23% to 30% higher than our independent estimates.

Durability

All REDD+ projects must estimate the risk that the carbon they conserved and credited will be released into the atmosphere due to natural or human causes over a 100-year period (called a *reversal*) and put a corresponding quantity of verified reductions into an insurance buffer pool. Credits from this insurance pool can be used to cover a reversal, and so should be sufficient to ensure that all credits sold remain valid even if reversals occur in some projects.

For the 57 REDD+ projects for which we were able to find matching remote sensing data in the published literature, we found the mean 100-year risk of a stand-clearing natural disturbance to be 28%. In other words, if past disturbance rates continue unchanged, around 28% of preserved forest carbon will be released into the atmosphere by a major natural disturbance event over the next 100 years. This is likely an undercount of actual risk for two reasons: first, our estimate only took into account a portion of the disturbance (stand-clearing disturbance), and second, our calculated risks did not account for the expected increases in risk with climate change. Nonetheless, the average REDD+ project estimated its risk from all natural disturbance to be just 2% of credited carbon reductions, less than a tenth of our estimates. Furthermore, more than half of all projects contributed the minimum allowed deduction, 10%, into the buffer pool to cover both natural and human risks.

Flexibility

All four of Verra's methodologies grant project developers significant flexibility in defining project baselines, accounting for the carbon impacts from leakage, estimating the carbon in forests, estimating project reversal risk, and applying safeguard standards. We found that, despite Verra's requirement that they treat uncertainty with conservativeness, project developers often made use of the flexibility allowed by Verra to make choices that generated high rather than conservative quantities of credits.

Baselines

To explore the accuracy of Verra's methodologies, we chose one project from each methodology. For each, we recreated the baseline seven times, using all four methodologies, and applying three methodologies twice, using different options within them. Since credits under all methodologies are treated as equivalent, applying all allowed methods to the same project area should result in similar baseline predictions.

Instead, we found that baseline deforestation rates varied enormously when different REDD+ methodologies and options were applied to the same project area, and that developers consistently went with higher baselines. The average difference between the lowest and highest baselines values for the four sample projects was 1459%. In other words, on average, the highest of the seven baseline values we calculated for a project using the different Verra methodologies was more than 14 times the lowest value for that same project.

Unsurprisingly, we also found that the official baselines used by developers to generate offset credits were consistently on the high end of the range of the alternative baselines we constructed. The official baselines used by the developers were higher than 23 of our 28 reconstructed baselines.

Leakage

We used four case study projects to examine the reasons for the application of low leakage rates. We found that project developers were able to apply no leakage deduction through a number of paths, even for projects with substantial leakage risk. For example, one project developer performed two household surveys back-to-back and chose to apply the results from the smaller survey that showed no leakage risk even though doing so was not conservative.

Forest Carbon Accounting

All methodologies lay out guidance for choosing equations to translate forest inventory data into aboveground and belowground carbon. The guidance allows for significant flexibility. We found that the range of equations the methodologies allow for assessing carbon in live trees per hectare resulted in estimates that varied by 80% for the aboveground portion and 193% for the belowground portion on average across our sample projects. We also found that most developers chose equations that led to high rather than conservative estimates of carbon per hectare of forest.

Social Safeguards and Outcomes for Forest Communities

While Verra's safeguard standards are presented as assurance that projects will not cause harm to local communities, in practice they are commonly treated as a check-box activity by both developers and auditors. Verra's safeguard policies are less specific and less stringent than those considered to be best practice. As with the other quality standards we reviewed, VCS safeguard policies are flexible and permissive. Verra provides little guidance to developers on how to follow them or to auditors on how to verify them; we saw many instances where safeguard policies were overlooked, or only weakly carried out, yet projects were still positively verified. Stakeholder consultation practices, for example, were rarely described in detail; practices such as sending emails to affected community members were accepted by auditors, reflecting serious misunderstanding of what *consultation* means.

In the process of estimating reversal risk, VCS asks developers to quantify *external risks* to project permanence, which are calculated based on the extent of local consultation, among other factors. We found that 17 of 18 projects reviewed (94%) rated community engagement risk as zero in their first monitoring period. Ultimately, the only actors who can determine whether harm has occurred are impacted communities themselves, yet our review found project-level grievance mechanisms to be non-transparent and rarely utilized; audit reports included surprisingly little indication that these mechanisms had been verified as effective avenues for complaints. Our review suggests that safeguards are most likely to fail to protect the rights of Indigenous peoples and local communities precisely in the contexts in which risks are greatest and protections are most needed.

Verra's most recent update to its safeguards policy recognizes important protections left out of prior policies, such as international human rights standards and respect for Indigenous peoples' rights. However, our close review of how safeguards are implemented and verified in practice suggests these changes in the standard alone may do little to change outcomes for forest communities. Safeguards have inherent limitations. What constitutes proper implementation is context-dependent, and judging compliance can be subjective. For example, assessing whether stakeholder consultations created space for meaningful dialogue with affected communities—or were merely a one-sided presentation of project information to a non-representative group invited by the developer—may hinge on contextualized knowledge and time in the field to meet with a broad range of stakeholders. Auditors rarely have the time, nor the expertise, to determine whether social safeguards meet Verra's standard and relevant international rights standards. Auditors cannot force compliance or provide redress for harms; they can only withhold credits. That auditors are hired by developers exacerbates a natural bias toward approval.

Ultimately, safeguards are implemented within existing power structures and political realities. As a set of discretionary policies with weak oversight and no binding mechanisms for accountability, safeguards provide no guarantee that harm has been avoided. Binding, enforceable standards with truly independent oversight, project design led by or in partnership with forest

communities, as well as fundamental changes to the underlying incentive structures of REDD+ in private carbon markets, are needed to improve safeguard compliance and outcomes for forest communities.

Validation and Verification Bodies

The voluntary carbon market relies on third-party auditors, called *validation and verification bodies (VVBs)*, to enforce compliance with the registry standards and methodologies. Our analysis shows that verifiers see their role as ensuring that the emissions calculations used are allowed, and not that they are accurate or conservative. We also saw many instances where requirements were not enforced, or when problems were found, the verifier accepted a simple answer by the developer rather than ensuring that the concern was adequately addressed.

The following instances illustrate ways VVBs failed to identify problems with projects or approved developer choices that were not conservative:

- One verifier approved a zero fire risk rating for a project in which that verifier had directly observed a fire during the site visit.
- One project noted that it used an equation for estimating aboveground carbon in live trees from a published article unrelated to forest carbon and actually about water nutrients.
- One project that restricted immigration into the area by coffee growers claimed a zero risk of leakage. In other words, the developer claimed that individuals who would have migrated into the project area to clear forest to grow coffee were assumed to not migrate elsewhere for that purpose, and that the reduction in coffee production because of project restrictions would not result in increased coffee production elsewhere to meet demand for this globally traded product.
- VVBs accepted communication via email or posting to a message board as sufficient fulfillment of stakeholder consultation requirements in regions with low levels of literacy and electrification.

Lack of Transparency

Our analysis was made more difficult due to lack of data availability. Offset registries do not require release of the data needed for independent analysts to fully reproduce credit calculations, yet the resulting credits are used to publicly claim a lower impact on one of the most important public goods: the stability of the Earth's climate system. Much of the data and assumptions used by developers to estimate project baselines, carbon in preserved forests, and total credits generated were not publicly available for independent evaluation. Project developers commonly stated that they met safeguard requirements but provided little or no description of how the requirements were met. Access to such data is critical to enable independent review of credit quality and project claims.

Verra's Proposed Program Updates

Verra was undertaking a major revision of its REDD+ program when the research for this report was conducted. Verra's August 2023 updates provide some important improvements. These include integrating future climate change impacts into natural risk assessments and buffer pool contributions (but with a vague 40% reduction for projects that include adaptive capacity), explicitly requiring respect for human rights and Indigenous peoples' rights, requiring benefit sharing when a

project affects property rights or use, and improving transparency in emissions calculations. Verra's proposed consolidated REDD+ methodology, if adopted, would reduce flexibility in constructing project baselines. All of these important improvements remain vague and actual improvement will depend on additional guidelines and how they are implemented in practice.

Our analysis suggests that substantial additional changes are still necessary to prevent over-crediting. These include improving estimates of current natural risk, refining the process of choosing allometric and belowground biomass equations, applying deductions for international leakage and leakage from agricultural displacement, and requiring more rigorous assessment of safeguards compliance for all projects and especially those with greater risk.

In addition, Verra could make several more fundamental changes to prevent over-crediting and improve protections for forest communities. These include changing the auditing system to remove conflicts of interest by auditors who are hired directly by project developers, enforcing the application of conservative methods for estimating impacts, shifting from forecasted to dynamic ex post baselines, creating a truly independent body to verify safeguard compliance and address grievances, requiring more appropriate assessment of safeguards compliance, and changing the program so that forest communities lead or fully participate in the design of projects that affect them. These and other suggested changes are described in each report chapter and in the conclusions below.

Conclusions

REDD+ Is Ill-Suited to Carbon Crediting

A key finding of this research is how widespread and significant over-crediting is for REDD+ crediting methodologies across all quality factors. Previously published studies found that flawed baselines alone likely resulted in over-crediting of 92% (i.e., projects are issued 13 times more credits than their climate benefit). In addition, forest carbon accounting methods used by project developers resulted in estimates 23% to 30% higher than our independent estimates. We found that average deductions for natural risk were 2% when they should have been greater than 28%, which translates into additional over-crediting of more than 36% from this factor alone. Leakage deductions taken were much lower than those from the academic literature. Since over-crediting compounds across factors, only a very small fraction of credits likely represent real emissions reductions from Verra's REDD+ projects.

The findings presented in this report make it clear that the current design of the carbon credit market is not effective at reducing deforestation and protecting people. More than 20 years ago, scholars asked why the World Bank and other development finance institutions continued to fund projects with well-documented human rights abuses. The answer was incentives—a culture of approval that rewarded Bank staff for moving money and demonstrating success. As a result, some projects reported successes with little relation to what was actually happening on the ground, using safeguards that offered little actual protection (Rich, 1994, 2013, Wade, 1997).

Carbon markets have a similar incentive structure. All participants benefit financially from moving more projects forward and exaggerating success. By primarily valuing carbon, emissions reductions are prioritized over people. Safeguards are presented as a backstop to avoid harm but are limited in their effectiveness, especially in the contexts in which they are most needed. The carbon market, by creating a set of rules and letting the market find the least expensive reductions in the

uncertain, complex, deeply unequal, and often contentious contexts of REDD+ interventions, creates the perfect conditions for generating poor-quality credits and imposing risk on vulnerable populations.

Already the world's carbon sink is full to overflowing. Offsets, even if they could work perfectly, would not reduce the concentration of greenhouse gasses in the atmosphere but would mainly move where the emissions occur (McAfee, 2012). As companies lay claim to the carbon sequestration services produced by distant landscapes to justify and offset their own ongoing emissions, the governments, landholders, or communities that receive offset payments cede their *own* emissions rights—their ability to use the territories designated as carbon sinks for their own subsistence and development.[1] Instead of the people who depend directly on the land, water, and forests, those with the ability to pay get to choose the use of "the greatest share of the earth's biomass and all that it contains" (McAfee, 1999, p. 138).

Therefore, we must direct our attention and actions to the underlying causes of deforestation and work to reverse the local, national, and international policies that promote them.

Another Way Forward

Support for the preservation of the Earth's dwindling climate sinks through forest and biodiversity conservation in the tropics is urgently needed. The findings of this report show that carbon markets create a set of incentives unable to protect forests and people. Another approach is urgently needed.

Here we list some of the measures that private actors can take or support that together can help to reduce tropical deforestation:

Curb the demand-side drivers of deforestation. To a great extent, the demand from industrialized and fast-growing economies for food (especially meat and animal feed), fibers, ores, and fuels impels deforestation and forest degradation. Legislation and regulatory action by governments at all levels can mandate nationally and globally sustainable trade. The European Union regulation on deforestation-free products offers one model for government action. Regardless of the regulatory environment, companies can proactively phase out all sourcing of supply chain inputs from tropical forests and other high conservation value areas.

Support forest plans designed by Indigenous and local communities. Many Indigenous Peoples and local communities have been and continue to be effective forest protectors, but often need additional resources to support their institutions in the face of mounting forest pressures. Indigenous Peoples networks have outlined how such contributions can prioritize local and indigenous communities in ways that recognize their human and territorial rights and support locally-determined sustainable development strategies.

Contributions approach. Funds can be provided to organizations, funds, programs, and projects that mitigate climate change, without counting any quantified benefits as offsets. Criteria and procedures for such contributions, how they can be guided by deep understanding of the root drivers in specific regions, and how additional finance for that purpose can be mobilized, have been proposed by civil society organizations and some governments, and are under discussion in

[1] Oxfam (2021) found the land area required for the offsetting plans of just the top four oil companies that have made net-zero pledges would be the size of the UK by 2030 and twice that by 2050.

UNFCCC negotiations on Article 6.8, Non-Market Mechanisms, for achieving the Paris Agreement goals.

Debt relief. Some governments condone forest-destroying activities because exports from them earn foreign-exchange income they need to finance their operations and pay interest on their foreign debts. Carbon credits are the latest in this series of low-priced tropical export commodities. These debts, accrued over a long history of unequal trade between the Global North and Global South, are again on the rise. Loans from the International Monetary Fund and multilateral banks have added to the debt burden, with requirements that loan recipient countries take steps to increase exports. The failure of these policies has prompted some wealthy governments to write off part of these debts as unpayable. Further write-offs by governments, banks, and companies could relieve some pressure driving tropical deforestation.

Fair share climate finance. Full funding is needed for the international finance facilities established to aid developing countries in carrying out their obligations under the Paris Agreement and the Convention on Biological Diversity and to compensate for the immense losses and damages to these countries from climate change. Countries could revive UN negotiations on establishing a global carbon budget and "fair share" distribution of reductions as a source of climate mitigation funding.

Focus on the largest driver of climate change—fossil fuel emissions. To effectively address climate change, the global community must take actions that focus on reducing fossil fuel emissions at their source. Reducing emissions at their source can, in turn, help relieve the biophysical stresses that forests face from climate change itself. Companies can invest funds they would have spent on carbon credits into directly reducing their own emissions.

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