

CARBON CREDITS AS ALTERNATIVES TO FIGHT AGAINST DEFORESTATION IN COLOMBIA

CRÉDITOS DE CARBONO COMO ALTERNATIVAS PARA COMBATER O DESMATAMENTO NA COLÔMBIA

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Abstract

Deforestation is a process caused by human actions, leading to the destruction and erosion of the regeneration capacity, which results in the loss of species, as well as dire consequences for ecosystems. In this sense, this research analyzes the importance of carbon credits as an alternative to mitigate deforestation in Colombia, since they represent a means to counteract climate change proposed by the Kyoto Protocol, taking into account the high carbon emissions of Greenhouse Gases (GHG). With the use of a descriptive analytical methodology, it was possible to demonstrate that in Colombia projections and strategies have been adopted toward the recovery, maintenance, and management of forests, with social participation of the communities to counteract deforestation in the territories, recognizing the commitment

Resumo

O desmatamento é um processo causado por ações humanas que resulta na destruição e no esgotamento da capacidade de regeneração, levando à perda de espécies, bem como a consequências adversas para os ecossistemas. Nesse sentido, esta pesquisa analisa a importância dos créditos de carbono como uma alternativa para mitigar o desmatamento na Colômbia, pois eles representam um meio de combater as mudanças climáticas em harmonia com o proposto pelo Protocolo de Kyoto, considerando as altas emissões de gases de efeito estufa (GEE). Com o uso de uma metodologia analítica descritiva, foi possível demonstrar que a Colômbia adotou projeções e estratégias voltadas à recuperação, manutenção e gestão de florestas, com a participação social das comunidades para combater o desmatamento nos territórios, reconhecendo o compromisso ambiental dos diferentes atores e visando



environmental by the different actors, aiming to reduce the CO₂ footprint in Colombian ecosystems, the above thanks to the commercialization of carbon credits.

Keywords: climate emergency; environmental crisis; forests; natural resources.

reduzir a emissão de CO₂ nos ecossistemas colombianos, graças à comercialização de créditos de carbono.

Palavras-chave: crise ambiental; emergência climática; florestas; recursos naturais.

Introduction

Currently, uncontrolled business dynamics, massive consumption, undue exploitation of natural resources, and poor implementation of public policies to mitigate polluting effects on ecosystems have been causing a global environmental problem and progressively altering the global climate. In this sense, the environmental crisis refers to the deterioration of natural resources resulting from polluting processes caused by biological and chemical factors, impacting the natural conditions for flora and fauna regeneration. The environmental crisis results from the unconscious connection between humankind and its natural environment.

This fact had repercussions on the inhabitants' quality of life, especially at the social level, affecting health and working conditions in areas with forest impact and soil degradation, as well as population migrations due to anthropogenic pollution. The environmental crisis is multi-causal, but this phenomenon is mainly caused by human actions, generally affecting the atmospheric, water, and soil contexts. This causes a collapse of the natural environment, as it does not have the capacity to respond and adapt to the productive processes of human progress and evolution.

Deforestation, the main topic of this research, is considered a phenomenon that causes the depletion of a forest area, due to both natural and human causes, resulting in the destruction of forests and jungles, in addition to irreversible consequences regarding the water cycle change, greenhouse effect, loss of biodiversity, and economic imbalances resulting from the loss of raw materials and components of forest resources.

Data from 2020 recognize 41 million hectares of forest destruction worldwide, especially in countries such as Brazil, Mexico, Democratic Republic of Congo, Sierra Leone, and Indonesia. It affects massively forests and jungles, with damage to soil quality as part of an ongoing impact on climate change and global warming.

In Colombia, in 2021, 179,798 hectares were deforested, mainly as a result of illegal mining activities, coca cultivation, indiscriminate agricultural and livestock practices, land grabbing, and illicit logging. This activity is particularly prevalent in departments such as Amazonas, Caquetá, Antioquia, Magdalena, Meta, Guaviare, and Putumayo. Therefore, the Colombian government has established a strategy to protect forests against illicit environmental activities, such as deforestation, with policies, legal processes, and criminal investigation to prevent activities that threatens natural environments throughout the national territory.

In this scenario, initiatives such as the acquisition of Environmental or Carbon Credits to neutralize the impact of deforestation in Colombia also stand out; they are international instruments used by States with money contribution to limit the environmental crisis by means of credits issued on the carbon market. Notably, this system offers economic advantages for private companies to improve environmental quality through best practices in production processes. Similar to the implementation of projects in nations with limited resources, but with great forest wealth as an agent for sequestering carbon in the atmosphere, combats global warming.

Nowadays, Colombia has 53.4 million hectares of natural forests and is classified as a forest country, and 51.4% of the continental and island surface is forested. In this sense, it is necessary to take public and private actions to curb activities that threaten forests and natural parks. Another aspect to be considered is Colombian President Gustavo Petro Urrego's proposal to exchange public debt for climate actions, including the issuance of environmental bonds. In view of the above, one presents the following research question: Can Carbon Credits be considered an alternative to correcting deforestation in Colombia?

In this respect, the specific objectives of this research are to present the Colombian environmental crime legal framework for combating the deforestation phenomenon, establish the international history of the implementation of carbon credits, and determine their importance in the deforestation scenario in Colombia.

This is an issue of total relevance on the social, legal and economic scene, thanks to the transcendence of the environment as a good of public interest that must be generated from sustainable and efficient measures, which, in the case of environmental bonds, represents an innovative alternative for the protection of ecosystems and a source of income to contain the climate crisis in the country.

1 Colombian legal framework for environmental crimes to combat the deforestation phenomenon

Environmental crimes correspond to infractions that threaten the development and sustainability of nature as a protected legal asset to which the natural resources necessary for the habitat converge (Salmieri Delgue, 2016). For this purpose, environmental laws aim to protect the environment from damage caused by the indiscriminate use of ecosystems and human practices that cause ecological imbalances, such as deforestation.

Presently, the blatant and definitive damage caused to the environment has been a cause for concern for States, which must incorporate into the legal system rules that offer legal and protective guarantees to the environment (Amirante, 2020). The relationship between Law and the environment is based on a fundamental legal and dogmatic structure to resolve difficult environmental problems arising from accelerated economic development (Scheidel *et al.*, 2020).

Considering the above, at the national level, environmental protection has constitutional support in the 1991 Colombia Constitution, which in its art. 79 affirmed that all people have the right to enjoy a healthy environment, and community intervention in decisions that affect it is guaranteed in this process, with the State's obligation to establish measures to preserve the environmental diversity and integrity, with special attention to the conservation of areas of ecological importance (Colombia, 1991).

In this context, Art. 80 of the Colombia Constitution highlights that the State will plan the administration and benefit of natural resources, in terms of sustainable development, conservation, renewal, or replacement, considering, in these processes necessary for the environment, the imposition of legal sanctions with demands for repair of damage caused to natural resources, as well as the international cooperation to ensure the protection of natural environments located in border areas. Art. 93 of the Colombia Constitution establishes the Colombians' duty to protect natural resources, promoting the preservation of a healthy environment.

Subsequently, Decree No. 1,791 of 1996 dictates the forest harvesting regime, which must be governed by conscious and sustainable forest management, especially in controlled activities to satisfy domestic consumption needs and reasonable use by individuals or legal entities, considering technical and legal licenses issued by the national environmental authority (Colombia, 1996).

In this context, the Ministry of Agriculture and Rural Development, in

Decree No. 1.498 of 2008, creates the policy of forestry crops for commercial purposes, and as protective measures of this provision, it is recognized that forestry systems must be registered by the Ministry of Agriculture and Rural Development, protective forestry plantations will be formalized by the Regional Autonomous Corporations (*Corporaciones Autónomas Regionales* – CAR), and forest crops or agroforestry systems cannot be implemented for commercial purposes in forests, protected forest areas and of special management or any other management, conservation or protection condition that excludes such activity (Colombia, 2008).

Considering the above, Law No. 1,450 of 2011 classifies forest areas, which can be protective and productive, in a competent comprehensive work by the Ministry of the Environment, Housing and Territorial Development, with regard to the use of forest areas in the national territory, with the exception of those protected as forest reserves and national parks, prohibiting all forms of exploitation in these environments, especially mining activities (Colombia, 2011). In the case of licenses for the subtraction of environmental reserve areas, interested parties must comply with offset, restoration, and forest recovery measures, for which indicators of natural forest coverage and deforestation rates will be established, with annual monitoring by the National Government.

Thus, Law No. 1,955 of 2019 from the Congress of the Republic lists deforestation as one of the main socio-environmental problems affecting Colombia (Colombia, 2019). To combat this scourge, it is imperative to establish an environmental agenda that strengthens biodiversity as a country's pillar and that the protection of this natural agent should become an opportunity for economic development and not a source of territorial disputes. To this end, sectoral policies to monitor deforestation must be implemented, complemented in an integrated manner with the National Council to Combat Deforestation (*Consejo Nacional de Lucha Contra la Deforestación* – Conaldef), with strategies to protect national forests.

Regarding the issue of deforestation, Law No. 2,111 of 2021, called Environmental Crimes, promotes measures by the National Government to curb this ecocide; in this sense, the practice of deforestation is typified in the Penal Code, referring to those who, without obtaining authorization from the competent entity or who fail to comply with current regulations, carry out actions of cutting, burning, felling or degrading areas equal to or greater than one continuous or discontinuous hectare of forest, may be sentenced to five to 12 years in prison and a corresponding fine of 134 to 50. 000 legal monthly

minimum wages in force (currently, the legal monthly minimum wage for a worker in Colombia is estimated at US\$ 300) (Colombia, 2021). The penalty will be increased by half when deforestation is carried out for land expropriation, illicit cultivation, illegal mining, illegal infrastructure development, or when more than 30 hectares of forest are affected. Similarly, promoting and financing deforestation is punishable by eight to 15 years in prison and a fine of 300 to 50,000 current monthly minimum wages.

Thus, since the adoption of Law No. 2,111 of 2021, new environmental crimes, such as deforestation, were incorporated into the legal system as an act that threatens natural resources, social well-being, and State security, providing the Public Prosecutor's Office with tools for safeguarding a legally protected asset such as the environment, with warning and criminal punishment of innovative criminal modalities promoted by law enforcement actors.

Accordingly, Environmental Law is empowered as a means of granting justice to the advocates of national natural resources, with a legal structure that has progressively included measures to care for soils, forests, and parks as fundamental elements of national ecosystems, and one of the National Government's priorities is to protect biodiversity by issuing environmental protection regulations, such as those mentioned previously. Natural forests, as a fundamental resource, have to receive special attention from the justice system, particularly in the face of evident issues such as deforestation (García Pachón, 2022), bearing in mind that multiple ecosystem and community services depend on adequate forest management, considering the cultural link with the different territories that make up Colombian geography¹.

2 International background to the implementation of carbon credits to combat the environmental crisis

“Environmental or carbon credits are a means of offsetting carbon dioxide (CO₂) emissions, allowing companies and individuals to mitigate the polluting effects of this gas” (Lauterbach, 2007, p. 12). In this scenario, any individual or legal entity can have access to purchasing carbon offsets; however, acquisition by companies is greater, as it contributes to mitigating the climate change effects by offsetting CO₂ releases derived from the industrial process (Nava Chávez, 2023).

Carbon credits as a mechanism to mitigate the environmental crisis were proposed in the 1997 Kyoto Protocol, representing the removal of one ton of

¹ To better understand what ecosystem services are, refer to Balvanera and Cotler (2007).

CO₂ equivalent from the Earth's atmosphere (¿Qué son los bonos..., 2022). In this sense, one carbon credit can capture or avoid the emission one ton of CO₂ equivalent from/to the atmosphere (Cepal, 2018).

Consequently, to exemplify the results of this environmental process, a bonus from a forest reforestation plan is generated by capturing one ton of CO₂ equivalent, and a bonus from a forest preservation strategy prevents the release of one ton of CO₂ equivalent into the environment (Foumani; Smith-Miles, 2019). Among the advantages offered by the acquisition of environmental is the financial promotion of activities toward mitigating the factors that cause climate change—such as strategies for generating renewable energy—plans to reduce solid waste and restore ecosystems, and initiatives to capture emissions of CO₂—such as forest conservation projects and territorial reforestation actions (Haas; Kempa, 2023).

Considering the above, Figure 1 presents the different projects that issue environmental bonuses:

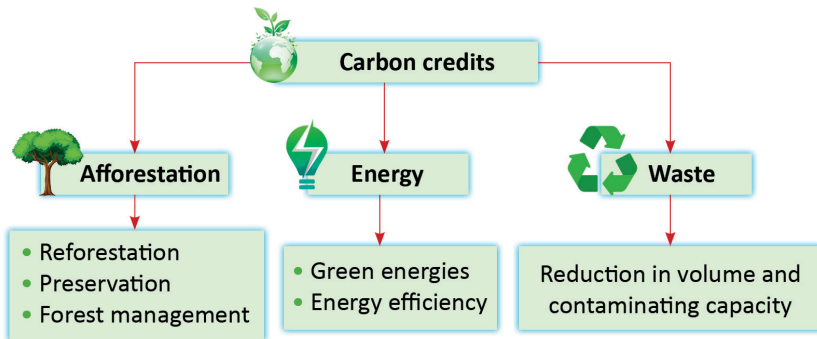


Figure 1. Projects of environmental bonuses
Source: Adapted from ¿Qué son los bonos... (2022).

Among the international experiences regarding the issuance of environmental bonds, it is possible to highlight, in Mexico, the installation of a green energy generator in La Ventosa Park for a multinational beer company, and three wind energy projects in the private sector in Oaxaca, as the Mareña Renovables, which supplies energy to a group of companies belonging to the Femsa group (López-Toache *et al.*, 2017). Also in Mexico, in Toluca, here are projects for the protection and conservation of forest resources with beneficial economic, social, and cultural results conducted through the environmental bonds market; initiatives led by ethnic communities in San Juan Lachao Pueblo Nuevo for forest management,

and activities in the agricultural sector with the capture of methane through the adaptation of biodigesters on farms in Yucatan (Estrada-Chavira, 2022).

In Peru, different environmental actions were gradually developed with the acquisition of carbon credits, specifically to protect soils and forests, such as the project for the conservation of the Alto Mayo Protected Forest, with reforestation processes and a reduction in the deforestation rate to 35% in approximately 290,000 hectares, resulting in a reduction of 2.5 million tons of CO₂ in the intervened area (Ministerio del Ambiente, 2022). In the Peruvian context, projects for the issuance of carbon credits were identified in the Cordillera Azul National Park and the Biocorredor Martín Sagrado as areas of special protection, thanks to an intervention model that concentrates an ecosystem proposal with adaptive procedures for sustainable development that incorporates principles of geographic planning for the care of natural resources, fauna-and-flora protection, and the population's articulation with value chain systems with the support from transnational companies (Loayza Aguilar; Valencia; Valencia, 2023).

In Chile, the commercialization of carbon credits provided environmental protection for 45,000 hectares of the Valdivian Coastal Reserve, preventing around 800 tons of CO₂ from being released into the atmosphere through a process supported by companies such as Natura and Ecology Safari (Huella de carbon..., 2024). The initiative enabled not only the forest preservation, but also the safeguarding of traditional species of Chilean ecosystems, such as the olive tree, via financial certificates, such as carbon credits. Chile was the first country in the region to issue such bonuses (Ministerio del Medio Ambiente, 2020).

In Guatemala, an agreement was established for the acquisition of carbon credits by the World Bank to reduce emissions from deforestation and forest degradation, as an institutional exercise where the responsibility for conserving tropical forests and biodiversity prevails, so that to face the climate change, seeking sustainable land use for the coming decades (León, 2021).

Similarly, in Panama, the Project for the Establishment of Protective Vegetation Cover in the Panama Canal Watershed was promoted with the issuance of carbon credits as an award related to carbon verification linked to agroforestry and reforestation activities in 1,399 hectares of the river basin, with a removal of around 378,566 tons of CO₂ over the next 20 years, impacting soil and water directly, by increasing vegetation in worn areas or regions with no vegetation (ACP, 2023).

In Spain, with regard to the contribution of carbon credits, fundamental measures have been taken to certify carbon capture in the agricultural sector,

through national projects supported by the Carbon Fund for a Sustainable Economy and by private sector companies, such as BBVA and Santander, Repsol, and Telefónica, in areas growing vines, olive trees and citrus trees in the southern regions of Spain (Beltrán Gómez, 2020). In the Spanish scenario, priority was given to forestry, efficiency, and waste management.

Based on the initiatives presented, carbon credits are recognized as mechanisms to meet territorial needs in relation to the CO₂ release, representing an investment opportunity for the business sector, in order to face the environmental crisis that exists worldwide; therefore, with the trading of carbon credits in the international arena, projects were designed for the conservation of natural resources, as well as offsetting for companies that have difficulties in reducing pollution, cutting emissions elsewhere.

3 Importance of carbon credits in Colombia's deforestation scenario

To mitigate the environmental effects of carbon, there was adoption of Law No. 1.819 of 2016, which established a tax related to the carbon content emitted by companies and was considered a necessary environmental provision to encourage compliance with greenhouse gas (GHG) mitigation targets in Colombia (Colombia, 2016). Thus, in the Andean country there is an environmental management alternative that seeks to help companies offset their carbon emissions. In this sense, the carbon credits market operates using the payments-for-benefits method, in which a company responsible for CO₂ emissions hires a company to stimulate the development of an environmental project that reduces pollutant emissions (Huella de carbon..., 2024). In this process, companies calculate the amount of emissions and, based on this operation, specify the number of credits to be offset, as part of a strategy promoted by carbon tax measures and related regulations (López-Toache *et al.*, 2017).

Considering the above, projects have been implemented in Colombia to combat deforestation with the purchase of carbon credits at a corporate level. In this scenario, in 2011, an environmental project was recognized in cocoa producing areas in Tumaco (Nariño); the environmental initiative was approved by the communities with the aim of improving production methods and avoiding the forest felling, providing better management of forest resources and, thus, reducing the high level of deforestation in the territory (Mataix Gómez, 2022).

Around 36,300 hectares of forest were recovered with the REDD+ (Reducing Emissions from Deforestation and Forest Degradation) program, due to the sale

of carbon credits, which recognized efficient means of cocoa cultivation, and promised no more deforestation as part of a collective conservation project. This substantial change that was accompanied by international cooperation, with the creation of a cocoa processing factory in rural Tumaco, promoted by the United States Agency for International Development (USAID).

In 2012, the second forestry project in South America toward generating carbon credits was implemented in the departments of Antioquia and Arauca, which was the fourth in the world (Velásquez, 2013). It was directed specifically at soils affected by deforestation and indiscriminate land use as a result of illegal mining activities, uncontrolled grazing, and agricultural crops (Zeng *et al.*, 2021). The certification process in voluntary carbon markets took place with the intervention of an international company, with carbon, association, and biodiversity standards, which endorses initiatives that improve environmental effects comprehensively. From this model, 128,900 carbon credits were generated, equivalent to 123,100 tons of CO₂ that were stored in forests. For this purpose, one million trees were planted, especially the *choibá* species, as it is a resource that grows more easily in these ecosystems and benefits selectively from valuable resources provided by forests, such as seeds, benefiting forest areas that are constantly threatened by human actions.

In 2013, the Matavén's REDD+ Project sought to protect one million hectares of forest and conserve the habitat of traditional species through the acquisition of carbon credits by companies such as *Primax Colombia*, *Latam*, *Terpel Biomax*, and *Exxon Mobil*, an initiative that was certified internationally by the Verified Carbon Standard (Bermúdez Liévano, 2021). As a result of this project, carbon credits were placed on the market, corresponding to emissions reductions since 2013, avoiding the estimated release of 104.1 million tons of CO₂ over a period of two decades from the start date. Current figures show that 20.7 million tons of CO₂ were avoided from 2013 to 2017.

In 2016, an environmental project was implemented for the conservation of forests of the oak corridor in the eastern Andes Mountain range, between the departments of Santander and Boyacá, with the acquisition of carbon credits, toward sustainable productive actions and sustainable forest management; this is one of the last forest areas that survived indiscriminate deforestation, thus affecting species such as Fagaceae tree and the black, purple, and white oak (Correa, 2014). To this end, with the support from the main Colombian hydrocarbon multinational, 1,500 efficient stoves that reduce CO₂ emissions by three tons per year were built, thus offsetting emissions. The project estimates are

that companies will progressively acquire bonds in the voluntary carbon market to raise US\$90,000 per year, which will be reinvested in new stoves.

In 2022, with the REDD+ *de Protección Pachamama Cumbal* Project, located in the south of the Department of Nariño, an environmental strategy will be created for the conservation of 45,000 hectares of moorlands, forests, and mountains which only exist in tropical countries, and which are considered strategic for their natural and territorial wealth, given the presence of Indigenous reserves (Bermúdez Liévano, 2023). This project was supported by Global Consulting and Assessment Services S.A., a Mexican company, and its Colombian subsidiary, SPV Business S.A.S., via a voluntary carbon market project. In this process, 325,000 carbon credits were acquired mainly by Chevron, a multinational fuel company. Moorlands are essential ecosystems for mitigating the climate emergency, as the surfaces, which are rich in organic matter, retain considerable amounts of carbon and, if the top layer of vegetation is removed, it will be released into the atmosphere. In this sense, moorland carbon credit projects discourage drastic changes in land use, especially harmful practices such as slash-and-burn agriculture and livestock farming.

In 2022, the REDD Huila Project was implemented with the objective of reducing GHG emissions resulting from deforestation, considering in this process the allocation of carbon credits to obtain economic compensation to develop environmental actions for the forest conservation. This initiative was supported by international companies, government entities, community, and international organizations, such as *ONF Andina*, an organization responsible for caring for forests in Latin America (Cormagdalena, 2022).

With the acquisition of carbon credits, the objective was to protect approximately 11,561 hectares of forests in municipalities such as Pitalito, Acevedo Palestina, and San Agustín. For that, advances in the control and evaluation of bond issuance translate into economic incentives for beneficiaries thanks to the generation of carbon credits that contribute to the conservation of forests by farming families.

Subsequently, in mid-2022, the forest recovery and fauna monitoring project was presented with the participation of the Afro-Colombian communities of Bahía Málaga, in the area bordering the Buenaventura port. This strategy encourages the population to develop collective actions to reduce GHG emissions due to deforestation and degradation of the forests around them, receiving an economic incentive for this work, which comes from carbon credits (Hincapié Patiño, 2022). This USAID initiative in the Colombian Pacific was accompanied

by the generation and sale of forest carbon credits to Colombian companies, which by 2022 should amount to around five million carbon credits. Considering the above, the project was very significant for the region, thanks to the forms of inhabitants' self-sustainability and, mainly, to the care for ecosystems that affect the conservation, the community's social well-being and the solidarity economy.

From the above-mentioned initiatives, the importance of environmental bonds in the deforestation scenario in Colombia was identified, considering an efficient use to reduce CO₂ in different regions of the country, with environmental actions and community participation for such purposes, and which included the support from several international and national companies for environmental management with forest recovery and efficient use of soil, "considering carbon credits as an economic instrument that allows companies to express environmental commitments by reducing their carbon emissions" (Gómez Charry, 2017, p. 9; free translation).

Final considerations

Considering the development of the specific objectives of this research, it was possible to verify that, in relation to the Colombian environmental crime legal framework for combating the deforestation phenomenon, the legal system has established legal provisions such as Law No. 99 of 1993, Decree No. 1,791 of 1996, Decree No. 1,498 of 2008, Law No. 1,450 of 2011, Law No. 1,955 of 2019, and Law No. 2,111 of 2021. Besides, Articles 79 and 80 of the Constitution guarantee the development and sustainability of nature as a protected legal asset to which natural resources such as forests and jungles converge, necessary for the habitat of different species, with special attention to environmental phenomena, as the deforestation resulting from accelerated economic development, indiscriminate use of ecosystems, and environmental crimes such as logging and fires that affect development, conservation, and forest renewal.

Regarding the international history of the implementation of carbon credits to combat environmental issues, different environmental projects were identified, promoted by voluntary participation in the carbon credits market by companies from different sectors of the economy in countries such as Mexico, Peru, Panama, Chile, Guatemala, and Spain, and in initiatives that were promoted by the Kyoto Protocol, taking into account the great international concern with the large emissions of CO₂ as GHG, and which, through business participation, responds to environmental goals, mainly associated to corporate social responsibility. In

this sense, experiences of protection and conservation of forest resources, energy efficiency, and reduction in the volume and polluting capacity of waste were established, as issues that seek to be corrected through the acquisition of carbon credits, such as international credits for environmental decontamination and which are reflected in programs, projects, actions, and activities to reduce CO₂ emissions in a process that provides economic, social, and environmental benefits.

Regarding the importance of carbon credits in the deforestation scenario in Colombia, it is concluded that this process has been progressive in the country, showing the participation of multinational companies that have invested in projects in departments such as Antioquia, Boyacá, Huila, Nariño, Santander, and Valle del Cauca. In this context, estimates and strategies were adopted aimed at the forest recovery, maintenance, and management, with the communities' participation to combat deforestation in the territories, recognizing different actors' environmental commitment and aiming to reduce CO₂ emissions in Colombian ecosystems. Sanctioning actions are not enough to tackle a scourge like deforestation. Therefore, preventative measures are necessary, such as encouraging communities to protect their ecosystems in exchange for better living conditions, in harmony with the ecosystem. Thus, in the medium and long term, carbon credits could become a lifeline in the face of the environmental emergency that Colombia is facing, constituting a strategy for avoiding practices that threaten the natural resources, such as forests and parks.

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