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EDITOR'S NOTE

The third edition of the Meridian Journal for Political Economy, *Sustainability in Times of Scarcity*, explores the politics of climate action, examining how international commitments are translated into policy and the challenges that emerge between ambition and implementation. As climate policy becomes increasingly intertwined with economic development, competitiveness and international cooperation, understanding how these competing priorities are balanced has never been more important.

The edition brings together three contributions that examine climate policy through distinct yet interconnected lenses. The first reflects on the aftermath of COP30 in Belém, assessing the role and effectiveness of international climate conferences in driving meaningful action. Building on this, the second is an empirical case study of deforestation in the Democratic Republic of the Congo, examining the environmental costs of development and the difficult trade-offs surrounding economic progress and conservation. The final contribution is a policy brief on reform of the European Union Emissions Trading System, focusing on the political debate surrounding ETS2 and the future direction of European carbon pricing. Together, the contributions trace the progression from international climate diplomacy to local environmental pressures and regional policy implementation, illustrating how climate ambitions are shaped by economic realities, institutional constraints and political choices.

— MJPE Editor-in-Chief —

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CONTENTS

COP30 and the Future of Global Climate Diplomacy

Assessing whether global climate conferences translate international commitments into meaningful action

Author: Paolo Torreborre

Spring 2026

MERIDIAN JOURNAL FOR POLITICAL ECONOMY

Introduction

In November 2025, representatives from almost every country gathered in Belém, Brazil, for the thirtieth United Nations Climate Change Conference (COP30). The conference marked a particularly significant moment for international climate diplomacy, taking place three decades after the first COP and, more importantly, ten years after the adoption of the Paris Agreement. Yet despite thirty years of negotiations, commitments and increasingly ambitious climate targets, the world remains far from the trajectory envisioned in Paris. Global greenhouse gas emissions reached a record 57.7 gigatonnes of CO_2 equivalent equivalent in 2024, an increase of 2.3% from the previous year (UNEP, 2025). Even if countries fully implement their current Nationally Determined Contributions (NDCs), global warming is projected to reach approximately 2.3–2.5°C this century, substantially above the Paris Agreement's ambition of limiting warming to 1.5°C (UNEP, 2025).

This apparent contradiction raises a fundamental question about the purpose of international climate conferences. If governments have met annually for three decades with the explicit objective of coordinating action against climate change, why does such a significant gap between international ambition and actual outcomes remain? Critics can reasonably point towards continued emissions growth, unenforceable commitments and repeated failures to implement agreed targets as evidence of an international system that promises considerably more than it delivers. At the same time, climate change represents an inherently global collective-action problem that cannot realistically be addressed by individual states acting independently.

COP30 therefore provides an important opportunity to assess not simply whether climate conferences have succeeded or failed, but what they can realistically be expected to achieve. A decade after Paris, this essay argues that while COPs remain limited instruments for delivering climate action, they are necessary institutions for coordinating it. Their future relevance will consequently depend less on producing increasingly ambitious commitments and more on translating existing commitments into measurable domestic action.

The Evolution of Global Climate Diplomacy

Modern climate diplomacy emerged from growing recognition that climate change could not be addressed through national policy alone. In 1992, governments adopted the United Nations Framework Convention on Climate Change (UNFCCC), establishing a framework through which states could coordinate their response to rising greenhouse gas emissions. The Convention entered into force in 1994, and the first Conference of the Parties was held in Berlin the following year (UNFCCC, 2026). Since then, the COP process has developed from a forum for negotiating emissions reductions into the central institution of international climate governance.

Early attempts at cooperation followed a predominantly top-down approach. The Kyoto Protocol, adopted at COP3 in 1997, established legally binding emissions-reduction targets for developed countries. Its first commitment period required participating industrialised economies collectively to reduce greenhouse gas emissions by at least 5% relative to 1990 levels between 2008 and 2012 (UNFCCC, 2024). However, Kyoto's comparatively strong obligations came at the expense of broad participation. Developing countries did not face equivalent binding targets, while the United States never ratified the Protocol. The resulting framework therefore imposed relatively stringent commitments on only part of the global economy.

The Paris Agreement fundamentally altered this approach. Adopted by 195 Parties at COP21 in 2015, Paris replaced internationally negotiated emissions targets with Nationally Determined Contributions (NDCs), through which individual governments determine their own climate commitments (UNFCCC, 2026). Rather than imposing identical obligations, this bottom-up structure allows countries to account for different levels of development, economic capacity and domestic political constraints. NDCs are submitted every five years and successive contributions are expected to represent a progression beyond previous commitments (UNFCCC, 2026). A Global Stocktake, also conducted every five years, assesses collective progress and is intended to inform subsequent commitments.

This evolution reveals a fundamental dilemma within climate diplomacy. Stronger international obligations may increase the credibility of individual commitments but make universal participation more difficult to achieve. Greater national flexibility encourages participation but leaves implementation dependent largely on domestic political willing-

ness. The modern COP system therefore represents a compromise between the ambition of international cooperation and the realities of national sovereignty.

What Have Climate Conferences Actually Achieved?

The shortcomings of international climate diplomacy are easier to identify than its successes. Global emissions remain at record levels and existing commitments are insufficient to meet the Paris temperature targets. However, evaluating COPs solely according to whether global emissions have fallen risks overlooking the institutional and political changes they have produced. Climate conferences do not directly determine national energy or industrial policy; their influence instead lies in establishing a common framework through which governments set targets, report progress and coordinate increasingly ambitious action.

The Paris Agreement represents the clearest example of this influence. Its near-universal framework established the objective of limiting warming to well below 2°C while pursuing efforts towards 1.5°C, alongside a recurring process for strengthening national commitments. This has created an international benchmark against which government climate policies can be evaluated. The Enhanced Transparency Framework requires countries to report on their emissions and progress towards their commitments, while the Global Stocktake periodically assesses collective progress and feeds its findings into subsequent NDCs (UNFCCC, 2026). This creates a degree of international scrutiny even where formal enforcement remains limited.

Successive COPs have also expanded the scope of climate cooperation. COP27 established funding arrangements for responding to loss and damage in particularly vulnerable developing countries, while COP28 operationalised the resulting fund and completed the first Global Stocktake. The COP28 agreement also called for a tripling of global renewable energy capacity by 2030 and, for the first time within a COP decision, for countries to transition away from fossil fuels in energy systems (UNFCCC, 2023). These outcomes do not guarantee implementation, but they demonstrate how climate conferences can progressively establish expectations that would be difficult for states to coordinate independently.

There is also evidence that national commitments have strengthened over time. Among the new NDCs assessed by the UNFCCC in 2025, 89% contained economy-wide targets, compared with 81% in the same countries' previous submissions, while 88% reported that their new plans had been informed by the first Global Stocktake (UNFCCC, 2025). More broadly, UNEP estimates that full implementation of current NDCs would limit warming to approximately 2.3–2.5°C, compared with 2.8°C under policies currently in place (UNEP, 2025).

These achievements should not be confused with sufficient progress. Rather, they demonstrate that COPs have created mechanisms capable of influencing national ambition and coordinating collective action. The more difficult question is why this growing body of international commitments has not translated into equivalent changes in real-world emissions.

Why Climate Conferences Keep Falling Short

The existence of increasingly ambitious commitments does not necessarily ensure their implementation. This represents perhaps the greatest weakness of the COP process. The Paris Agreement relies primarily on states determining and implementing their own contributions, reflecting the political reality that decisions concerning taxation, energy, transport and industrial policy ultimately remain under national control. Consequently, governments can collectively recognise the need for rapid decarbonisation while individually remaining reluctant to bear its economic and political costs.

This problem is reinforced by the collective-action nature of climate change. Emissions reductions generate benefits that extend beyond national borders, while many of the immediate costs of decarbonisation are borne domestically. Individual governments therefore have an incentive to pursue less costly climate policies while benefiting from reductions achieved elsewhere. These incentives become particularly significant when climate measures affect energy prices, employment or industrial competitiveness. The result is a persistent gap between what governments collectively

promise internationally and what they are willing or able to implement domestically. UNEP estimates that current policies place the world on course for approximately 2.8°C of warming, compared with 2.3–2.5°C if existing NDCs were fully implemented (UNEP, 2025).

The distribution of these costs also creates significant tensions between developed and developing economies. Many developing countries require substantial investment in energy infrastructure, adaptation and economic development while possessing considerably less fiscal capacity to finance the transition. Climate finance is therefore not simply an issue of redistribution, but an important condition for securing broader participation in global mitigation efforts. At COP29, developed countries agreed to take the lead in mobilising at least $300 billion annually for developing countries by 2035, within a wider ambition to scale climate finance from all sources to $1.3 trillion annually (UNFCCC, 2024). Yet the scale of financing requirements remains substantial. In the 2025 round of NDCs, developing countries that quantified their needs reported almost $2 trillion in financing requirements for implementation (UNFCCC, 2025).

Implementation is further constrained by differences in institutional capacity. Of the developing countries included in the UNFCCC's first synthesis of Biennial Transparency Reports, 47 required flexibility in meeting at least one reporting requirement, frequently because of technical limitations, insufficient domestic data systems or weak institutional coordination (UNFCCC, 2025). International agreements may therefore establish common objectives without providing every government with an equivalent ability to achieve them.

These problems reveal an important limitation of evaluating climate diplomacy through negotiated ambition alone. Governments can agree increasingly sophisticated targets, reporting frameworks and financing objectives while the policies required to achieve them remain politically difficult, financially expensive and institutionally demanding. The weakness of the COP system is therefore not necessarily its inability to produce agreements, but its limited capacity to ensure that those agreements alter domestic behaviour. This distinction between negotiation and implementation became particularly important at COP30, which was explicitly presented as an opportunity to move global climate diplomacy from commitments towards delivery.

COP30 in Belém, a Decade After Paris

COP30 arrived at an important moment for the international climate regime. Held ten years after the Paris Agreement and three decades after the first COP, the conference was intended to shift attention from negotiating new ambitions towards implementing those already agreed. This distinction was particularly important given the first Global Stocktake's conclusion that existing action remained insufficient to meet the Paris temperature goals. Belém therefore provided a useful test of whether the COP process could address the implementation gap that had become increasingly apparent during the decade following Paris.

There were tangible outcomes. Parties adopted 56 decisions by consensus, including the launch of the Global Implementation Accelerator, a voluntary initiative intended to support implementation of NDCs and National Adaptation Plans (COP30 Presidency, 2026). Alongside it, the Belém Mission to 1.5 was established to identify solutions for increasing ambition and implementation ahead of COP31 (UNFCCC, 2026). Progress was also made on adaptation. Parties adopted 59 Belém Adaptation Indicators, creating a common framework for assessing progress towards the Global Goal on Adaptation, while the final decision called for adaptation finance to be tripled by 2035 (UNFCCC, 2025). These measures represented a noticeable attempt to orient the COP process towards measuring and facilitating delivery rather than simply announcing additional targets.

Finance remained equally prominent. The Belém outcome reaffirmed the broader objective of mobilising $1.3 trillion annually for climate action in developing countries by 2035, building upon the financing framework agreed at COP29 (United Nations, 2025). The conference also produced 13 finance-related decisions and confirmed further work on the mechanisms intended to channel international support towards implementation (UNFCCC, 2026). In this respect, COP30 recognised one of the central problems identified throughout the previous decade: developing countries cannot reasonably be expected to implement increasingly ambitious mitigation and adaptation commitments without corresponding access to finance.

Yet Belém also demonstrated the limits of consensus-based climate diplomacy. One of the most contentious questions

concerned the commitment made at COP28 to transition away from fossil fuels. Despite pressure for a clearer implementation roadmap, governments were unable to secure consensus on incorporating such a roadmap into the formal COP30 outcome. A similar effort to establish a formal roadmap for halting and reversing deforestation also failed to enter the negotiated agreement. In response, the Brazilian COP Presidency announced that it would pursue separate roadmaps on both fossil fuels and deforestation outside the consensus decision, with results expected to be presented at COP31 (United Nations, 2025).

This outcome is particularly revealing because the disagreement concerned not the recognition of climate change, nor even the existence of previously agreed objectives, but how those objectives should be implemented. Ten years after Paris, the central obstacle to climate diplomacy increasingly appears to be less about establishing collective ambition than distributing the economic and political costs of achieving it. The Global Implementation Accelerator reflects an acknowledgement of this problem, but its voluntary and facilitative character also demonstrates the continuing reluctance of states to surrender meaningful control over domestic climate policy.

COP30 therefore offers evidence for both defenders and critics of the COP process. Fifty-six consensus decisions, common adaptation indicators and new implementation mechanisms demonstrate that multilateral climate governance continues to develop. Yet the inability to reach formal agreement on how to implement a transition away from fossil fuels illustrates the limits of that cooperation precisely where economic interests become most difficult to reconcile. Belém did not demonstrate that climate conferences are incapable of producing progress; rather, it exposed the increasingly important distinction between agreeing on the direction of climate policy and agreeing on who must bear the costs of getting there.

Are Climate Conferences Still Necessary?

The limitations exposed in Belém raise the question of whether annual climate conferences remain the most effective means of coordinating global action. The requirement for consensus among countries with vastly different economic structures, development needs and energy systems inevitably produces compromise. Smaller groups of states may be capable of pursuing deeper cooperation through regional agreements, bilateral partnerships or “climate clubs”, particularly in areas such as carbon pricing, methane reduction and industrial decarbonisation. Such arrangements can reduce the number of competing interests involved and allow participating governments to adopt measures that would struggle to secure universal support.

However, replacing rather than supplementing the COP process would create a different problem. Climate change is global, and a system restricted to willing or wealthy states would exclude many of the countries most vulnerable to its consequences. The UNFCCC provides a forum in which virtually every government can participate in establishing common objectives, negotiating financial support and scrutinising collective progress. The 56 decisions adopted by consensus at COP30 demonstrate that agreement across this diverse membership remains possible even as disagreements persist on the most politically sensitive issues (COP30 Presidency, 2026).

The more persuasive approach may therefore be to reconsider what COPs are expected to achieve. Their comparative advantage is not their ability to compel national governments to decarbonise, but their ability to establish a common framework within which decarbonisation can occur. More ambitious action can then develop through national policy, regional institutions and cooperation between smaller groups of states. Indeed, COP30’s Global Implementation Accelerator was explicitly designed as a cooperative and voluntary mechanism supporting countries in implementing their NDCs and adaptation plans rather than imposing new obligations upon them (UNFCCC, 2026).

The future of climate diplomacy may consequently depend on accepting a division of responsibility. COPs can establish common goals, monitor progress and maintain international pressure, while implementation increasingly occurs through institutions better equipped to address particular sectors and national circumstances. Their effectiveness should therefore be judged less by whether each conference produces a transformative agreement and more by whether the international framework collectively encourages measurable action between conferences.

Conclusion

Three decades of climate conferences have not placed the world on a trajectory consistent with the objectives established in Paris. Emissions remain at record levels, implementation continues to lag behind international commitments and COP30 demonstrated that consensus becomes considerably more difficult when climate objectives confront national economic interests. Judged solely by their ability to deliver sufficient emissions reductions, the record of international climate conferences is therefore difficult to describe as a success.

Yet this is also an unrealistic standard against which to judge institutions that possess limited authority over domestic policy. The COP process has established common temperature goals, increasingly comprehensive national commitments, transparency mechanisms and channels for climate finance while maintaining participation from almost every country. Belém reinforced both sides of this record. Its new implementation mechanisms demonstrated the continuing development of international cooperation, while the failure to formally agree roadmaps on fossil fuels and deforestation revealed its political limits. The Presidency's subsequent decision to continue developing both roadmaps beyond the conference itself further illustrates how COPs increasingly operate as part of an ongoing process rather than isolated annual negotiations (COP30 Presidency, 2026).

Climate conferences are therefore neither sufficient nor obsolete. Their importance lies in providing the architecture through which international climate action can be coordinated, while responsibility for delivering that action ultimately remains with governments. A decade after Paris, the challenge facing global climate diplomacy is no longer simply establishing greater ambition. Its relevance will increasingly depend on whether the commitments already negotiated can be translated into measurable outcomes.

Reconciling Development and Forest Conservation in the Democratic Republic of Congo

Examining why efforts to reduce deforestation in the DRC have struggled to deliver lasting results

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CONTENTS

Abstract

This paper examines why more than two decades of forest conservation efforts have struggled to produce lasting reductions in deforestation in the Democratic Republic of the Congo (DRC), and how forest protection can be reconciled with continued economic development. Focusing on the 2002 Forest Code and REDD+, it evaluates existing forest governance through the economic and institutional constraints surrounding forest exploitation, including externalities, insecure property rights, information asymmetries and transaction costs. The analysis finds that both approaches have strengthened forest governance but have struggled to alter the underlying incentives driving forest loss. Weak enforcement, implementation delays and insecure land tenure have constrained domestic regulation, while REDD+ remains limited by institutional capacity, monitoring costs and difficulties ensuring that conservation payments generate additional and lasting reductions in deforestation. These limitations are particularly significant because forest loss remains closely connected to small-scale agriculture, household energy demand and wider development pressures.

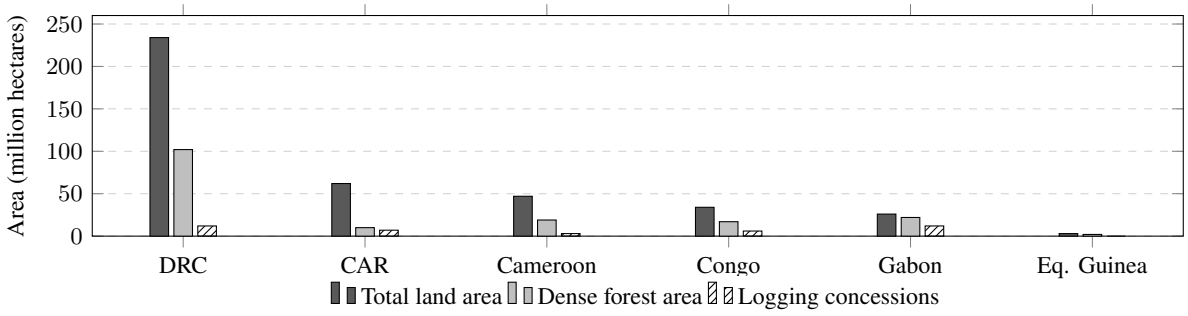
The paper therefore argues that reducing deforestation requires conservation policy to address the economic incentives behind forest conversion rather than relying principally on stronger environmental regulation. It identifies subsidised agroecological intensification as the principal policy response because it most directly targets agricultural expansion by increasing productivity on existing farmland, although stronger land tenure and enforcement are necessary to prevent productivity gains from encouraging further clearing. Debt-for-nature swaps can complement this approach by easing fiscal constraints and mobilising additional resources for conservation and institutional capacity. The paper concludes that forest conservation and economic development in the DRC should not be treated as competing objectives: lasting reductions in deforestation depend on reducing the economic need for continued forest conversion while strengthening the institutions required to keep forests standing.

Introduction

The Congo Basin contains the world's second-largest tropical rainforest and represents one of the most important ecosystems for global climate regulation and biodiversity conservation (World Bank, 2025; World Resources Institute, 2026). At its centre lies the Democratic Republic of the Congo (DRC), which contains approximately 60% of the Basin's rainforest and more than 100 million hectares of humid primary forest (World Resources Institute, 2026). These forests store substantial quantities of carbon, regulate regional rainfall patterns, support exceptional biodiversity and provide food, energy and livelihoods for millions of people (World Bank, 2025). Their preservation consequently carries implications extending well beyond the borders of the DRC.

The exceptional scale of the DRC's forest resources is also apparent relative to the other major forest states of the Congo Basin. Comparative land-use data show that the DRC contains considerably more dense forest than any other country in the region, while also containing a substantial area allocated to industrial logging concessions (European Commission JRC and COMIFAC, via GLC 2000 and FORAF datasets). Although these data provide an earlier structural snapshot rather than a measure of current forest cover, they illustrate the scale of the forest-governance challenge facing the country (Figure 1).

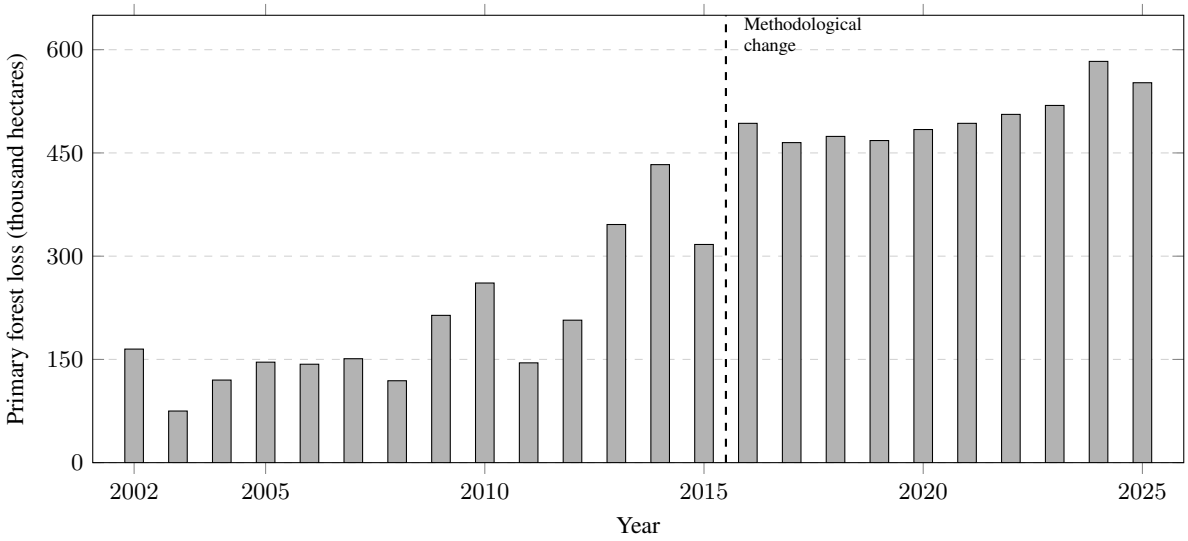
Figure 1: Forest and Land Use in Congo Basin Countries



Source: GLC 2000 and FORAF datasets, accessed via the European Commission Joint Research Centre and COMIFAC.

Yet forest loss has persisted despite growing domestic and international efforts to prevent it. Between 2002 and 2025, the DRC lost approximately 8 million hectares of humid primary forest, equivalent to around 8% of its 2001 primary-forest area (Global Forest Watch, 2026). While methodological changes in the underlying forest-loss series prevent straightforward comparison of annual estimates across the entire period, the cumulative scale and persistence of loss demonstrate the continuing challenge facing conservation policy (Global Forest Watch, 2026; World Resources Institute, 2026). This presents an important policy puzzle. The country has possessed a comprehensive Forest Code since 2002 and has subsequently become one of the most significant participants in international initiatives aimed at reducing emissions from deforestation and forest degradation (World Bank, 2012; UNFCCC, 2012). Nevertheless, the establishment and expansion of conservation policies have not produced a sustained reversal in forest loss.

Figure 2: Annual Humid Primary Forest Loss in the Democratic Republic of the Congo (2002–2025)



Source: Global Forest Watch (2026), based on University of Maryland GLAD data.

The persistence of deforestation cannot be separated from the DRC's developmental circumstances. Unlike forest loss driven principally by large-scale commercial agriculture elsewhere in the tropics, forest loss in the DRC remains overwhelmingly associated with small-scale shifting cultivation: approximately 86% of primary-forest loss between 2002 and 2025 was attributed to this form of agriculture (World Resources Institute, 2026). The harvesting of wood for fuelwood and charcoal represents an additional major source of pressure, reflecting the continued dependence of households on biomass energy (World Bank, 2022; World Resources Institute, 2026). These activities are closely connected to food production, livelihoods and basic energy needs rather than simply large-scale commercial exploitation. Poverty remains widespread and access to electricity and clean cooking technologies remains extremely limited, particularly outside major urban centres (World Bank, 2022; World Bank, 2025). Restricting forest use without providing economically viable alternatives therefore risks imposing the immediate costs of conservation on households with limited capacity to bear them.

This creates a fundamental tension between the local benefits of forest conversion and its wider social costs. Clearing forest can provide households with agricultural land, fuel and income, while commercial actors and governments can derive revenues from timber, mining and other forms of resource extraction (World Bank, 2013; World Bank, 2025). The resulting carbon emissions, biodiversity loss and disruption of ecosystem services, however, extend well beyond those undertaking the initial conversion (World Bank, 2025). Weakly defined property rights, insecure land tenure and limited enforcement capacity further reduce the ability of forest governance to internalise these externalities (Debroux et al., 2007; World Bank, 2012). Conservation in the DRC is therefore not simply an environmental problem, but one of political economy: effective policy must alter the incentives driving forest conversion without preventing improvements in living standards and economic development.

This paper asks why more than two decades of forest conservation efforts have struggled to deliver lasting reductions in deforestation in the DRC. It evaluates the 2002 Forest Code and REDD+ through the economic and institutional constraints affecting forest governance, including externalities, property rights, information asymmetries, transaction costs and limited enforcement capacity. It subsequently considers whether subsidised agroecological intensification and debt-for-nature swaps could address some of the incentives sustaining forest conversion. The central argument is that stronger environmental rules alone are unlikely to substantially reduce deforestation while the economic incentives for forest conversion remain intact. Effective conservation must therefore combine stronger governance and clearer land tenure with policies that reduce the dependence of households and the state on continued forest exploitation, allowing economic development and forest conservation to become more closely aligned.

Literature Review and Analytical Framework

This section reviews three strands of literature relevant to understanding persistent deforestation in the DRC. The first concerns the economic value of the Congo Basin and the unequal distribution of the costs and benefits associated with its conservation. The second examines the drivers of forest loss and, in particular, the relationship between small-scale agriculture, energy demand and rural development. The third considers how externalities, property rights and fiscal constraints shape incentives for forest exploitation. Together, these perspectives provide the analytical framework through which the Forest Code and REDD+ are subsequently evaluated.

I The Congo Basin and the DRC

A substantial literature treats tropical forests not simply as stocks of extractable resources but as forms of natural capital generating ecosystem services extending beyond national borders. In the Congo Basin, these include carbon sequestration, rainfall regulation and biodiversity conservation alongside locally captured benefits from timber, fuelwood and food (World Bank, 2013; Nzabarinda et al., 2025; World Bank, 2025). Recent ecosystem accounting estimates the value of forest ecosystem services across the Basin at approximately $1.15 trillion in 2020, almost double their estimated value in 2000, with more than 90% associated with climate regulation (World Bank, 2025). The scale of these estimates reinforces a central argument in environmental economics: the economic value of forests considerably exceeds the value captured through their direct exploitation (Tietenberg & Lewis, 2018).

This distinction creates an important distributional problem. While the international community captures substantial benefits from carbon storage and other ecosystem services, the opportunity costs of conservation are concentrated within forest states. The World Bank (2025) estimates that Congo Basin governments captured only around $8 billion in domestic benefits from forest ecosystems in 2020, principally through timber production, wild foods and ecotourism. From an externality perspective, conservation therefore produces benefits that extend well beyond those responsible for providing them, while forest conversion can generate locally captured income at the expense of environmental costs borne more widely (Tietenberg & Lewis, 2018; World Bank, 2025).

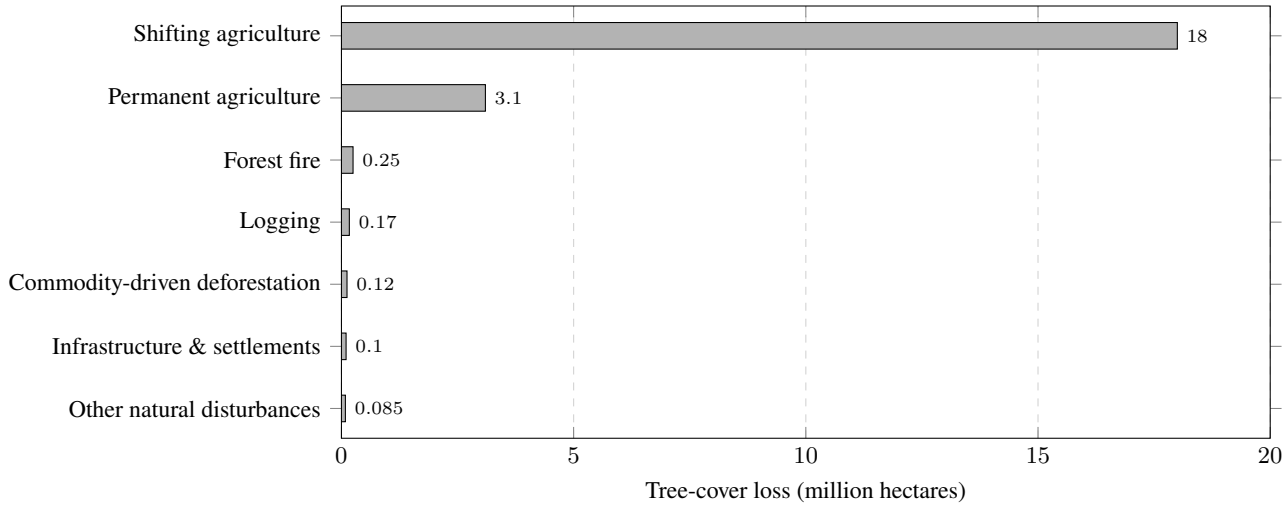
The literature on the DRC further complicates this relationship because forest exploitation is closely connected to household welfare. Earlier World Bank research emphasises the dependence of rural communities on forests for food, agricultural land and energy, while more recent evidence continues to identify limited access to alternative energy sources as an important source of forest pressure (Debroux et al., 2007; World Bank, 2013; World Bank, 2022). Access to clean cooking fuels and technologies stood at only 3.7% nationally and approximately 0.5% in rural areas in 2020 (World Bank, 2022), while traditional charcoal production can require approximately six kilograms of wood to produce one kilogram of charcoal (World Bank, 2018). Conservation therefore involves a tension between globally dispersed environmental benefits and immediate domestic development needs. The relevant policy question is consequently not only how forests can be protected, but how the opportunity cost of doing so can be reduced or redistributed.

II The Drivers of Deforestation

Research on tropical deforestation identifies agricultural expansion as one of its most important proximate drivers, although the mechanisms vary substantially across countries (Angelsen & Kaimowitz, 1999; World Bank, 2013). In parts of Latin America and Southeast Asia, commercial agriculture and commodity production have played major roles, whereas research on the Congo Basin places considerably greater emphasis on small-scale and shifting cultivation

(World Bank, 2013; Nzabarinda et al., 2025). Recent remote-sensing evidence reinforces this distinction. Global Forest Watch estimates that between 2001 and 2025 approximately 18 million hectares of tree-cover loss in the DRC occurred where shifting agriculture was the dominant driver, compared with around 3.1 million hectares associated with permanent agriculture (Global Forest Watch, 2026). Masolele et al. (2024) similarly identify small-scale cropland as the dominant land use following deforestation across much of the country.

Figure 3: Dominant Drivers of Tree-Cover Loss in the Democratic Republic of the Congo (2001–2025)



Source: Global Forest Watch (2026).

The prominence of shifting agriculture has important implications for how deforestation is interpreted. Angelsen and Kaimowitz (1999) argue that forest conversion cannot be understood independently of the economic incentives facing agricultural households: where increasing productivity is costly, expanding cultivated area can remain a rational response to rising demand. This mechanism is particularly relevant to the DRC, where access to fertiliser, irrigation, credit and agricultural technology remains constrained and food insecurity remains widespread (World Bank, 2013; FAO, 2024). Approximately 25.6 million people experienced high levels of acute food insecurity during the second half of 2024 (FAO, 2024). The literature therefore suggests that shifting cultivation should not be interpreted simply as environmentally inefficient behaviour, but as a response to limited agricultural productivity and alternative livelihood opportunities.

Wood-energy demand represents a related mechanism. Studies of forest use in the DRC consistently identify fuelwood and charcoal as major sources of pressure because limited electrification and clean-cooking access leave households dependent on biomass energy (Debroux et al., 2007; World Bank, 2013; World Bank, 2022). Commercial logging, mining and infrastructure account for smaller direct shares of aggregate forest loss but can generate important indirect effects by opening previously remote forests to settlement, charcoal production and agricultural expansion (World Bank, 2013; Global Witness, 2015). The literature therefore points towards interacting rather than independent drivers: agricultural expansion and energy demand create direct pressure, while infrastructure and commercial extraction can alter access and increase the area over which those pressures operate.

III Development, Property Rights and Resource Pressure

Environmental-economic approaches interpret these pressures principally through externalities and the institutional structure governing access to forests. Tietenberg and Lewis (2018) describe common-resource problems as arising where individual actors can capture the benefits of resource exploitation while imposing part of its costs on others. Applied to the DRC, households, firms and governments can obtain private benefits from agricultural conversion, charcoal production, logging and resource extraction, while carbon emissions, biodiversity loss and wider ecosystem degradation are collectively borne. The original literature on forest governance in the DRC similarly emphasises weakly

enforced property rights and institutional capacity as central constraints on sustainable forest management (Debroux et al., 2007; World Bank, 2013). Deforestation can therefore be understood partly as a Tragedy of the Commons in which incentives facing individual users diverge from the socially optimal use of the forest resource.

Property-rights literature suggests that the security and distribution of tenure can alter these incentives. Where households or communities cannot be confident that they will retain control over land, the expected future benefits of conservation decline relative to immediate extraction. Conversely, clearer and more secure rights can extend the time horizon of resource users and increase incentives for long-term management (Debroux et al., 2007; Tietenberg & Lewis, 2018). This provides the economic rationale behind community-based forest management and attempts to strengthen customary tenure in the DRC. However, formal recognition alone is insufficient where rights cannot be effectively enforced, making institutional capacity central to whether property-rights reform changes behaviour in practice (Robinson, Kumar & Albers, 2010).

A related literature emphasises the interaction between conservation and poverty. Enforcement can theoretically increase the private cost of environmentally damaging behaviour, but its effectiveness depends upon both institutional capacity and the availability of substitutes for the restricted activity (Robinson, Kumar & Albers, 2010). In the DRC, restrictions on agricultural expansion or charcoal production can impose immediate costs on households dependent upon those activities for food, income or energy (World Bank, 2013; World Bank, 2022). This creates a broader development constraint: environmental regulation may be economically justified by the social value of conservation while remaining difficult to sustain where the private opportunity cost imposed on affected households is high.

Fiscal constraints may reproduce similar incentives at the state level. The Debt-Resource Hypothesis proposes that indebted developing economies can face incentives to intensify natural-resource exploitation in order to generate foreign exchange and meet fiscal obligations (Kahn & McDonald, 1995). George (1992) associated higher debt burdens with greater deforestation, providing early empirical support for this mechanism. However, Neumayer (2005) finds the broader empirical relationship to be less robust, suggesting that indebtedness should not be treated as a deterministic cause of environmental degradation. More generally, Robinson, Kumar and Albers (2010) show that limited institutional and fiscal capacity can constrain forest enforcement in developing economies. The relevance of the Debt-Resource Hypothesis to the DRC therefore lies less in claiming a direct causal relationship between debt and deforestation than in identifying how fiscal scarcity can increase the relative attractiveness of short-term resource revenues while reducing the resources available for conservation.

Taken together, these strands of literature suggest that persistent deforestation in the DRC cannot be explained solely by inadequate environmental regulation. Forest conversion occurs within a system in which many conservation benefits accrue externally or in the future, while the benefits of exploitation are often immediate and locally captured. Insecure property rights, limited enforcement capacity and development and fiscal constraints reinforce this asymmetry. The analytical implication is that effective forest policy must both strengthen institutions and alter the relative economic returns to conservation and forest conversion. This framework provides the basis for evaluating whether the 2002 Forest Code and REDD+ have successfully changed these incentives, and for assessing the alternative policy responses considered later in the paper.

Case Selection and Methodology

I Case Selection and Scope

The Democratic Republic of the Congo is selected as a case study because it combines exceptional environmental importance with persistent forest loss and substantial development constraints. As the largest forest state in the Congo Basin, and a country that has pursued both domestic forest reform and extensive participation in international initiatives such as REDD+, the DRC provides a useful case for examining why the adoption of conservation policies does not necessarily translate into sustained reductions in deforestation.

The analysis focuses primarily on the period following the adoption of the 2002 Forest Code, allowing the evolution of domestic forest governance to be considered alongside the subsequent expansion of REDD+ and international conservation finance. Rather than estimating the causal effect of individual interventions, the paper examines how these policies have addressed the economic and institutional mechanisms identified in the preceding literature review.

II Evidence and Analytical Approach

The study adopts a qualitative case-study approach combining forest-loss data, policy documents, institutional assessments and academic literature. Forest trends and drivers are drawn primarily from Global Forest Watch and World Resources Institute data, while World Bank, FAO and other institutional sources provide evidence on socioeconomic conditions and forest governance. These sources are supplemented by academic research on forest economics, land tenure, community forestry and REDD+ in the DRC.

The analysis evaluates the 2002 Forest Code and REDD+ against the economic and institutional constraints established in the analytical framework, before considering two complementary policy responses: subsidised agroecological intensification and debt-for-nature swaps. The objective is to identify the mechanisms limiting existing conservation efforts and assess whether alternative approaches could better align forest protection with economic development.

Forest Governance in the DRC

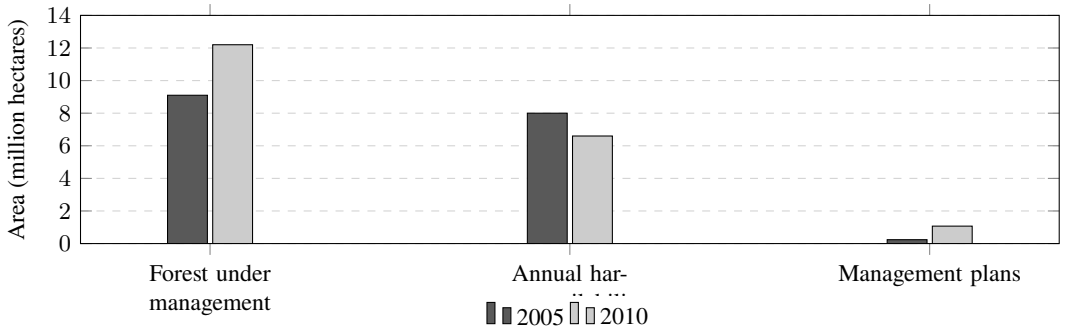
I The 2002 Forest Code

The 2002 Forest Code represented a major restructuring of forest governance in the DRC. Law No. 011/2002 replaced the previous colonial-era forestry regime and established a new framework for the management, conservation and exploitation of forest resources, incorporating principles of sustainable forest management and greater community participation (Debroux et al., 2007; IMF, 2007). The Code also sought to regulate commercial concessions more effectively and strengthen the role of local communities in forest governance. In institutional terms, it therefore represented a significant attempt to move forest management towards a more regulated and participatory system (Debroux et al., 2007; World Bank, 2012).

Of particular importance is Article 22, which recognises customary possession of forests and provides for local communities to obtain concessions over forests traditionally held by them (DRC Forest Code, 2002; World Bank, 2012). In principle, this addresses part of the property-rights problem identified in the preceding analytical framework by giving communities a stronger stake in the future value of forest resources. Implementation, however, proved considerably slower than legislative reform. The decree establishing the rules for granting Local Community Forest Concessions was adopted only in 2014, twelve years after the Forest Code, illustrating the gap between formal recognition of rights and their practical implementation (World Bank, 2017).

Available forest-management indicators provide a similarly mixed picture. Between 2005 and 2010, the area classified as forest under management increased from approximately 9.1 million to 12.2 million hectares, while the area covered by management plans rose from around 238,000 to 1.07 million hectares (International Tropical Timber Organization, 2005; 2010). However, the latter remained small relative to the overall forest resource, while annual harvest availability declined over the same period (Figure 4). These trends do not establish the causal effect of the Forest Code, but they illustrate the broader implementation problem: the creation of a more comprehensive legal framework was not matched uniformly by the institutions and management capacity required to operationalise it.

Figure 4: Selected Forest Management Indicators in the Democratic Republic of the Congo, 2005 and 2010



Source: International Tropical Timber Organization (2005; 2010).

The Forest Code should therefore be understood as an important institutional reform whose effectiveness has been constrained by implementation. It established legal mechanisms capable of improving concession management and strengthening community rights, but delayed implementation, limited administrative capacity and persistent uncertainty surrounding forest rights reduced the extent to which formal reform changed incentives on the ground (Debroux et al., 2007; World Bank, 2012; World Bank, 2017). This distinction between institutional design and implementation is central to evaluating the subsequent development of forest governance in the DRC.

II REDD+

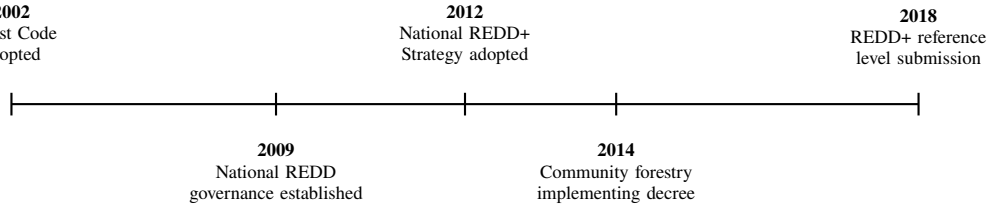
The limitations of domestic forest governance have increasingly been addressed through REDD+, which attempts to create financial incentives for reducing emissions from deforestation and forest degradation. The DRC became an early participant in the international REDD+ process and adopted its National REDD+ Strategy in 2012 (Government of the DRC, 2012; UNFCCC, 2012). The strategy identifies both direct and underlying drivers of forest loss and organises intervention around seven pillars: agriculture, energy and forests, alongside governance, land-use planning, land reform and demography (Government of the DRC, 2012; UNFCCC, 2012). This broader approach is significant because many of the pressures identified in the preceding literature review originate outside the formal forestry sector.

Economically, REDD+ attempts to address the externality at the centre of forest conservation by attaching financial value to avoided forest loss. Where the international community captures substantial benefits from carbon sequestration while the opportunity costs of conservation are borne domestically, results-based international finance can transfer part of that value towards the countries and communities responsible for maintaining forests (Angelsen, 2008; UNFCCC, 2012). In principle, REDD+ can therefore alter the relative returns to conservation and conversion rather than relying exclusively on restrictions on forest use.

Its effectiveness, however, depends upon the institutions through which these incentives operate. Early assessments of REDD+ in the DRC identified limited organisational capacity, insufficient long-term financing and weaknesses in government and stakeholder capacity as important constraints (World Bank, 2012). The programme also creates substantial informational and administrative requirements: reductions in forest loss must be measured against an appropriate reference level, attributed to interventions and monitored sufficiently well for payments to reflect genuine additional reductions (Angelsen, 2008; UNFCCC, 2018). These requirements generate transaction and monitoring costs that are particularly significant where state capacity and forest information systems remain limited.

Questions of land tenure and benefit sharing create a further difficulty. If communities bearing the opportunity costs of conservation lack secure rights or receive only a limited share of REDD+ benefits, financial incentives at the national or project level may not translate into stronger incentives for conservation at the household level (World Bank, 2012; UN-REDD, 2021). REDD+ can therefore complement domestic forest governance by increasing the economic value attached to standing forests, but cannot substitute for effective institutions, secure land rights and viable alternatives to forest conversion.

Figure 5: Development of Forest Governance and REDD+ in the DRC



Source: DRC Forest Code (2002); Government of the DRC (2012, 2014); UNFCCC (2018).

III The Persistence of Deforestation

The persistence of forest loss despite these interventions suggests that the central problem is no longer simply the absence of conservation policy. Since 2002, the DRC has developed a substantially broader institutional framework encompassing forest legislation, community forestry and REDD+. Yet assessments of these interventions repeatedly identify weaknesses in enforcement, institutional capacity, land tenure, benefit sharing and access to reliable legal and forest information (Debroux et al., 2007; World Bank, 2012; World Bank, 2017; UN-REDD, 2021). These constraints are mutually reinforcing: uncertain rights weaken incentives for long-term management, while weak administrative capacity reduces the credibility of both regulation and conservation payments.

The economic pressures established earlier have also remained largely intact. Households continue to derive immediate benefits from agricultural land, fuelwood and other forest resources, while many benefits of conservation remain internationally dispersed or realised over longer periods (World Bank, 2013; World Bank, 2025). The Forest Code primarily changes the rules governing forest use, while REDD+ attempts to increase the economic value of conservation. Neither, however, automatically removes the livelihood and development constraints that make forest conversion attractive. Their limitations therefore reflect not simply failures of individual policy design, but the difficulty of changing incentives within the institutional and economic environment in which forest exploitation occurs.

The evidence consequently supports a distinction between establishing conservation institutions and changing the underlying conditions producing forest loss. Stronger enforcement and more secure land tenure remain necessary, but durable reductions in deforestation also require policies capable of lowering the opportunity cost of conservation and reducing dependence on forest conversion. This provides the basis for the complementary policy responses considered in the following section.

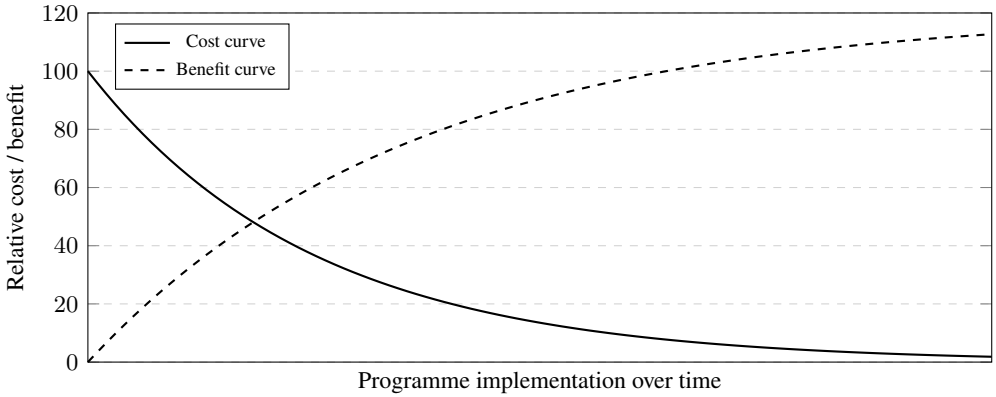
Policy Responses

I Subsidised Agroecological Intensification

Given the importance of small-scale agriculture as a driver of forest loss, one policy response is to reduce the amount of additional land required to increase agricultural output. Subsidised agroecological intensification (SAI) seeks to raise productivity on existing farmland through practices such as agroforestry, improved soil management, crop rotation and more efficient use of agricultural inputs. This approach differs from a Pigouvian-style tax on forest conversion. Although taxation could theoretically internalise part of the social cost of deforestation, weak enforcement and the dependence of low-income households on small-scale agriculture limit its practical and distributional appeal in the DRC (Forest Trends, 2022). Subsidies instead reduce the private cost of adopting production methods that could make expansion into forest land less necessary.

The economic rationale depends on the timing of costs and benefits. Intensification generally requires upfront expenditure on training, equipment, seeds and changes in production methods, while improvements in yields may emerge only gradually. Where farmers face credit constraints and high discount rates, even investments with positive long-run returns may therefore remain unattractive. Subsidisation can shift part of these initial costs away from households and make adoption feasible before the productivity benefits are fully realised (Angelsen & Kaimowitz, 1999). Figure 6 illustrates this mechanism conceptually.

Figure 6: Conceptual Cost-Benefit Dynamics of Subsidised Agroecological Intensification



Source: Author. Conceptual illustration.

There is evidence that this type of intervention is operationally feasible in the DRC. Forest Investment Program projects have combined agroforestry with cleaner energy, sustainable landscape management and community-based forest initiatives, reaching more than 421,000 people by 2025 (World Bank, 2025). This does not demonstrate that intensification necessarily reduces deforestation, however. Economic models of tropical forest conversion show that higher agricultural productivity can either reduce pressure for expansion or increase it where greater profitability raises the returns to cultivating additional land (Angelsen & Kaimowitz, 1999). SAI therefore carries a potential rebound effect: productivity gains intended to spare forests may instead encourage expansion if access to forest land remains weakly regulated. Its effectiveness consequently depends upon combining productivity support with secure land rights, land-use planning and credible protection of remaining forests.

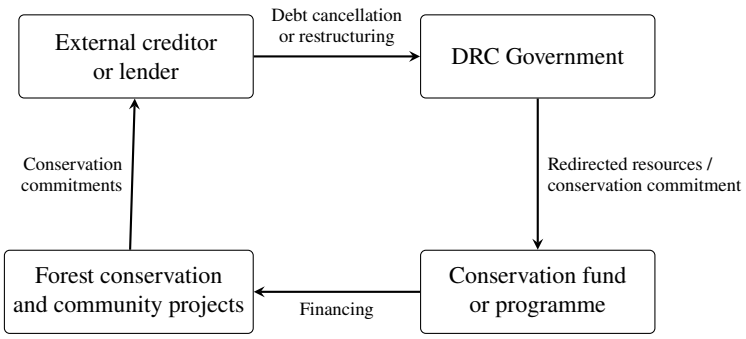
II Debt-for-Nature Swaps

A second approach addresses the fiscal side of the development-conservation trade-off. Debt-for-nature swaps restructure or reduce sovereign debt in exchange for commitments to direct agreed resources towards conservation. Their attraction for the DRC lies in their potential to address two constraints simultaneously: debt-service obligations can be reduced while additional resources are committed to environmental protection. This relates to the Debt-Resource Hypothesis considered earlier, although indebtedness should not be treated as a direct or deterministic cause of deforestation (Kahn & McDonald, 1995; Neumayer, 2005).

The mechanism is most useful where debt relief creates genuine fiscal space that would not otherwise have been available for conservation. Empirical research on bilateral debt-for-nature swaps has found an association between their use and lower forest loss, suggesting that the instrument can produce environmental benefits under appropriate institutional conditions (Sommer, Restivo & Shandra, 2020). More recent research nevertheless stresses that their scalability depends on the composition of sovereign debt, the cost of protecting priority areas and the willingness of creditors to participate (Nedopil, Yue & Hughes, 2024). A swap should therefore be evaluated not simply by the nominal amount of debt exchanged, but by the additional conservation expenditure and environmental protection it ultimately generates.

The DRC provides a plausible setting for such an instrument. Nedopil, Yue and Hughes (2024) identify the country as containing approximately 6.5% of global priority areas for biodiversity protection, while the government has begun exploring debt-for-nature swaps with support from the UN Economic Commission for Africa and the French Development Agency (UNECA, 2024). Yet the same institutional constraints affecting other conservation policies remain relevant. Negotiation and monitoring generate transaction costs, conservation commitments must be credible over time, and spending must be genuinely additional rather than replacing expenditure that would otherwise have occurred. Debt-for-nature swaps should therefore be understood as a mechanism for reallocating fiscal resources towards conservation, rather than as a substitute for either broader debt management or effective forest governance.

Figure 7: Structure of a Debt-for-Nature Swap



Source: Adapted from Greiner and Lankester (2004); Nedopil, Yue and Hughes (2024).

III Enforcement and Land Tenure

Neither SAI nor debt-for-nature swaps can produce lasting reductions in deforestation if the institutions governing access to forests remain weak. Their effectiveness is therefore complementary to, rather than independent from, improvements in enforcement and land tenure. Secure rights matter because households and communities will invest in long-term forest management only where they expect to retain control over land and capture part of the future benefits generated by conservation. Insecure or overlapping claims instead shorten decision horizons and can increase the attractiveness of immediate extraction (Debroux et al., 2007; World Bank, 2020).

Enforcement addresses a related but distinct problem. Economic incentives can make conservation more attractive, but they cannot prevent forest conversion where competing land claims remain unresolved or restrictions on clearing are effectively non-binding. Conversely, enforcement without viable economic alternatives can impose substantial costs on households dependent on agriculture and fuelwood and may therefore prove difficult to sustain (Robinson, Kumar & Albers, 2010). The two approaches are consequently mutually reinforcing: tenure clarifies who has rights and responsibilities over forest resources, while monitoring and enforcement increase the credibility of those rights and of restrictions on conversion.

Existing programmes in the DRC illustrate this complementarity. The Maï-Ndombe emissions-reduction framework combines incentives for less land-intensive agriculture and forest conservation with land-use planning, land-tenure reform and governance measures (World Bank, 2018). Community forestry has also expanded under the Forest Code framework, with almost 200,000 hectares of community forest concessions active by 2024 alongside payments-for-ecosystem-services projects supporting local and Indigenous communities (World Bank, 2024). These initiatives suggest that community participation can provide a mechanism through which the benefits of conservation reach actors whose land-use decisions directly affect forest outcomes.

The policy implication is therefore not that one instrument should replace another. SAI addresses the agricultural opportunity cost of keeping forests standing; debt-for-nature swaps can increase the fiscal resources available for conservation; secure tenure gives communities a stronger claim to its future benefits; and enforcement limits the ability to capture private returns through continued illegal or unsustainable conversion. Each instrument addresses a different component of the incentive structure identified earlier in the paper. Their effectiveness is consequently likely to depend on implementation as a coordinated policy package rather than as isolated interventions.

Discussion

Of the policy responses considered, subsidised agroecological intensification provides the strongest basis for the DRC's primary conservation strategy. The central reason follows from the preceding analysis: the dominant source of forest loss is small-scale agricultural expansion, and this expansion is closely connected to low productivity, food insecurity

and limited livelihood alternatives. A policy that concentrates principally on restricting forest conversion therefore addresses the consequence of these pressures without necessarily altering their cause. SAI instead seeks to reduce the need for additional clearing by increasing the amount of agricultural output that can be produced from land already under cultivation. It consequently addresses deforestation through the same economic incentives that currently make forest conversion attractive.

This also makes SAI preferable as the principal intervention to debt-for-nature swaps. Debt-for-nature swaps could provide valuable fiscal space and increase the resources available for conservation, particularly given the international benefits generated by the DRC's forests. Their effect on deforestation, however, remains indirect. Additional conservation finance does not itself determine how smallholders respond to declining soil fertility, limited agricultural inputs or the need to expand food production. SAI operates closer to the point at which decisions over forest conversion are actually made. By lowering the cost of adopting more productive agricultural practices, subsidies can make intensification economically viable without imposing additional costs on households whose livelihoods depend upon agriculture.

SAI should not, however, be interpreted as a standalone solution. The same increase in agricultural productivity that reduces the amount of land required for a given level of output could increase the profitability of agriculture and encourage further expansion. Stronger land tenure and credible enforcement are therefore necessary complements to the policy. Secure rights can increase incentives for households and communities to manage land over longer time horizons, while enforcement and land-use regulation can limit the conversion of productivity gains into additional forest clearing. The appropriate policy package is consequently one in which SAI changes the economic incentive to expand, while tenure reform and enforcement determine where and under what conditions expansion can occur.

Debt-for-nature swaps remain valuable within this strategy, but primarily as an enabling rather than principal instrument. By reducing debt-service pressures and directing resources towards conservation, a swap could help finance agricultural support, forest monitoring, community forestry and institutional capacity. Its contribution would therefore be greatest where additional fiscal space is used to support interventions that directly alter incentives on the ground. This distinction is important: the objective should not be to select between agricultural support, conservation finance and institutional reform as independent alternatives, but to establish which should form the centre of the policy response and which are required to make it effective.

The analysis therefore supports a clear policy hierarchy. Subsidised agroecological intensification should form the principal economic intervention because it most directly addresses the dominant driver of forest loss while remaining compatible with the DRC's need to increase agricultural production and improve rural livelihoods. Stronger land tenure and enforcement are necessary conditions for preventing productivity gains from generating further expansion, while debt-for-nature swaps can provide part of the fiscal capacity required to support both. This approach reflects the broader finding of the paper: lasting forest conservation in the DRC is unlikely to result from making forest exploitation progressively more difficult while the economic need for it remains unchanged. A more durable strategy is to reduce that need itself, making improvements in living standards progressively less dependent on continued forest conversion.

Conclusion

This paper examined why more than two decades of conservation efforts have struggled to produce lasting reductions in deforestation in the Democratic Republic of the Congo. It situated forest loss within the country's economic and developmental context before evaluating the 2002 Forest Code and REDD+ through the economic and institutional constraints surrounding forest use. The analysis found that both approaches have strengthened forest governance, but that their effectiveness has been limited by implementation challenges and by the persistence of the underlying incentives driving forest conversion.

The paper subsequently considered subsidised agroecological intensification, debt-for-nature swaps, and improvements in enforcement and land tenure as responses to these constraints. Taken together, the analysis demonstrates that deforestation in the DRC cannot be addressed independently of the country's development needs. Lasting forest conservation therefore requires stronger governance alongside policies that reduce the economic dependence of households and the state on continued forest conversion.

POLICY BRIEF SERIES

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Reforming the EU Emissions Trading System and the Future of European Carbon Pricing

Balancing Europe's climate ambitions with the economic and political challenges of ETS2

Executive Summary

EU Emissions Trading System at a Glance

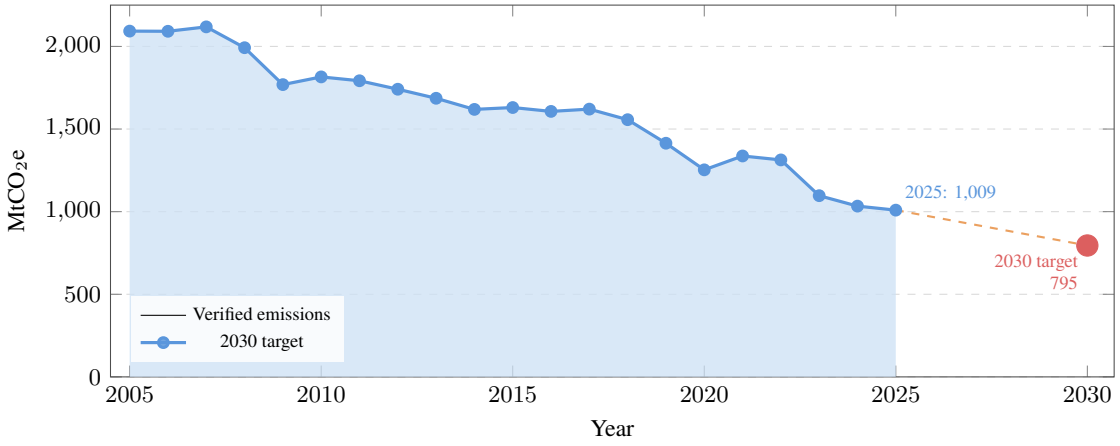
- Launched in **2005** as the world's first major carbon market
- Covers approximately **37% of EEA greenhouse gas emissions**
- Covers around **10,000 installations** in the energy and manufacturing sectors
- Stationary-installation emissions fell by **51% between 2005 and 2024**
- Current legislation targets a **62% reduction in ETS emissions by 2030**, relative to 2005

The European Union Emissions Trading System (EU ETS) has been a central instrument of European climate policy since its introduction in 2005. Through a declining emissions cap and a market for tradable allowances, it prices greenhouse gas emissions from electricity and heat generation, energy-intensive industry and aviation, with maritime transport incorporated from 2024. The system now covers approximately 37% of greenhouse gas emissions across the European Economic Area and around 10,000 energy and manufacturing installations (European Commission, 2024; EEA, 2026). Following its 2023 revision under the Fit for 55 package, the ETS cap is designed to deliver a 62% reduction in covered emissions by 2030 relative to 2005.

The system has delivered substantial emissions reductions. Emissions from stationary installations fell by approximately 51% between 2005 and 2024, driven particularly by decarbonisation in the power sector, fuel switching and increased renewable-energy deployment (EEA, 2026). The ETS has also become an important source of transition finance: allowance auctions generated €38.8 billion in 2024 and more than €230 billion between 2013 and 2024, supporting national climate expenditure, the Innovation Fund and the Modernisation Fund (European Commission, 2025). Its increasing stringency, however, has intensified concerns over industrial competitiveness, carbon leakage and the distribution of carbon-pricing costs.

These tensions will become more important as free allocation is progressively phased out alongside the Carbon Border Adjustment Mechanism (CBAM), while ETS2 will extend carbon pricing to fuels used in buildings, road transport and additional sectors from 2027. The next phase of reform must therefore preserve the ETS's environmental effectiveness while maintaining industrial competitiveness and political support. This brief evaluates the system's economic, environmental and social performance, assesses the implications of ETS2, and considers how European carbon pricing should develop beyond the current framework.

Figure 1: EU ETS Stationary Installation Emissions and the 2030 Target, 2005–2030



Source: European Environment Agency, EU ETS Union Registry (July 2026); European Commission (2025). Historical values are adjusted to reflect the current scope of the EU ETS. The 2030 target represents a 62% reduction relative to 2005.

Context and Background

The EU Emissions Trading System operates through a cap-and-trade mechanism. A fixed quantity of allowances limits aggregate emissions from covered activities, with each allowance permitting the emission of one tonne of CO_2 equivalent. Regulated operators must surrender allowances equal to their verified annual emissions and can trade allowances between themselves. As the cap declines, allowances become increasingly scarce, creating a financial incentive to reduce emissions where abatement is cheaper than purchasing additional allowances (European Commission, 2026).

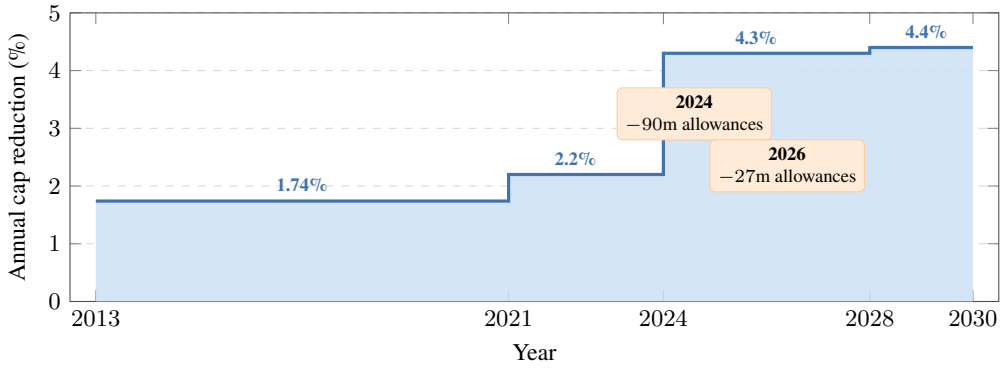
The system has been progressively strengthened since its introduction in 2005. Early phases relied heavily on free allocation and experienced substantial allowance surpluses, weakening the carbon-price signal. Phase III (2013–2020) introduced a single EU-wide cap and greater auctioning, while the Market Stability Reserve (MSR) began operating in 2019 to manage accumulated surpluses. Phase IV began in 2021 and was subsequently strengthened by the 2023 Fit for 55 reform, which increased the rate at which the emissions cap declines and expanded the scope of the system (European Commission, 2023; European Commission, 2026).

Figure 2: Development of the EU Emissions Trading System, 2005–2026

Source: European Commission (2023; 2026).

The 2023 reform significantly tightened the cap. The Linear Reduction Factor (LRF), which determines its annual decline, increased from 1.74% during Phase III to 2.2% from 2021, 4.3% for 2024–2027 and 4.4% from 2028. The reform also introduced one-off reductions of 90 million allowances in 2024 and 27 million in 2026. Together, these changes are intended to reduce emissions covered by the ETS by 62% by 2030 relative to 2005 (European Commission, 2023; European Commission, 2026).

Figure 3: Tightening of the EU ETS Linear Reduction Factor



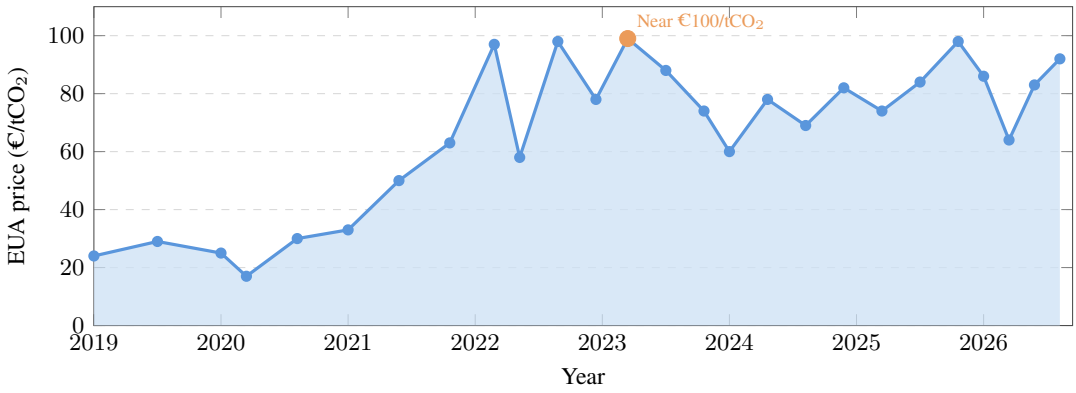
Source: European Commission (2023). The 2023 ETS revision increased the Linear Reduction Factor and rebased the cap through one-off reductions in 2024 and 2026.

The reform also broadened the scope of carbon pricing. Maritime transport entered the existing ETS in 2024, while free allocation to aviation is being phased out in favour of full auctioning from 2026. The system continues to combine auctioning with free allocation for parts of industry, while the MSR adjusts allowance supply when significant market imbalances emerge (European Commission, 2025; European Commission, 2026). The result is a considerably more stringent and comprehensive system than that introduced in 2005. The ETS now combines a rapidly declining emissions cap with broader sectoral coverage and mechanisms for managing allowance supply.

Economic Impact and Competitiveness

The economic effect of the EU ETS operates principally through the allowance price. Firms capable of reducing emissions below the cost of purchasing allowances have an incentive to abate, allowing reductions to occur where they are comparatively inexpensive while creating a common investment signal for efficiency, electrification and low-carbon technologies. The strength of this signal has increased considerably: the average allowance price rose from approximately €5/tCO_2 in 2017 and €25/tCO_2 in 2020 to €83.6/tCO_2 in 2023, before declining to €64.8/tCO_2 in 2024 (EEA, 2025).

Figure 4: Evolution of the EU ETS Allowance Price, 2019–2026

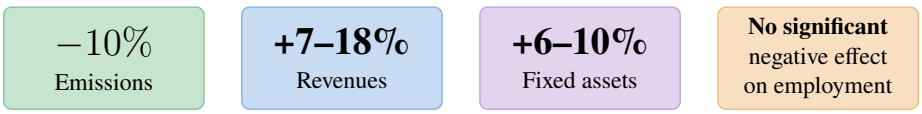


Source: ICAP Allowance Price Explorer (2026); European Environment Agency (2025). The EEA reports annual average prices of €83.6/tCO_2e in 2023 and €64.8/tCO_2e in 2024.

Higher carbon prices create potential competitiveness risks for energy-intensive and trade-exposed industries, particularly steel, cement, chemicals and fertilisers. Where firms cannot pass carbon costs to consumers or reduce emissions economically, production could relocate to jurisdictions with weaker climate constraints, creating "carbon leakage". Free allocation has historically reduced this exposure, while CBAM is intended progressively to replace this protection for covered sectors as their free allowances are phased out (European Commission, 2026).

Existing empirical evidence nevertheless finds little indication that the ETS has produced substantial aggregate competitiveness losses. Dechezleprêtre, Nachtigall and Venmans estimate that the ETS reduced emissions from regulated installations by approximately 10% between 2005 and 2012 without a statistically significant negative effect on employment or profits. Regulated firms instead recorded estimated revenue increases of 7–18% and increases in fixed assets of 6–10%, depending on model specification (Dechezleprêtre, Nachtigall & Venmans, 2018; OECD, 2023). Broader OECD reviews similarly find that most ex-post studies of carbon pricing detect no statistically significant effects on indicators including turnover, value added, employment, profits, productivity or foreign investment (Ellis, Nachtigall & Venmans, 2019).

Figure 5: Estimated Effects of the EU ETS on Regulated Firms



Source: Dechezleprêtre, Nachtigall and Venmans (2018; 2023), OECD. Estimates cover the first two trading phases (2005–2012); ranges reflect alternative model specifications.

There is also evidence of an investment and innovation response. OECD assessments report that ETS-regulated firms increased investment in fixed assets and that carbon pricing has encouraged low-carbon innovation; earlier research estimates that the ETS increased low-carbon patenting among regulated firms relative to comparable firms not subject to the system (OECD, 2021; OECD, 2024). These effects are economically important because competitiveness depends

not only on the immediate cost imposed by carbon pricing, but also on whether firms respond by increasing productivity and reducing their future exposure to carbon costs.

The ETS also generates substantial financial resources that can support this adjustment. Auctions produced €38.8 billion in 2024, of which €24.4 billion accrued directly to Member States, €6.3 billion to the Modernisation Fund, €2.4 billion to the Innovation Fund and €5.6 billion to the Recovery and Resilience Facility. Since 2013, cumulative auction revenues had exceeded €258 billion by the end of 2025 (EEA, 2025; European Commission, 2026).

Table 1: **Allocation of EU ETS Auction Revenues, 2024**

Recipient / Instrument	Revenue	Principal role
EU Member States	€24.4bn	National climate and energy expenditure
Modernisation Fund	€6.3bn	Energy-system modernisation and transition investment
Recovery & Resilience Facility	€5.6bn	REPowerEU and energy-transition investment
Innovation Fund	€2.4bn	Low-carbon technology and industrial decarbonisation
Total auction revenue	**€38.8bn**	

Source: European Environment Agency (2025); European Commission (2026).

The historical evidence should nonetheless be interpreted cautiously when assessing future competitiveness. Much of the strongest causal evidence covers 2005–2012, when allowance prices averaged around €20/tCO_2 and vulnerable industries received substantial free allocation (OECD, 2023). The current environment combines materially higher carbon prices with a faster-declining cap and the progressive replacement of free allocation by CBAM. Past resilience therefore does not establish that further increases in carbon costs will be economically neutral.

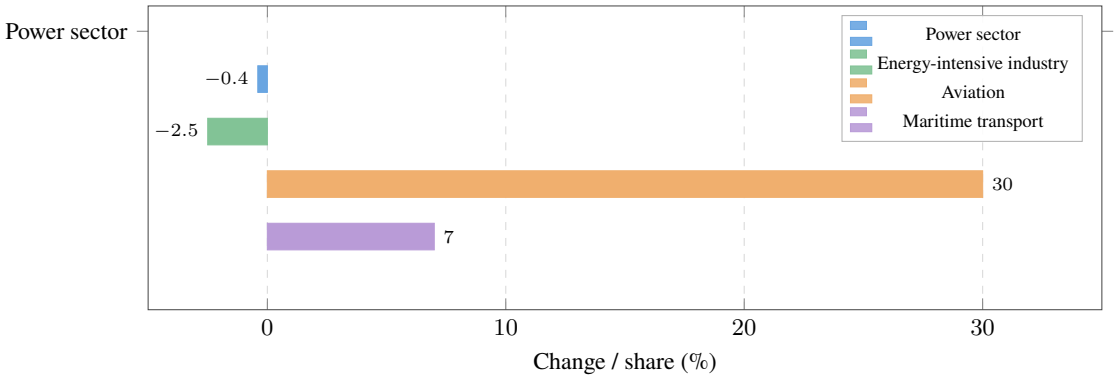
The policy challenge is consequently not simply to minimise the allowance price, but to preserve a credible carbon signal while increasing firms' capacity to respond to it. Recycling ETS revenues into clean technology, industrial decarbonisation and energy infrastructure can lower future compliance costs, while CBAM seeks to reduce the competitive asymmetry between European and foreign producers. A weaker carbon price could protect carbon-intensive production in the short term but reduce incentives to invest; tightening the system without adequate investment conditions could instead raise industrial costs before viable low-carbon alternatives are available. Competitiveness therefore depends increasingly on whether carbon pricing is accompanied by the investment conditions required for European industry to decarbonise.

Environmental and Social Effectiveness

The environmental record of the EU ETS is broadly positive, but observed emissions reductions cannot be attributed to carbon pricing alone. Emissions from stationary installations fell by approximately 51% between 2005 and 2024, with the largest reductions occurring in electricity generation (EEA, 2025). Fuel switching, renewable-energy deployment, improvements in energy efficiency and wider climate policy have also contributed, meaning the ETS operates most effectively as part of a broader decarbonisation framework (EEA, 2025; OECD, 2024).

Sectoral differences reinforce this point. Power generation has responded relatively strongly because firms can substitute between fuels and access mature renewable technologies, while harder-to-abate sectors face greater technological and infrastructure constraints. Aviation emissions returned close to pre-pandemic levels by 2024, while maritime transport entered the ETS only in 2024 and remains at an early stage of integration (EEA, 2025). Carbon pricing is therefore most effective where firms have viable alternatives through which to respond to the price signal.

Figure 6: Uneven Decarbonisation Across EU ETS Sectors



Source: European Commission (2026); European Environment Agency (2025). Power and industrial values refer to changes in 2025; aviation compares 2024 with 2013; maritime refers to its share of ETS emissions in 2024.

The social effect of carbon pricing depends largely on how its costs are distributed. Higher energy prices can be regressive where lower-income households devote a larger share of disposable income to energy and have fewer resources to invest in alternatives such as efficient housing or low-carbon transport (OECD, 2021; OECD, 2023). However, household responses and the design of transfers can significantly alter this outcome, making policy design central to the distributional impact of carbon pricing (OECD, 2023).

Under the existing ETS, many costs reach households indirectly through electricity and product prices rather than direct compliance obligations. Revenue recycling therefore plays an important role in maintaining fairness and political legitimacy. Since 2023, Member States have been required to devote ETS revenues, or an equivalent financial value, to climate and energy purposes, allowing the system to finance decarbonisation while offsetting part of the transition cost (European Commission, 2026; OECD, 2021).

Table 2: **Selected Evidence on the Environmental and Social Effects of Carbon Pricing**

Source	Main finding	Policy implication
EEA (2025)	EU ETS stationary emissions have fallen substantially, particularly in power generation, but carbon pricing operates alongside renewable deployment and fuel switching.	Environmental effectiveness depends on complementary energy and technology policy.
OECD (2021)	Carbon-pricing burdens can be regressive when energy expenditure represents a larger share of lower-income household budgets.	Distributional effects need to be addressed through policy design rather than lower carbon prices alone.
OECD (2023)	Household responses and revenue recycling can substantially alter the incidence of higher carbon prices.	Targeted transfers and investment can reduce regressivity while maintaining the price signal.
EEA / European Commission (2026)	Revenue recycling increasingly supports climate investment and transition measures.	The legitimacy of carbon pricing depends partly on how visible costs are matched by visible benefits.

Sources: European Environment Agency (2025); OECD (2021; 2023); European Commission (2026).

The overall record is therefore positive but conditional. Carbon pricing has supported substantial emissions reductions, yet its effectiveness depends on the availability of technologies and infrastructure that allow firms and households to adjust. Distributional pressures can similarly be reduced through targeted investment and revenue recycling. These issues become more important under ETS2, where carbon pricing will extend more directly to household heating and road transport.

ETS2 and the Extension of European Carbon Pricing

ETS2 represents the next major expansion of European carbon pricing, extending emissions trading to fuels used in buildings, road transport and additional sectors not covered by the existing ETS. Compliance obligations fall on upstream fuel suppliers rather than directly on households or motorists. Following its postponement, the system is scheduled to become fully operational in 2028 (European Commission, 2026).

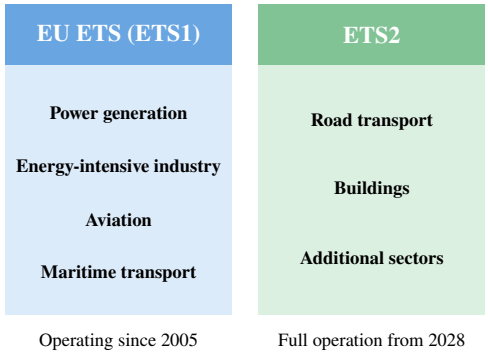
Its distributional implications are nevertheless more direct than under ETS1. Higher fuel costs can be transmitted to household heating and transport expenditure, while the ability to reduce consumption varies considerably. Households with efficient buildings, public transport or access to low-carbon technologies can adjust more easily than those facing financial, geographic or infrastructure constraints. ETS2 therefore combines the carbon-price signal with mechanisms intended to contain excessive price volatility and support investment in alternatives to fossil-fuel consumption (European Commission, 2026; European Parliament, 2023).

From ETS1 to ETS2

The two systems remain legally separate. ETS1 principally covers electricity generation, energy-intensive industry, aviation and maritime transport, whereas ETS2 targets fuel combustion in buildings and road transport alongside additional sectors.

This distinction moves European carbon pricing closer to everyday energy consumption. Its effectiveness will consequently depend not only on the allowance price, but also on whether households and businesses can realistically substitute away from fossil fuels.

Expansion of EU Carbon Pricing



Source: European Commission (2026).

ETS2 includes several safeguards to limit disruption during its introduction. Auction volumes will be 30% higher than normal in 2028, while a dedicated Market Stability Reserve can release additional allowances if supply becomes too tight. Further allowances may also be released if prices exceed €45/tCO_2 in 2020 prices, adjusted for inflation, or rise excessively rapidly (European Commission, 2026).

Table 3: **Mechanisms for Managing the Introduction of ETS2**

Mechanism	Key provision	Purpose
Front-loaded auctions	+30% in 2028	Improve liquidity and reduce supply shortages.
Price safeguard	€45/tCO_2 trigger	Allows additional allowances to be released if prices become excessive.
Market Stability Reserve	Dedicated ETS2 reserve	Adjusts allowance supply when market imbalances emerge.

Source: European Commission (2026). The €45/tCO_2 threshold is expressed in 2020 prices and adjusted for inflation.

The Social Climate Fund provides the main distributional support, financing measures such as building renovation, cleaner heating and low-emission transport for vulnerable households, micro-enterprises and transport users (European Commission, 2025). The aim is to reduce exposure to future carbon costs by improving access to lower-carbon alternatives.

ETS2 therefore extends carbon pricing into sectors where households differ significantly in their capacity to adjust. Its effectiveness will depend on maintaining the price signal while using investment and safeguards to make cleaner transport and heating realistically accessible.

Policy Options

One approach would be to place greater emphasis on containing near-term carbon costs for European industry through transitional free allocation and greater flexibility in allowance supply. This could reduce exposure for energy-intensive sectors facing high abatement costs and international competition, consistent with the Commission's 2026 proposal to increase allocation under the heat and fuel fallback benchmarks. However, prolonged protection would weaken the effective carbon-price signal, reduce auction revenues and risk delaying investment in low-carbon production (European Commission, 2026).

A more stringent approach would preserve the rapidly declining allowance supply, limit interventions that weaken scarcity and continue the phase-out of free allocation as CBAM develops. A stronger and more predictable carbon constraint would reinforce incentives for efficiency, electrification and low-carbon investment, supporting the EU's 2030 and 2040 climate objectives. The principal risk is that carbon costs could rise faster than firms' access to affordable electricity, infrastructure and commercially viable low-carbon technologies, increasing competitiveness and carbon-leakage pressures (European Commission, 2026).

A third approach would preserve the declining cap while using ETS revenues and EU-level instruments more systematically to reduce firms' future exposure to carbon costs. Investment could focus on industrial electrification, clean production technologies and enabling infrastructure, with temporary carbon-leakage protection retained where necessary. This broadly reflects the direction of current EU policy, combining a strong carbon-price signal with instruments such as the Innovation Fund and Modernisation Fund to support investment in decarbonisation (European Commission, 2026). It therefore seeks to maintain the environmental effectiveness of the ETS while addressing the investment constraints that can prevent firms from responding to higher carbon prices.

Recommendations

The EU should preserve a progressively tightening carbon constraint while directing a greater and more predictable share of ETS revenues towards industrial decarbonisation. Evidence from earlier phases of the ETS suggests that substantial emissions reductions can coexist with industrial activity, but remaining emissions are increasingly concentrated in sectors where abatement is more expensive and technologically difficult. Weakening the carbon price would reduce incentives to invest, while tightening it without adequate infrastructure and finance risks increasing costs before firms can realistically adjust. Support should therefore prioritise electrification, clean industrial processes and the infrastructure required to make low-carbon production commercially viable (OECD, 2021; European Commission, 2026).

Transitional protection should nevertheless remain where credible carbon-leakage risks persist. Free allocation should become progressively more targeted as CBAM develops and increasingly support, rather than substitute for, investment in decarbonisation. The Market Stability Reserve should similarly retain its capacity to address exceptional supply imbalances without becoming a mechanism for routinely suppressing allowance prices. This would provide firms with greater transitional resilience while preserving the scarcity signal on which the environmental effectiveness of the ETS depends (European Commission, 2026).

The same principle should guide ETS2. Its introduction in 2028 should be accompanied by investment in building renovation, cleaner heating, public transport and low-emission mobility, particularly for households least able to respond to higher fossil-fuel prices. Price safeguards can moderate short-term disruption, while the Social Climate Fund should be used to reduce longer-term exposure by expanding access to lower-carbon alternatives (European Commission, 2025; European Commission, 2026). The next phase of European carbon pricing should therefore combine a credible tightening of the carbon constraint with investment that enables firms and households to respond to it.