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Improving Tropical Forest Financing From TFFF and REDD+ to SSLB and FLL

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Improving Tropical Forest Financing

From TFFF and REDD+ to SSLB and FLL

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Key Takeaways:

- To address deforestation, Brazil is proposing the Tropical Forest Financing Fund (TFFF). TFFF has several weaknesses.
- The recommendations presented below can address these weaknesses.
- Recommendation 1 is to let payments be loans instead of grants. Forest-linked loans (FLLs) must be repaid only when the deforestation rates are high.
- With FLLs, incumbents and sponsors induce future governments to conserve.
- The cost of conservation by FLLs is only 20-32 percent of the cost of grants.
- With FLLs, three to five times as much forest can be conserved per dollar.

Deforestation in the tropics is a key contributor to climate change as well as to the loss of biodiversity. Therefore, Brazil is proposing the creation of a “Tropical Forest Forever Fund” (TFFF) to address tropical forest deforestation. Brazil will host the 30th Conference of Parties to the United Nations Framework Convention on Climate Change (COP 30) in November, 2025.

While TFFF is well-meaning and is gaining traction, it has several weaknesses (some of which are shared with various approaches to implementing REDD+). But TFFF can be modified and improved to ensure that tropical forest conservation will succeed. This policy brief outlines why and how the weaknesses can be addressed with Forest-Linked Loans (FLLs).

According to the Brazilian government, and its Concept Note (2025, p. 6), TFFF is supposed to be an umbrella operation with two distinct arms:

“One arm, the Tropical Forest Investment Fund (“TFIF”), will mobilize and raise financial resources to fund annual payments to participating tropical forest countries (TFCs) that preserve and increase their tropical and sub-tropical forest cover. The other arm, the Tropical Forest Facility (“the Facility”) will coordinate how the TFFF's forest cover rewards system works.”

In other words, TFIF generates revenues and the “Facility” will spend them on conservation.

The investment fund, TFIF, wants to raise \$125 billion in investments from sponsor countries as well as from the private sector. The investors will earn a return on their investments. But nearly half of that return will be set aside as a fee to pay for the “Facility”. The Concept Note (p. 25) refers to an example where the real rate of return is 7.6 percent but, to fund TFCs, the return to investors will be only 4.90 percent.

Every year, a TFC may expect to receive a base rate, proposed to be \$4, for every hectare of standing forest. But there is reduction in payment, or a penalty, for every hectare that is lost. In cases of deforestation, or a permanent removal of trees, the penalty is 100 times the base rate for every hectare if the deforestation rate is less than 0.3 percent, and 200 times the base rate for larger rates deforestation. In cases of degradation, where there’s damage or a thinning of forest cover, the penalty is 25 times the base rate, per hectare.

The initiative is well intended and it can help to reduce deforestation. But the proposed scheme is burdened by several (more or less independent) weaknesses. Some but not all of these weaknesses are shared with variations of the United Nations program Reducing Emission from Deforestation and forest Degradation (REDD+). A few of these are discussed in the Concept Note (2025, p. 54), but others are described below.

As a guide, Table 1 references TFFF’s weaknesses (W) and the recommendations (R) that address them. The weaknesses and recommendations are explained in the sections following the table. Recommendation 1 is to let payments be forest-linked loans. The benefits of FLLs are formalized and quantified in the [Appendix](#).¹

Weaknesses		Recommendations
W1	Forced bundling	R2
W2	Risky investments	
W3	Insufficient incentives	R3,R4,R5
W4	Uncertain continuation	R1
W5	Impermanence	
W6	Short-sightedness	

Table 1: *Weaknesses W1-W6 can be addressed by recommendations R1-R5*

1. Weaknesses with TFFF

¹ See: <https://drive.google.com/file/d/1dmF3f7Q8eMqPJg83Q18pcSLN8qobXzs8/>

W1. Forced bundling. There are no natural synergies between investment fund management and compensation for forest conservation: Private investors who are seeking high rates of return are typically not the same stakeholders as those who are willing to make sacrifices to conserve forest.

The two parts of TFFF force sponsors to invest, and they require investors to accept a fee that compensates for conservation. The bundle is especially inefficient because donors who are willing to give up money to conserve forest face the additional request of having to invest in risky assets at the same time.

The bundle is not only inefficient on the demand side, as described above, but also on the supply side: The expertise that is necessary for running an investment fund is not the same expertise that is necessary for monitoring and compensating countries that have conserved forests. When two tasks require different types of expertise, they are, in business, typically split and undertaken by different units or firms. If the two tasks cannot be split completely, there will be frictions and inefficiencies in the management of one or the other, even if the TFFF Secretariat “will coordinate the interlinkages between both arms”, as explained in the Concept Note (2025, p. 6).

W2. Risky investments. Less capital will be raised if the returns are risky. With a fixed cut in the rate of return (to fund the \$4 per hectare), the variance in return, relative to the expected return, will be higher than without such a cut. The higher variance will make the fund unattractive and limit how much capital that can be raised. If the cuts were not fixed but related to the rate of return in the market, then the compensation for conservation would fluctuate, instead, which would make the scheme risky for the TFCs. The risks are recognized in the Concept Note (p. 55) but the solutions being discussed are insufficient.

The risk strengthens the argument in W1: Bundling the request to invest in shares with payments for conservation does not create synergies – especially not when the investments are risky.

W3. Reliance on private investors. The two arguments above are further strengthened by the fact that 80 percent of TFIF is supposed to come from private investors. (The “seed money,” from sponsor countries, constitutes only 20 percent of the planned fund.) This is concerning, and in conflict with standard economic theory, because the governments in developed countries (and not private investors) tend to be more altruistic and willing to face a sacrifice in return for the provision of public goods (such as tropical forest conservation).

W4. Uncertain continuation. Because investors cannot be forced to continue investing in a fund with a fee, and thus with a lower interest rate or returns, TFCs cannot be certain that TFFF will continue to be so popular in the future that it will be possible to

pay countries \$4 per hectare of conserved forest. This uncertainty implies that the present-discounted value of conserving today, which partly comes from the possibility of obtaining future compensation, will be less. That is, the weight (i.e., the discount factor) on future potential compensation will be reduced, due to the uncertainty.

W5. Impermanence. TFFF is not robust to populism or policymakers that prefer deforestation. If forests are conserved in 2025, they may or may not be conserved later. That is, the effort in 2025 may or may not be permanent. This follows because TFFF is, by design, static. Payments are based only on recent deforestation and forest cover, so the connection between one period and another is not fully exploited.

Suppose that \$4 per hectare, minus deductions because of high deforestation rates, ends up being a negative number. In this case, there will be zero (instead of negative) transfers to this particular TFC. Thus, TFFF has no bite, and will not at all motivate policymakers to reduce deforestation. This situation is not unrealistic: It can occur, for example, if voters in the TFC are electing policymakers who prefer to develop agriculture or mining instead of forest conservation.

It is a severe flaw with the TFFF design that it has no bite in this situation.

W6. Short-sightedness. TFFF is not robust to political economy forces. Because today's government might not necessarily stay in power, future payments are valued less, from the incumbent's point of view. The higher the rate of political turnover (i.e., the smaller is the probability that the incumbent remains in power), the lower is the incumbent's value from future payments, and the less effective future compensations are in motivating conservation today (Harstad, 2023).

Variants of the REDD+ approach can also be subject to Weaknesses 4-6. For TFFF, however, Weaknesses 1-3 arise, in addition. (For more on the differences between TFFF and REDD+, see the Concept Note, p. 62.)

2. Recommendations for how to make payments more effective

R1. Let payments be forest-linked loans. Any payment for forest conservation should be repaid by the TFC if, and only if, deforestation rates exceed a certain threshold (e.g., "x" percent). Here, the threshold, x, can be 0.1 or 0.2 percent -- or whatever the parties find to be acceptable. The cost of repaying the loan with interest should be so high that policymakers will prefer to keep deforestation rates below the threshold, in which case they will not actually have to repay the loan. Nevertheless, the possibility of having to repay brings with it several benefits:

- W4 (uncertain continuation), above, is mitigated when, with the loan, TFCs will receive more money up-front rather than later.

- W5, on permanence, is explicitly dealt with because the payments are kept only if conservation remains permanent. The scheme is robust in that every future government will be incentivized to reduce deforestation in order to reduce the amount or the possibility of repayments. The payment to the TFC is negative if the country's government fails to conserve.
- W6 (short sightedness), most importantly, is turned into an asset: Political turnover leads to a time inconsistency problem and a government would typically like to “tie the hands” of future governments. By accepting a loan that must be repaid if, and only if, deforestation levels are high, the current government ensures that future governments will not over-exploit the common resource to its benefit. This is beneficial to the current government (Harstad, 2023) and thus more can be conserved per dollar if the payments are given as loans instead of as grants -- especially when the incumbent's probability (p) of staying in power is limited: See Figure 1, which builds on the formal model in the [Appendix](#) and data provided by Assunção et al. (2025).

The interest rate on the repayment, if the deforestation rate is high, should be high and so high that the TFC's government would like to conserve to avoid it.²

One can account for the possibility that a country will not repay, and instead default. Even TFFF is subject to this risk: See the Concept Note (p. 55). Defaults are also costly, however, and thus something that a government would like to avoid, by keeping deforestation levels low.

To prevent TFCs from simply defaulting at low costs, one can benefit from existing rules and regulations that are established for sovereign lending. Loans of this type can be given “seniority,” which will prevent selective (and costless) default (see Bolton and Jeanne, 2009).

The [Appendix](#) shows that when defaults are a concern, FLLs can crowd out private lending to TFCs. Crowding out raises the cost and reduces the cost-savings from FLLs, but they are still beneficial: See the black line in Figure 1.

² For that reason, TFCs would actually not need to repay the loan. If there mere possibility restricts how the payments can be spent, one can design the FLL so that, if deforestation is high, repayment is due in the next budget. That way, the current budget will not need to account for this possibility, and the payment can be spent on conservation expenditures.

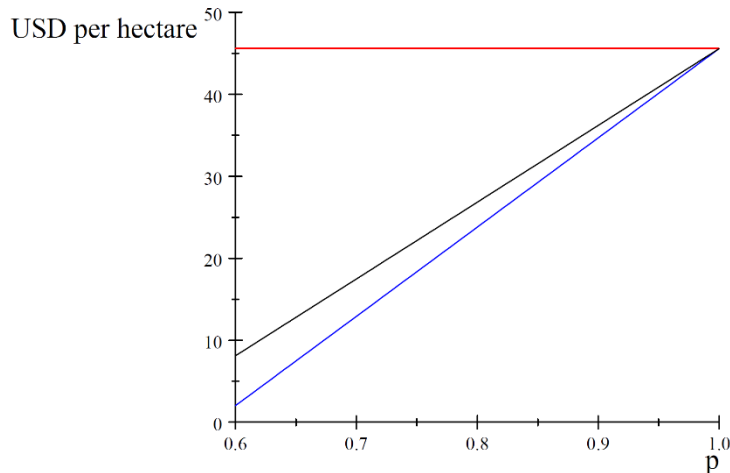


Figure 1: The cost of an FLL is less if p is small whether the TFC can default (black line) or not (blue line), relative to grants (straight red line).

Another concern is that a loan seems more costly than grants for the TFC -- if there is a real possibility that the TFC would need to repay. After all, a government does not fully control deforestation. The concern can be addressed as follows:

This cost to the TFC is an equivalent benefit to the lender who faces a real possibility of being repaid. Therefore, the lender can, in principle, compensate the TFC for the risk. One way to compensate the TFC for the risk is to let the initial transfer to the TFC to be raised. Alternatively, the initial loan can be supplemented with future payments so that the TFC is not worse off because the payment is a forest-linked loan rather than a grant. With either of these solutions, forest-linked loans (that must be repaid if and only if future deforestation levels exceed the threshold), instead of simply as grants, will be better for both the lender, or the donor, and the TFC.

These benefits imply that R1 is not restricted to TFFF: it is a recommended improvement for *all* forest compensation schemes. For example, debt-for-nature swaps should swap nature for debt repayment instead of debt forgiveness. Payments within appropriate REDD+ programs should also be given as FLLs, rather than as grants.

R2. Target governments. The underlying motivation to pay, or accept a lower rate of return, is that forests will be conserved. Therefore, governments in developed countries should be more willing to offer them than are private investors, and such governments such be the primary target. This recommendation can be combined with R1, even though it is also independently beneficial.

This recommendation addresses W3, above, which was that TFFF relies too heavily on private rather than public investments.

Even if sponsor governments are liquidity constraints, the benefits of FLLs prevail as long as current and future payments are given as FLLs rather than as grants.

R3. Invest in forests – not markets. W1 and W2 can be addressed if the payments to the TFCs are collected directly, instead of indirectly as fees on investments that must be managed by TFIF. With the TFIF, investors expect a loss compared to the real return in the market because TFIF must fund the Facility. If this loss can be paid directly, it can be paid without the need to invest in the market at the same time (addressing W1). That way, the investors avoid the additional risk (addressing W2). R3 is especially desirable when combined with R2, because governments are unlikely to have an appetite for combining their payments for conservation with risky investments in the market.

R4. Transfer of title. For forest-linked loans, described in R1, it is relatively easy to identify and credit the lender with the "carbon right". This possibility implies that the scheme can be combined with Article 6 of the Paris Agreement (on international trade of emissions reductions), and also with an emission trading system (ETS) when these (and Article 6) are further developed to account for international trade.

With this type of entitlement, the need to focus on governments instead of private investors (recommendation R2, above) is diminished.

R5. Credit co-benefits. If forest conservation is indeed connected to ETS, as Recommendation 3 suggests, then one should acknowledge that conserving tropical forests creates the double benefit of biodiversity and carbon storage. Conserving a ton of CO₂ as tropical forests is thus more valuable for the world than reducing a ton of CO₂ in alternative ways. One way of recognizing the additional benefit is to introduce exchange rates where one gets additional credits for conserving CO₂ in tropical forests, relative to reducing CO₂ emission elsewhere. The additional number of credits should reflect the value of biodiversity conservation. In this way, the incentive to focus on tropical forest conservation will be strengthened.

3. Experiences with bonds, loans, and additional suggestions

Forest-linked loans are not unrealistic or impractical. In fact, they already exist. In 2022, Uruguay issued sovereign sustainability-linked bonds (SSLBs). With them, the country borrows money from private investors, and the rate of return is contingent in that it is lower if the country succeeds to implement sustainable policies, such as national forest conservation.

To be specific, the bonds have 12 years maturity. The yield is 5.75 percent, but it drops (or increases) by 15 basis points for each success (or failure) in addressing two Sustainable Performance Targets (SPTs). One of the SPTs is to conserve and increase

the national forest cover. This STP will be judged as successful if the forest cover increases to 103 percent, compared to 2012. The STP fails if the forest cover falls below 100 percent. If the forest cover stays between 100 and 103 percent, the yield remains at 5.75 percent. Chile³ also issued SSLBs in 2022 and, in 2024, Thailand issued SSLBs.⁴

The three SSLBs differ in important respects. The differences allow us to learn and improve their effectiveness.

Although these SSLBs are in line with R1, above, they can still be improved according to R2-R4. In particular, larger funds might be elicited if the borrower targets governments rather than private investors. In line with R2, above, the reason is that governments, who already spend resources on environmental conservation, are valuing the environmental benefits associated with SSLBs. Because they value it more, they are also willing to accept cuts or variances in the yields if the environmental consequences are positive.

In the following, four additional suggestions to improve SSLBs are presented.

- **Raise the reward and the penalty.** One possible improvement to SSLBs is to increase the difference in yield (or interest rates) that is paid if the TFC succeeds vs. fails with its STP. After all, a major purpose of the SSLBs is to induce future governments in TFCs to work hard to succeed with the STP. This motivation requires that the impact on the yield is substantial. Ideally, the yield (and the requested repayment of the principal) can be as low as zero if the borrower is sufficiently successful with its STP. In this case, the reward for success will be large if the upper boundary for the yield is large.
- **Proportionality.** A second suggestion is to let the decrease in the yield be gradual and proportional to the compliance with the STP. Conversely: The larger the deforestation rate is, the larger the repayment should be. A binary step-up or step-down is not helpful in providing incentives if the TFC is confident that the performance will be outside of (or in-between) the threshold(s).
- **Maturity.** For the SSLBs to exploit the desire to tie the hands of future governments (see W6), and to ensure permanence (W5), it can be valuable to let the maturity of the SSLBs be longer than 12 years. (The maturity is 16 years for Thailand's SSLBs and 20 years for Chile's.) In fact, the reasoning behind R1, above, justifies bonds or loans that never expire, so that every future policymakers will face the cost of having to repay the principal (with interests) if they permit policies that cause deforestation.

³ On Chile's SSLBs, see: <https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/esg-bonds/sustainability-linked-bonds>

⁴ On Thailand's SSLBs, see: <https://www.adb.org/news/adb-supports-asia-first-sovereign-sustainability-linked-bond-thailand>

- **Seniority.** Finally, if lenders are worried about defaults, then it is important to ensure that the bonds or loans have seniority so that selective defaults can be prevented (Bolton, Patrick and Jeanne, Olivier, 2009):

4. Conclusions

It is immensely important to motivate tropical forest conservation. Not only do forests store carbon, but tropical forests are the most biodiverse spheres in the world and the homes of indigenous peoples. Conserving tropical forests amounts to a global public good, and it is fair and necessary that the provision of such a public good by low-income countries of the Global South is compensated for by developed nations of the Global North.

Existing approaches are important and they range from REDD+ to, most recently, TFFF. These approaches are valuable, but they have severe weaknesses. If they are modified and improved, more forests can be conserved at lower costs. This policy brief explains the most important improvements.

In particular, compensations and payments should be given as loans that are kept, and no interests are paid, if and only if deforestation levels are low and the forest is conserved. Future policymakers from left to right will face maintained incentives to continue with conservation-friendly policy if the loan must be repaid (with high interests) as soon as new and non-conservation friendly policies are being introduced. The quantitative analysis in the [Appendix](#) indicates that about three to five times as much forest can be conserved with FLLs relative to grants.

With this and other improvements, we can learn from the SSLBs that have recently been introduced by Uruguay and other countries. The design of these SSLBs has been conservative and modest rather than aggressive. Thus, they can and should be improved upon by other countries.

With these schemes, COP30 can provide a triple-win: Tropical forest conservation will play a more important role for global climate policies, biodiversity will be conserved, and responsible governments in the tropics will benefit.

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