

## CARBON CREDITS, CREDIBILITY AND SYSTEMATIC EX POST ANALYSIS



Photograph: Joshua Woroniecki, Unsplash

This paper addresses a core credibility problem in voluntary carbon markets: whether carbon offsets can reliably deliver real emissions reductions when project baselines and impacts are assessed primarily through ex ante modelling by project developers. A growing body of scientific evidence shows that ex ante baselines often overestimate business-as-usual emissions, leading to systematic overcrediting.

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# Restoring Credibility in Carbon Offsets through Systematic Ex Post.

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## Research and policy question

This paper addresses a core credibility problem in voluntary carbon markets: whether carbon offsets can reliably deliver real emissions reductions when project baselines and impacts are assessed primarily through ex ante modelling by project developers. A growing body of scientific evidence shows that ex ante baselines often overestimate business-as-usual emissions, leading to systematic overcrediting. The central policy question is whether carbon offset mechanisms can restore credibility without fundamentally changing how project impacts are evaluated, and whether systematic ex post evaluation should become a core requirement of certification schemes.

## Methodological approach

The paper adopts a conceptual and evidence-based perspective, synthesizing results from a large literature of ex post evaluations of carbon offset projects. These evaluations rely on experimental and quasi-experimental methods—such as randomized controlled trials, difference-in-differences, matching and synthetic controls—to construct counterfactual baselines after project implementation. The authors contrast these approaches with the dominant ex ante baseline methodologies used by certification standards, highlighting how ex post methods better account for time-varying economic, political and ecological shocks. They review the strengths and limitations of different evaluation techniques and discuss the feasibility of scaling them across diverse offset types and sectors.

## Findings

The evidence reviewed shows that ex ante baselines frequently fail to represent realistic counterfactual scenarios, resulting in inflated additionality claims across major project categories, including avoided deforestation, improved forest management and cookstoves. Ex post evaluations consistently find that many credited projects deliver far smaller emissions reductions than claimed, and in some cases none at all. These credibility failures create a classic 'market for lemons', in which low-quality credits crowd out high-quality ones and depress market prices. Although certification schemes have begun updating methodologies, the authors argue that incremental reforms to ex ante approaches are unlikely to fully resolve baseline bias (See Table 1).

## Policy implications

The paper argues that systematic ex post evaluation is a necessary step to restore trust in carbon offset markets. Integrating ex post evaluations into certification frameworks would improve the accuracy of credit issuance, reduce overcrediting and allow high-quality projects to credibly signal their impact. However, such a shift raises challenges related to evaluation costs, data availability, risk allocation and credit supply. The authors propose a hybrid framework in which ex

ante baselines continue to support climate contributions, while credits used for offsetting and climate claims must be validated through transparent, scientifically robust ex post evaluations. Risk-sharing mechanisms, clear signalling of credit quality and regulatory support—potentially through Article 6 rules and corporate disclosure requirements—are identified as critical to making this transition feasible.

Scope	Levels of flexibility
<b>A/R</b>	<ul style="list-style-type: none"> <li>• Baseline determination may be based on historical land-use data or direct measurements, depending on data availability (CDM, Gold, VM0042).</li> <li>• Projects may stratify on the basis of vegetation type, soil characteristics or management practices; ex post stratification can be updated to reflect on-the-ground conditions (CDM, Gold).</li> <li>• Developers can choose to include or exclude certain carbon pools (such as litter or deadwood) based on project-specific significance thresholds (CDM, Gold).</li> <li>• Leakage mitigation can include measures such as agroforestry or intensification of land use in leakage belts (CDM, Gold).</li> </ul>
<b>IFM</b>	<ul style="list-style-type: none"> <li>• Developers may choose any modelled baseline that is financially, legally and contractually feasible, provided it is not below the regional average for most projects (ARB and CAR–U.S.).</li> <li>• Baseline determination may be based on historical logging records or common regional practices, depending on data availability (VM0010).</li> <li>• Commitment periods for maintaining credited carbon stocks vary from 1 to 100 years (CAR–Mexico).</li> </ul>
<b>REDD+</b>	<ul style="list-style-type: none"> <li>• Developers have broad discretion in defining reference regions with minimal requirements (VM0007, VM0009, VM0006, VM0015).</li> <li>• Varied methodologies and datasets can be used to create deforestation-risk maps (VM0007, VM0015).</li> <li>• Diverse sampling procedures can be applied in logistic regressions (VM0009).</li> <li>• Biophysical constraints on deforestation can be interpreted differently (VM0015).</li> <li>• Forest scarcity factors can be incorporated into project considerations (VM0006).</li> </ul>

**Table 1. Examples of flexibility within commonly used forestry carbon offsetting methodologies**

## Links and materials

Delacote, P. et al. (2025). Restoring credibility in carbon offsets through systematic ex post evaluation. Nature Sustainability.

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