

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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Abstract

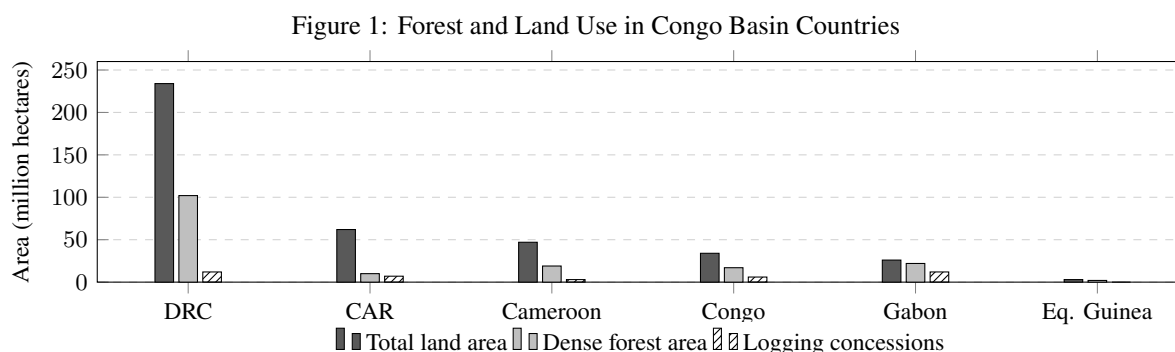
This paper examines why more than two decades of forest conservation efforts have struggled to produce lasting reductions in deforestation in the Democratic Republic of the Congo (DRC), and how forest protection can be reconciled with continued economic development. Focusing on the 2002 Forest Code and 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.

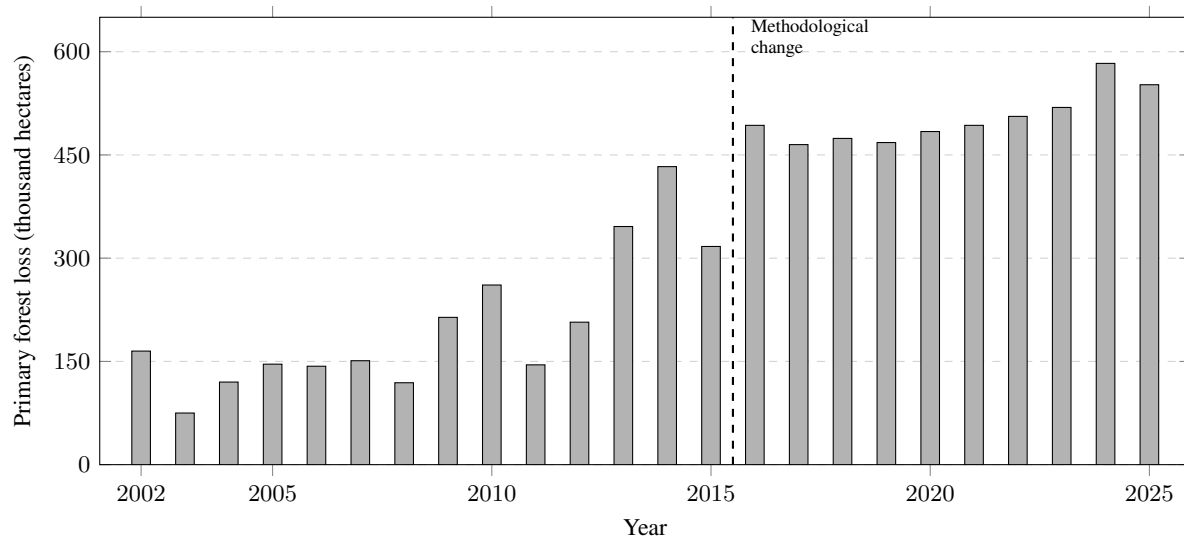
The exceptional scale of the DRC's forest resources is also apparent relative to the other major forest states of the Congo Basin. Comparative land-use data show that the DRC contains considerably more dense forest than any other country in the region, while also containing a substantial area allocated 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).



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).

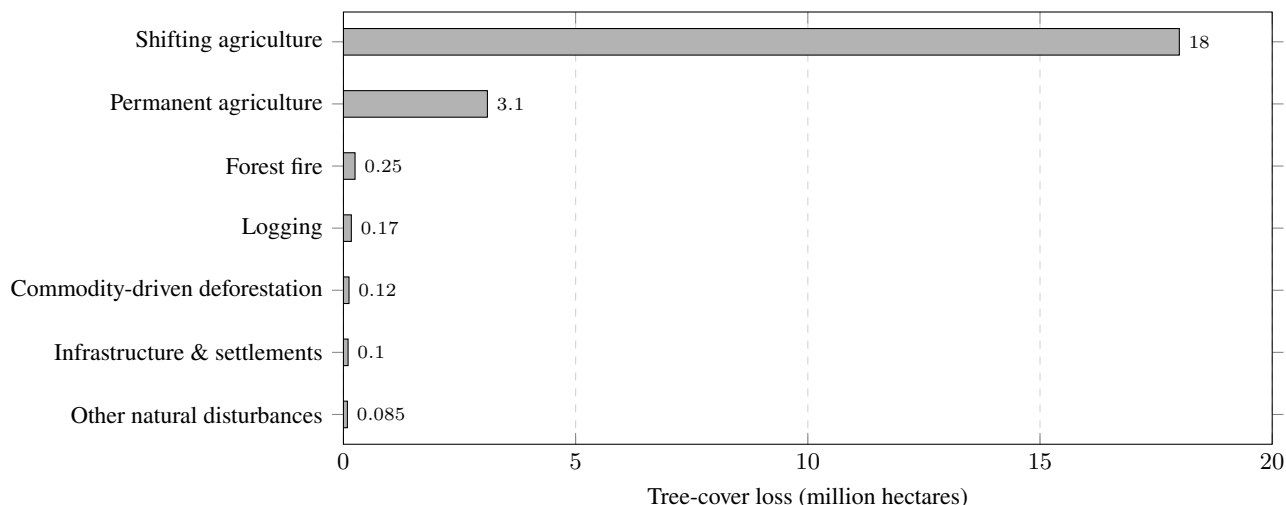
The literature on the DRC further complicates this relationship because forest exploitation is closely connected to household welfare. Earlier World Bank research emphasises the dependence of rural communities on forests for food, agricultural land and energy, while more recent evidence continues to 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

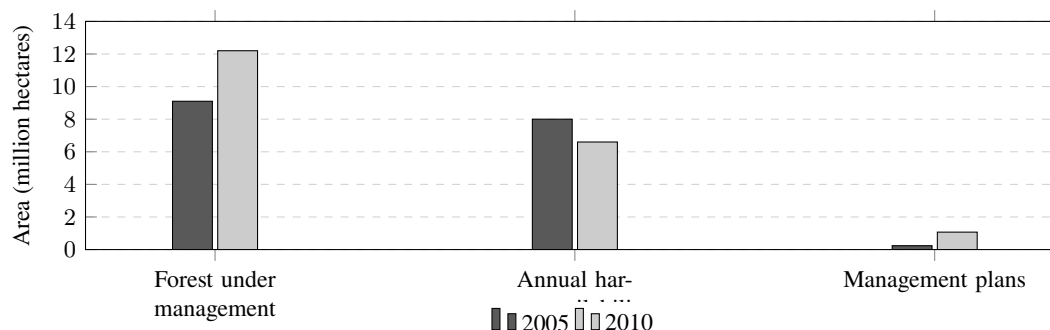
I The 2002 Forest Code

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+

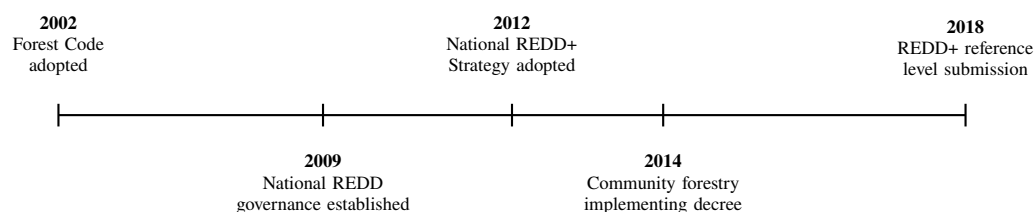
The limitations of domestic forest governance have increasingly been addressed through REDD+, which attempts to create financial incentives for reducing emissions from deforestation and forest degradation. The DRC became an early participant in the international REDD+ process and adopted its National 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.

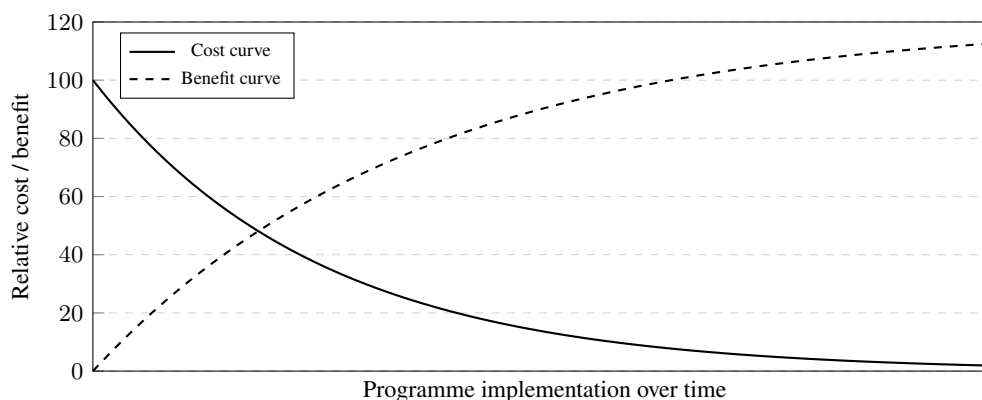
Policy Responses

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.

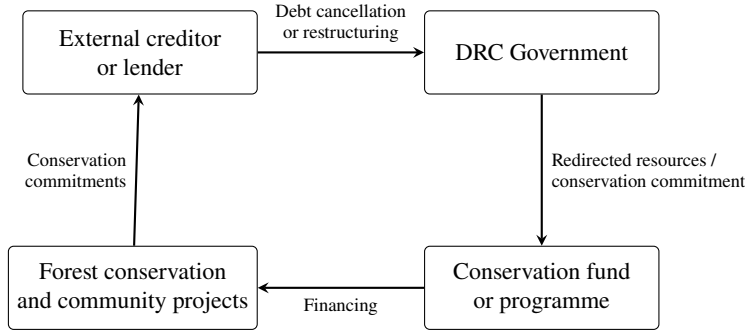
II Debt-for-Nature Swaps

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 Mai-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.