

Bridging the Carbon Market Gap: The Role of Development Banks in Fostering Climate Finance and Mitigating Market Failures

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Introduction

This article embarks on a comprehensive exploration of the role of development banks in the carbon market. The carbon market, a key instrument in the global fight against climate change, has been hindered by various market failures. These failures, which include high transaction costs, information asymmetry, and regulatory uncertainties, have limited the potential of the carbon market in emerging countries.

This article delves into the role of development banks in addressing these market gaps, their potential to support Agriculture, Forestry, and Other Land Use (AFOLU) sector projects, and their capacity to crowd in private capital, create new markets, and focus on less-commercially viable initiatives that yield significant development results.

Through an examination of the current state of the carbon market, an exploration of the unique role of the AFOLU sectors, and a detailed analysis of the distinct roles of Multilateral Development Banks (MDBs) and National Development Banks (NDBs), this article presents a comprehensive overview of the potential of development banks to drive sustainable development in the face of climate change.

The insights presented in this article are not only relevant for Brazil but also provide valuable lessons for other emerging market economies grappling with similar challenges. As the world continues to grapple with the pressing need to mitigate climate change, the role of development banks in driving sustainable development will only become more critical.

Chapter 2: The Carbon Market Gap

Climate change is a global challenge that requires urgent action from governments, financial institutions, and other key stakeholders.¹ The Intergovernmental Panel on Climate Change (IPCC) has emphasized the need for “rapid and far-reaching” transitions to limit global warming to 1.5°C.² The rise in greenhouse gas (GHG) emissions correlates with an increase in our planet’s average temperature, which leads to severe consequences, including mass extinction, risks to human health, and restrictions on food and water availability.³

The Paris Agreement, adopted by 196 parties in 2015, has been instrumental in driving countries to commit to nationally determined contributions (NDCs), delineating their

¹ IPCC. "Global Warming of 1.5°C. An IPCC Special Report." IPCC, 2018.

² Ibid.

³ Tuckett, David. "Climate Change and the New Industrial Revolution: What We Know, Don't Know and Need to Know." *Psychoanalysis, Culture & Society* 14, no. 4 (2009): 325–339. <https://doi.org/10.1057/pcs.2009.16>.

plans to reduce greenhouse gas emissions and build resilience to the impacts of climate change.⁴ However, the financial resources required to address this challenge are immense. It is estimated that trillions of dollars will be needed over the next few decades to finance the transition to a low-carbon economy.⁵ More recent studies suggest that the annual investment gap in key sectors for meeting the Paris Agreement targets is around USD 2.4 trillion.⁶

Within this context, the creation of the carbon markets came from a perception that the amount of CO₂e⁷ generated by entities has higher social costs than private costs. Social cost should be incorporated into the price of carbon, as mentioned in Stern and Stiglitz,⁸ leading to reductions in carbon emissions. This carbon price becomes tangible when it is turned into a scarce resource by the Paris Agreement, meaning that countries, according to their NDCs, now have limits for them. To achieve their NDC goals, countries need to establish emissions limits in their territories, which makes GHG emissions a scarce resource.

According to Ledyard,⁹ market failure is the inefficient allocation of resources that can occur if there are 1) too few markets, 2) non-competitive behaviors from the suppliers or consumers, or 3) non-existence problems in the absence of a market. In the absence of a well-regulated market, the price of carbon credits may not accurately reflect the social cost of carbon emissions, leading to inefficient allocation of resources.¹⁰

Several countries have yet to regulate their carbon markets. In Brazil, for example, the government has shown a commitment to reducing its greenhouse gas emissions, but the country's carbon market is still in the process of being fully regulated.¹¹ Similar situations can be found in other countries, such as Kenya and Zimbabwe, where ongoing efforts to establish and regulate domestic carbon markets have created uncertainties.¹²

In relation to market failures in the carbon market, two issues still need to be addressed. First, the process of issuing and certifying carbon credits still presents inefficiencies due to its high-cost relative to the credit itself. This results in a shift of gains from carbon credit producers to intermediaries. According to Timothy et al.¹³, the transaction costs

⁴ UNFCCC. "Paris Agreement." UNFCCC, 2022. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

⁵ Buchner, B., et al. "Global Landscape of Climate Finance 2017." Climate Policy Initiative, 2017.

⁶ UNEP. "The Adaptation Gap Report 2021." UNEP, 2021.

⁷ Greenhouse emissions equivalent in radioactive forcing effect to one ton of CO₂ over a given period. Intergovernmental Panel on Climate Change, *Climate Change 2014: Mitigation of Climate Change* (Cambridge: Cambridge University Press, 2015).

⁸ Stern, Nicholas, and Joseph E. Stiglitz. "Report of the High-Level Commission on Carbon Prices." Carbon Pricing Leadership Coalition, 2021.

⁹ Ledyard, John O. "Market Failure." In *The New Palgrave Dictionary of Economics*, edited by Steven N. Durlauf and Lawrence E. Blume. Palgrave Macmillan, 2017.

¹⁰ Stavins, Robert N. "Addressing climate change with a comprehensive US cap-and-trade system." *Oxford Review of Economic Policy* 24, no. 2 (2008): 298–321.

¹¹ World Bank. (2021). *State and Trends of Carbon Pricing 2021*. World Bank, Washington, DC.

¹² African Climate Wire. (2023). *African Countries Move to Regulate Domestic Carbon Markets and Claim Revenue*.

¹³ Pearson, T.R.H., Brown, S., Sohngen, B. et al. Transaction costs for carbon sequestration projects in the tropical forest sector. *Mitig Adapt Strateg Glob Change* 19, 1209–1222 (2014).

for carbon sequestration projects in the tropical forest sector ranged from 0,3% to 270% of the anticipated revenue. The same research shows that most existing estimates of carbon sequestration marginal costs are underestimated by up to 30% due to not including transaction costs. Aggregating the relevance, in percentage of the estimated revenue of carbon sequestration projects, and the uncertainty of their costs, there is evidence of how risky the projects are when considering just their cost-return analysis.

Second, there is still a lack of comprehensive information, which heightens the risks associated with projects. Specifically, there is insufficient data on the performance of carbon sequestration projects in tropical regions. Even within different tropical forests, the potential for carbon sequestration varies significantly, as demonstrated in a study on Borneo's forests.¹⁴ While protecting tropical forests can contribute substantially to mitigating climate change, the lack of data on the performance of these projects can limit their investment potential.

In conclusion, the carbon market, while a promising tool for addressing climate change, is laden with challenges. Market failures, including regulatory gaps and a lack of complete information, pose significant obstacles to the market's effectiveness. These challenges can be seen as an open space for support from development banks.

Chapter 3: Beyond Carbon Markets: The Dual Role of AFOLU

The Agriculture, Forestry, and Other Land Use (AFOLU) sectors play a crucial role in climate change mitigation and adaptation. They are responsible for nearly a quarter of global GHG emissions, primarily through deforestation and agricultural emissions from livestock and soil.¹⁵ However, they also hold potential for climate change mitigation, mainly through carbon sequestration in forests.¹⁶

The AFOLU sectors hold a unique position in contributing to climate change mitigation. They can reduce emissions by increasing carbon sinks, as well as by reducing emissions from deforestation, forest degradation, and agricultural intensification.¹⁷ The AFOLU sectors can also enhance resilience to climate change, particularly for communities dependent on these sectors for their livelihoods. For instance, sustainable forest management can help maintain forest health, making forests more resilient to climate change and protecting the communities that rely on them.¹⁸

Biodiversity is fundamental to the health of our planet and plays a vital role in combating

¹⁴ Jucker, Tommaso, Gregory P Asner, Michele Dalponte, Philip G Brodrick, Christopher D Philipson, Nicholas R Vaughn, Yit Arn Teh, et al. 2018. "Estimating Aboveground Carbon Density and Its Uncertainty in Borneo's Structurally Complex Tropical Forests Using Airborne Laser Scanning." *Biogeosciences* 15 (12): 3811–30.

¹⁵ Smith, P., Bustamante, M., Ahammad, H., Clark, H., Dong, H., Elsiddig, E., Haberl, H., Harper, R., House, J., Jafari, M., Maser, O., Mbow, C., Ravindranath, N., Rice, C., Robledo Abad, C., Romanovskaya, A., Sperl, F., & Tubiello, F. (2014). *Agriculture, Forestry and Other Land Use (AFOLU)*. In: *Climate Change 2014: Mitigation of Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹⁶ Grassi, G., House, J., Dentener, F., Federici, S., den Elzen, M., & Penman, J. (2017). The key role of forests in meeting climate targets requires science for credible mitigation. *Nature Climate Change*, 7(3), 220–226.

¹⁷ Smith, P., et al. (2014).

¹⁸ FAO. (2020). *The State of the World's Forests 2020*. FAO & UNEP.

climate change. It contributes to climate change mitigation by regulating the atmospheric concentrations of greenhouse gases. The conservation and sustainable use of biodiversity can enhance ecosystem resilience, reduce vulnerability to climate change, and provide other co-benefits to society.¹⁹ AFOLU initiatives are significant in this context. They not only contribute to climate change mitigation but also help conserve biodiversity. For instance, sustainable forest management practices can maintain or increase forest carbon stocks while conserving biodiversity within the forest ecosystem.²⁰

Carbon credits are another important aspect of AFOLU initiatives. They provide a financial incentive for countries to reduce greenhouse gas emissions. The sale of carbon credits can generate funds that can be reinvested in sustainable land management practices, further contributing to climate change mitigation and biodiversity conservation.²¹

Payment for Ecosystem Services (PES) schemes are also gaining traction as an alternative to traditional conservation methods. These schemes provide financial incentives to landowners and farmers to manage their land to provide certain ecosystem services. For instance, a study focusing on Kenya, Uganda, and Tanzania has highlighted the potential advantages and benefits of PES, including the possibility to generate revenue from landscape conservation, “increase the efficiency of conservation approaches, secure ecosystem services, and benefit poor rural communities”.²²

While alternatives to the traditional carbon credit market may not require as complex and structured regulatory frameworks compared to carbon markets, they are still in their early stages.²³ Despite the passing years from Wunder (2008) considerations, they are still true where the regulations didn't evolve as presented in Chapter 2 examples. Thus, their novelty shows that, similar to the carbon market, there are still spaces for the development of their markets to be worked on.

Alternative instruments to the traditional carbon market, such as payment for environmental services, can be alternative approaches to climate mitigation that should be evaluated in conjunction with the carbon credit market and that can result in direct benefits to the preservation and improvement of biodiversity, contributing to the climate agenda.

Chapter 4: Distinguishing Multilateral Development Banks and National Development Banks: Concentration and Execution of Donor Resources

Multilateral Development Banks (MDBs) and National Development Banks (NDBs) play

¹⁹ CBD. (2020). Global Biodiversity Outlook 5. Secretariat of the Convention on Biological Diversity.

²⁰ Thompson, I., Mackey, B., McNulty, S., & Mosseler, A. (2011). Forest Resilience, Biodiversity, and Climate Change. Secretariat of the Convention on Biological Diversity.

²¹ Griscom, Bronson W., Justin Adams, Peter W. Ellis, Richard A. Houghton, Guy Lomax, Daniela A. Miteva, William H. Schlesinger, et al. 2017. “Natural Climate Solutions.” *Proceedings of the National Academy of Sciences - PNAS* 114 (44): 11645–50.

²² Njogu, J., Mwangi, E., & Mutua, J. (2023). Critical Analysis of Payments for Ecosystem Services: Case Studies in Kenya, Uganda and Tanzania. *Forests*, 14(6), 1209.

²³ Wunder, S. "Payments for environmental services: Some nuts and bolts." CIFOR Occasional Paper, 2008.

distinct roles in the global financial landscape, particularly in the context of climate finance. MDBs, such as the World Bank and the Inter-American Development Bank, are international institutions that provide financial and technical assistance to developing countries for development programs (e.g., infrastructure, health, education) that are expected to improve the economic outcomes and quality of life of their country's population.²⁴ On the other hand, NDBs, such as the Brazilian Development Bank (BNDES) and the China Development Bank, are primarily public financial institutions that provide financial services to support the development goals of their respective countries²⁵.

MDBs and NDBs differ in their capacities to consolidate and manage donor resources. MDBs are capable of pooling resources from multiple donor countries and leveraging these funds to finance large-scale development projects. They also play a crucial role in setting global development agendas, including climate change mitigation and adaptation.²⁶

In contrast, NDBs, in this paper including sub-national development banks, usually manage resources from their own governments and can attract and execute resources from MDBs. They have the advantage of being closer to the ground, understanding local contexts better, and being able to tailor their financial products and services to meet the specific needs of their countries.²⁷

NDBs have expertise in financial and capital products, a mission linked to the global development agenda, which includes climate change, and access to MDBs as "last mile" agencies.²⁸ The term "last mile" refers to the final leg of the delivery process, where goods or services reach the end user. In the context of climate finance, NDBs can act as "last mile" agencies by channeling funds from MDBs and other international sources to local projects and beneficiaries.

Therefore, development banks, both multilateral and national, are technically equipped, financially potent, and institutionally aligned to address the challenges of the global agenda. Their operations can even be innovative, with a spillover effect. For instance, the Rhino operation of the World Bank, funded by the Global Environment Facility (GEF),²⁹ is a prime example of how MDBs and NDBs can work together to achieve common development goals.

In conclusion, acting like a bridge, connecting initiatives that offer social value higher than its private value it is in the nature of DBs, as presented. With their tools,

²⁴ ²⁴ Humphrey, C. (2015). Developmental revolution or Bretton Woods revisited? *Oxford Review of Economic Policy*, 31(3-4), 391-417.

²⁵ Smallridge, D., de Ollouqui, F., & Attridge, S. (2013). A health diagnostic tool for national development banks. Inter-American Development Bank.

²⁶ Humphrey, C. (2015).

²⁷ Smallridge et al., 2013.

²⁸ Griffith-Jones, S., & Ocampo, J. A. (2018). *The future of national development banks*. Oxford University Press.

²⁹ GEF (2022). Wildlife Conservation Bond boosts South Africa's efforts to protect black rhinos and support local communities.

development banks can establish a roadmap of initiatives, that goes from support and advocacy when regulating carbon markets, to providing financial support for carbon and PES projects, de-risking their uncertainties, executing pilot projects that improve information access, de-risking innovative processes, and, finally, using carbon offsets at the capital market, when the regulation context is advanced.

Chapter 5: The Role of Development Banks in Addressing Carbon Market Gaps

In contrast to their traditional roles as counter-cyclical players and gap-fillers for market failures in financial sectors,³⁰ development banks in the 21st century are increasingly recognized for their potential to drive innovation. This innovation is particularly relevant in the context of the carbon market, where development banks can leverage their expertise to enhance financial feasibility and reduce risks associated with uncertain returns on investment.

However, the need to address market failures, which are at the core of any development bank's mission, can lead to several different courses of action. Development banks can engage in traditional banking activities, such as providing direct loans, or they can operate as second-tier institutions, offering loans to other financial entities by acting as a fund supplier or even by providing guarantee funds for other institutions' loans. Furthermore, they can participate in the capital market as investors to share equity risk in innovative businesses or in seed money funds.³¹

Beyond financial tools, whether debt or equity, there are also activities related to market promotion, technology dissemination, and the structuring of complex institutional relationships and agreements to enable innovative technologies, disseminate financial knowledge, reduce asymmetric information, and facilitate long-term infrastructure investments.³²

These multiple approaches can be seen simultaneously as opportunities and risks. With this inclination to act for impact, combined with the understanding that development banks are carving a new path for operation, navigating non-traditional financial services (especially loan activity) presents an opportunity to explore new roles and spaces. This opportunity, coupled with a nascent carbon market in emerging markets that are currently in the early stages of maturity, brings the possibility of exploring a role for development banks that could act to innovate the climate change mitigation agenda.

The key concept surrounding this new role is 'de-risking'. For instance, pilot projects can help reduce risks related to lack of information by creating a history of information and generating spill-over effects. Pazarbasioglu et al.³³ highlight the importance of development banks in addressing market failures and promoting sustainable development. They argue that these institutions can play a crucial role in "crowding in" private sector investment, particularly in sectors and regions where investment risks are

³⁰ Gutierrez, E., Rudolph, H. P., Homa, T., & Beneit, E. B. (2011). Development Banks: Role and Mechanisms to Increase Their Efficiency. World Bank Policy Research Working Paper No. 5729.

³¹ Pazarbasioglu, C. (2023). A new role for development banks? World Bank Blogs.

³² Ibid.

³³ Pazarbasioglu, C., Garcia Mora, A., Uttamchandani, M., Natarajan, H., Feyen, E., & Saal, M. "Digital Financial Services." World Bank, 2020.

perceived to be high. This aligns with the potential role of a subnational development bank in innovating the climate change mitigation agenda, as it could help to attract private sector investment into this area.

Development banks (DBs) play a significant role in addressing the market gaps identified in Chapter 3. They can be instrumental in narrowing the gap between the need for funds and the availability of funds, particularly for infrastructure financing, helping to crowd in the private sector and anchor private-public sector partnerships, financing through partial credit guarantees, and providing recently specialized ecosystem with stable funding sources.³⁴

Development banks can develop credit guarantee schemes, credit enhancements on capital market instruments, or matching private equity funds.³⁵ For instance, the issuance of green bonds has become a common practice among development banks to finance environmentally friendly projects. BDMG, for example, has been part of this trend, issuing green bonds to finance sustainable development projects in its jurisdiction.³⁶ Similarly, Corfo's Startup Chile initiative has pushed the development of local venture capital funds in Chile, while BNDES has been working to develop a corporate bond market in Brazil.³⁷

Acting as a bridge, connecting initiatives that offer social value higher than their private value, is in the nature of DBs. With their tools, development banks can establish a roadmap of initiatives to address the challenges and opportunities in the carbon market. This roadmap could include the following steps:

1. Advocacy and support for the regulation of carbon markets: Development banks can play a crucial role in advocating for robust and transparent carbon market regulations, and providing technical support to governments in this process.
2. Financial support for carbon and PES projects: Development banks can provide direct financial support to projects that generate carbon credits or provide ecosystem services, helping to kick-start these initiatives and attract additional private investment.
3. De-risking uncertainties: By providing financial support and technical expertise, development banks can help reduce the risks associated with carbon and PES projects, making them more attractive to private investors.
4. Executing pilot projects to improve information access: Development banks can fund and execute pilot projects that generate valuable data and information about the performance of carbon and PES projects, helping to reduce information asymmetry in the market.
5. Using carbon offsets in the capital market: Once the regulatory context is advanced, development banks can use carbon offsets as a financial instrument

³⁴ Pazarbasioglu, C. (2023). A new role for development banks? World Bank Blogs.

³⁵ Ibid.

³⁶ Finance in Common. (2023). The Role of Public Development Banks in Scaling Up Sustainable Financing. Finance in Common.

³⁷ Pazarbasioglu, C. (2023).

in the capital market, further promoting the growth and development of the carbon market.

This roadmap provides a strategic approach for development banks to actively engage in the carbon market actively, leveraging their unique capabilities to enhance financial feasibility and reduce risks associated with uncertain returns on investment.

Conclusion

In conclusion, this article has explored the potential of development banks to address the challenges and opportunities presented by the carbon market in emerging countries. The market failures identified in Chapter 2, such as the high cost of issuing and certifying carbon credits and the lack of complete information, pose significant obstacles to the effectiveness of the carbon market. However, as discussed in Chapter 3, development banks are well-positioned to address these market gaps through their technical capabilities, financial potential, and institutional alignment.

The potential of development banks to support AFOLU sector projects, as discussed in Chapter 4, is significant. Through their involvement in projects related to the restoration of degraded areas, PES initiatives, and sustainability credit projects, development banks can contribute to climate change mitigation and biodiversity conservation. The practical examples presented in this section illustrate the innovative ways in which development banks can contribute to these efforts.

The role of development banks in addressing the market gaps in the carbon market is crucial not only for climate change mitigation and biodiversity conservation but also for the broader sustainable development agenda. By crowding in private capital, creating new markets, and focusing on less commercially viable initiatives that yield significant development results, development banks can play a pivotal role in driving sustainable development.

Future research should continue to delve into the role of development banks in the carbon market, particularly within the context of emerging market economies such as Brazil. Further studies could also investigate the potential for development banks to support other innovative climate finance mechanisms, such as climate bonds and green loans. As the challenges of climate change continue to mount, the role of development banks in driving sustainable development will only become more critical. But more than that, development banks should be encouraged to keep pursuing their mission through innovative and sophisticated operations to support the global climate agenda.

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