

PATHWAYS TO THE FUTURE WE WANT >>

GREEN FINANCING: BRAZILIAN PANORAMA

Erika Pinto, Osvaldo Stella e Paulo Moutinho



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BRAZILIAN PANORAMA

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Presentation

In the last decades, scientific knowledge of environmental issues has improved substantially. Faced with the reality of climate change and the realization that human activity is responsible for this transformation, many countries, international agencies, and corporations have been proposing actions to avoid potentially catastrophic scenarios on a global scale.

Measures developed to both decrease the rate at which the climate has been changing and contribute to the dynamics of sustainable development have been studied and debated as part of initiatives jointly carried out by the Brazilian Center for International Relations (CEBRI) and the Konrad Adenauer Foundation (KAS). This five-year-long partnership entered a new phase in 2013, when we decided to house future initiatives under an umbrella project called “Pathways to ‘The future we want’.”

In 2014, building off of past endeavors, we addressed the debate on green financing by applying economic tools capable of overcoming environmental issues on local, national, regional, and global levels. By analyzing the functioning and application of these tools, we intend to map some strategies that aim to improve environmental management and promote sustainable production and consumption patterns.

In order to do that, CEBRI has conducted a study group on this subject over the course of the year. This group is divided in two branches: an international one and a national one, which focuses on Brazil. This study gave rise to two publications introduced in two roundtable discussions in Rio de Janeiro and São Paulo. In addition to these, a workshop also took place in which we suggested the initiation of a horizontal dialogue between politicians, activists and experts. Our goal is to exchange experiences and expectations around this issue.

In this article, Erika Pinto, Osvaldo Stella, and Paulo Moutinho present some of the main economic instruments and financial incentives set forth by Brazilian law, which are used by governments at the national and sub-national levels as well. The authors highlight the strain put on natural resources by the present economic model and emphasize the need to switch from production cycles that pollute and are obsolete in regards to sustainability to more environmentally conscious alternatives.

We hope the following sections will facilitate the exchange of ideas and strengthen Brazil’s role in the post-2015 environmental agenda.

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Introduction

Global climate change represents the biggest environmental crisis humanity has ever faced. Therefore, it is mandatory that we look for a development model that has the following concerns as its compass: low greenhouse gas (GHG) emissions, preservation of the ecosystem's ecological functions, and, at the same time, economic prosperity and social welfare for an increasing number of people. As stated in the last report of the Intergovernmental Panel on Climate Change (IPCC, 2013, p. 11), atmospheric concentrations of the main GHGs (carbon dioxide, methane, and nitrous oxide) have reached unprecedented levels in the last 800,000 years. CO₂ concentrations alone have increased forty percent (40%) compared to the pre-industrial era (IPCC, 2013, p. 11) due to the burning of fossil fuels (oil, natural gas, and coal) and changes in land use (deforestation and agriculture). As a result, the IPCC estimates that the temperature of the planet in 2100 will be 2°C to 4°C higher than the recorded average prior to the Industrial Revolution. In order to keep global warming under 2°C (i.e., the level past which is considered extremely dangerous for the climate system), GHGs emissions must be reduced quickly and brought down to nearly zero by 2040. Experts regard this as a difficult goal to achieve. There have been attempts to reduce emissions by creating strategies through international agreements under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC). However, these efforts have not been able yet to promote the changes necessary to properly deal with the climate issue that is central to the making of a sustainable model of development.

In addition to the agreements signed by the international community and under the aegis of the UNFCCC, the growing scientific evidence of the escalation of climate change and the demand for more dramatic measures by the global community have been directly and indirectly urging countries to adopt strong domestic initiatives for the mitigation of environmental problems. The same happens in Brazil. From disturbing rates of GHG emissions, the country has now become the global leader in reducing emissions, particularly those related to Amazon deforestation (Nepstad et. al., 2014, p. 1118). This accomplishment is largely, though not entirely, the result of command and control actions against forest degradation, the creation of new protected areas (Soares-Filho et. al., 2010, p. 1082), and, more recently, credit restrictions imposed on potential deforestation agents (Assumpção et. al. 2013, p.30). Nevertheless, the sustainability of these efforts to reduce Amazon deforestation is still uncertain (Nepstad et. al., 2014, p.1121). The tenuous nature of environmental law (what is illegal today might become legal tomorrow), the lack of a clear policy to support small businesses, investment in infrastructure (roads and hydroelectric plants) with no socio-environmental protections, and the strong influence of rural lobby groups in Congress advocating new agricultural enterprises are elements that may affect the future viability of the reduced rates of deforestation achieved so far (Nepstad et. al. 2014, p.1119). Despite the reduction of emissions in the Amazon, Brazil is still far from attaining a consistent rate of development with low GHG emission rates. Evidence of this reality can be found in the rising emission levels in the energy, transport, and agriculture industries. In a way, this is due to the "comfortable position" they were left in by the huge reduction in emissions from deforestation.

In order to avoid a new rise in emissions resulting from deforestation as well as those related to other industries, it is not enough to stop at command and control actions and robust environmental laws. It is vital that these environmental issues also find solutions in the economic realm. Financial mechanisms connected to sustainable activities that reduce GHG emissions can be a powerful way, along with different strategies, to limit environmental degradation and put the country on the right track to development with low GHG emission rates. The main goal of this article is to discuss the role that these mechanisms can play.

Brazilian emission panorama: what should the country reduce and where?

Brazilian emission rates are still considered some of the highest rates in the world. According to data compiled by the World Resources Institute/Climate Analysis Indicator Tool (WRI/CAIT, 2011), in 2005, Brazil ranked fourth in a list of countries with the highest emissions (figure 1). In the same year, 2.26 billion tons of CO₂e (Bt CO₂e) were released into the atmosphere. Only the European Union, China, and the United States presented higher emission levels. In 2011, there was a substantial emission reduction (1.42 Bt CO₂e) due to a dramatic decline in the deforestation of the Amazon rainforest. However, the country still remained among the top ten GHG emitting nations (figure 2). And that is not all: a new emission profile became noticeable .

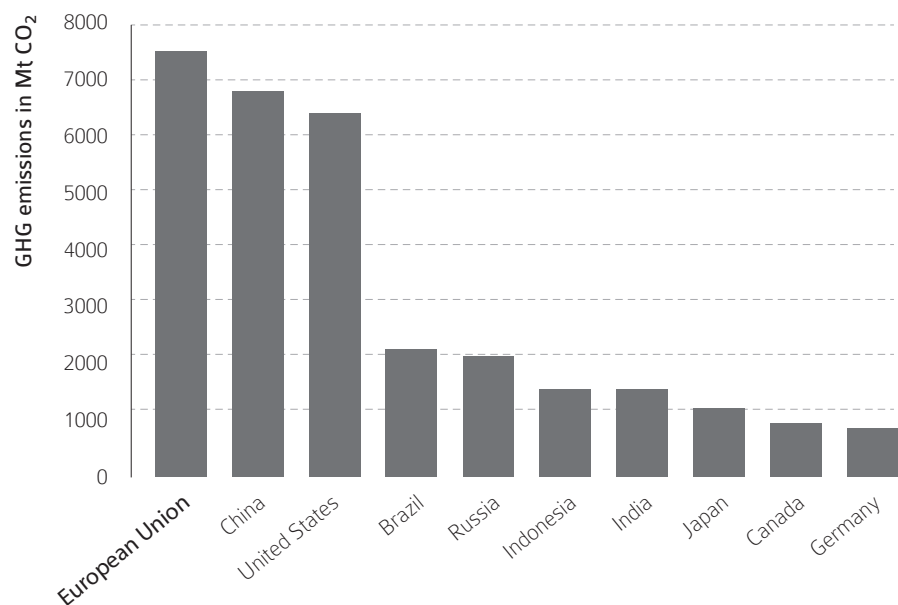


Figure 1. Top GHG emissions in 2005. Source: WRI/CAIT, available on: <http://cait2.wri.org>

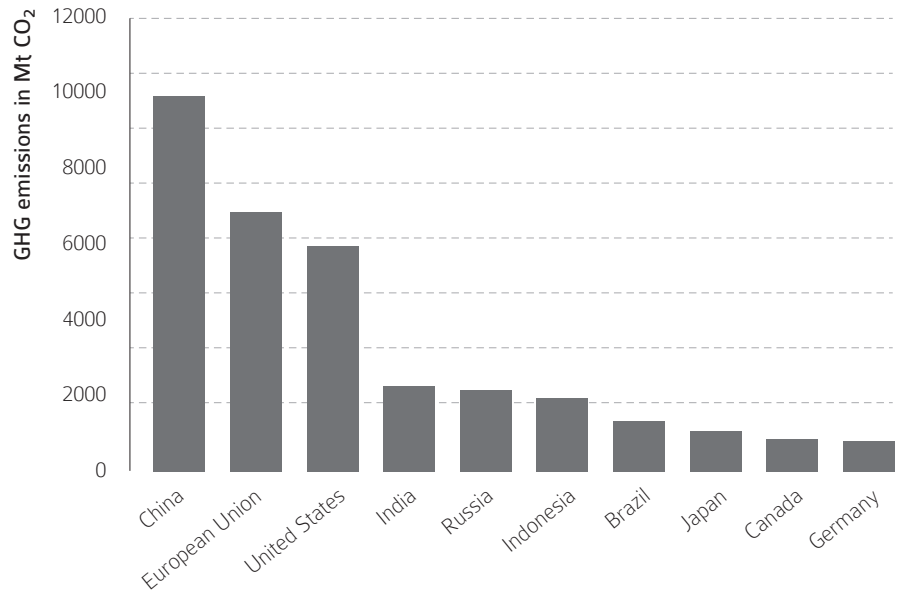


Figure 2. Top GHG emissions in 2011. Source: WRI/CAIT, available on: <http://cait2.wri.org>

Emission reductions from deforestation have dropped 78.2% between 1990 and 2012 (SEEG, 2014). Yet, emissions from other industries have increased greatly (energy, 85.9%, and farming, 31.2%). The current Brazilian emissions profile bears a strong resemblance to the one from developed nations (figure 3).

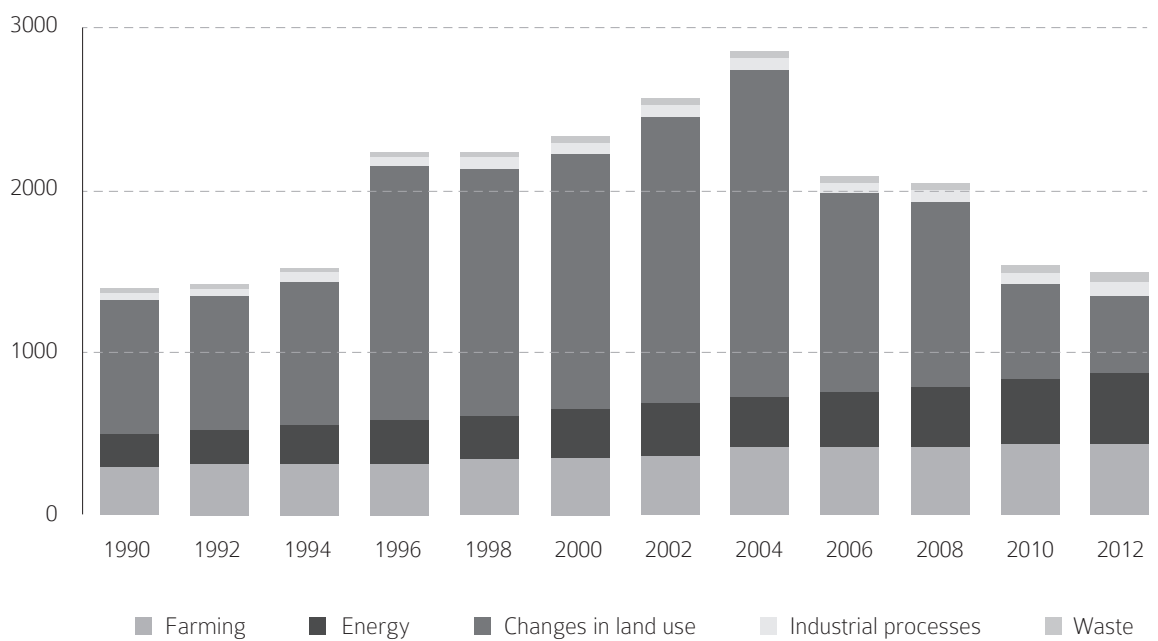


Figure 3. Brazilian CO₂e emissions from 1990 to 2012 by activity (MtCO₂e).

Despite these changes in its emission profile and its continued status as one of the countries with highest emission rates in the world, Brazil has seen great advancement in the past few years towards creating a legal environment that facilitates taking concrete action to mitigate global climate change. The main progress has been the approval of the National Policy on Climate Change – PNMC (Law n° 12.187/2009). For the first time, there was an official policy that defined goals to be achieved in order to reduce GHG emissions.

The PNMC formalized the country's commitment to reduce its GHG emissions between 36.1% and 38.9% of projected emissions by 2020, estimated in 3.236 GtCO₂ (MCTI, 2013). However, if no measures are taken in order to maintain the rates of emissions reduction, this legal progress and the achievement of goals set forth by laws are put at risk. The increasing emissions of the energy, transport, and agriculture industries indicate that there is still no economic scenario to support an attitude change.

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As stated before, even the results from the reductions in deforestation will be put at risk if there are no incentives to maintain them. Contradictions in governmental policies reveal that Brazil is still far from being on the path to low-emission development. In spite of the PNMC and its goals, financial incentives, such as tax benefits, have been allocated to highly carbon-intensive activities. For example, in 2008, the federal government argued that the country was faced with the need to confront the effects of the international financial crisis. While deforestation emission levels were getting lower and lower, Brazil decided to make every effort to spur economic sectors that were regarded as strategically important for economic growth and job creation, even though these sectors had historically been responsible for the highest GHG emissions. This included tax relief to activities deemed important, such as the automotive industry, which had its Brazilian federal excise tax reduced.

On the other hand, the approval of a new Forest Code (Law n° 12.651/12) in 2012 resulted in a 58% reduction of environmental liabilities for rural properties in Brazil (ISA, 2013, p.4). Unfortunately, this unique opportunity to create jobs and revenue in rural areas was not profitably used. Environmental issues, including global climate change, are key elements to consider when it comes to forging a new inclusive and sustainable development model. It is important that they be incorporated into the process of making laws and implementing public policies in Brazil in order to align public and economic interests.

Redirecting tax expenditures towards sustainability: the “CIDE-Carbono” and the tax deductions for the forest sector

The Brazilian tax policies work against sustainable development. A great deal of tax expenditures (tax benefits) are directed towards economic activities that impact the environment and have high GHG emission rates. According to preliminary data drawn from studies conducted by the Amazon Environmental Research Institute (IPAM), in 2013, the cost of federal tax benefits from the period between 2008 and 2012 reached the amount of R\$ 100 billion in the industrial sector, R\$ 45 billion in farming, R\$ 9 billion in the energy sector, and R\$ 11 billion in the transport industry.

For example, between 2004 and 2013, costs incurred in the farming and energy industries increased the most. In spite of representing 59% of Brazil’s GHG emissions (figure 4), these sectors presented average annual rates of 69% and 38% respectively (IPAM, in press).

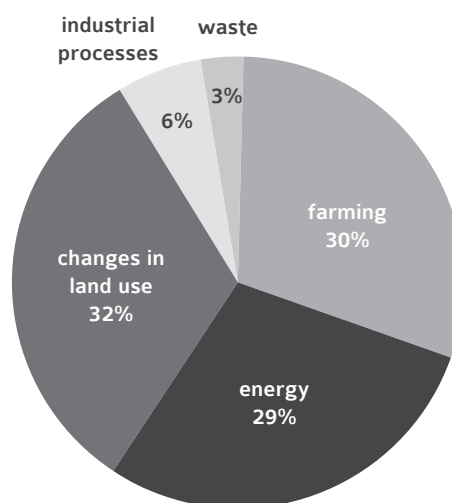


Figure 4. Percentages of Brazilian GHG emissions by different economic sectors – according to data drawn from the Projection System for Greenhouse Gases Emissions (reference year: 2012).

Moreover, Brazilian federal excise tax relief and other tax benefits for the automotive industry reached 18% per year during the same period¹. This only served to further reify a transportation model that is considerably less effective than the public transport system in a number of ways. This measure was created and adopted to deal with the most important sectors of the current economic model. It is only natural that the carbon footprint of the Brazilian tax system becomes more and more significant each day.

Thus, it is necessary to look for a new direction for the Brazilian tax system that takes sustainability into account. The elaboration of tax mechanisms that benefit economic sectors whose practices are more environmental friendly and burden

¹ Analyses were carried out using data made available by Tax Expenditure Statements published by the Department of Federal Revenue of Brazil and by surveys and projection reports of GHG emissions published by the Brazilian Ministry of Science, Technology and Innovation (MCTI, 2013), the Ministry of the Environment (MMA, 2012), Eletrobrás (Eletrobrás, 2003-2013), the National Confederation of Transport (CNT, 2013), and the Energy Research Office (EPE, 2013). Documents published by other public, private and third-sector institutions provided additional information for the study.

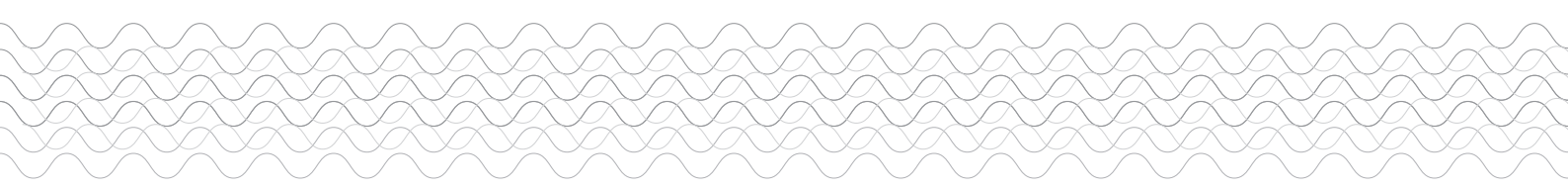
those that deeply affect the environment would produce results that contribute to the creation of a new economic model that is more environmentally sustainable. Among existing initiatives, there is one known as “CIDE-Carbono” (IPAM, in press). CIDE is technically a contribution for intervention in the economic domain, that is, a specific type of tax. Under this concept, it is possible to create proposals that take advantage of the strategy’s extrafiscal nature in order to encourage desirable behaviors. In other words, one can direct economical activity through the charge or relief of such a tax.

“CIDE-Carbono”: levy on fossil fuels

In this specific case, the proposal currently being developed intends to begin by addressing the main GHG emissions activities in Brazil: the livestock industry and the burning of fossil fuels. According to the reference year of 2010, they are responsible for 21.4% and 30.6% of total emissions within the country, respectively (MCTI, 2013). Using the energy industry as an example and considering that its emissions are directly influenced by present tax policy, any taxation proposal on fossil fuels must be charged for all kinds of oil-based products, natural gas, and coal. Therefore, an initial tax rate could be applied to every ton of carbon dioxide equivalent (CO₂e) released by burning fossil fuels and then increase in a progressive manner. The generated revenue could be used to support reforestation activities that absorb the atmospheric CO₂, reducing its environmental impact. In the event that “CIDE-Combustíveis” (CIDE addressing fuels) is already being levied, although at a rate of zero, the amount payable determined by CIDE-Carbono would be deducted from the amount payable in the first tax. At the same time, if the taxed product were not used as fuel and thus did not emit CO₂, the taxpayer would be refunded the collected amount. The total revenue projection resulting from this taxation would be R\$ 1.3 billion (projection for 2013), whereas the impact on product prices passed onto the consumer would be 0.37% per liter of diesel and 0.26% per liter of gasoline (IPAM, in press). This simple tax mechanism could finance the annual planting of millions of trees, create jobs and revenue, and contribute to the preservation of biodiversity, the conservation of water resources, and the mitigation of the greenhouse effect, which is caused mainly by the use of these fuels.

“CIDE-Carbono”: taxation on the late slaughter of cattle

In addition to the taxation on fossil fuels, there could also be another tax on the late slaughter of cattle in Brazil. The livestock industry is responsible for about 61.3% of emissions resulting from farming activities, which released a total of 437 million tons of CO₂e into the atmosphere in 2010. This volume represents 35% of total emissions in Brazil (MCTI, 2013). A large part of these emissions could be reduced if animals were slaughtered at any earlier stage. This would allow for an earlier termination of the emissions arising from enteric fermentation (IPAM, in press). The more deteriorated a pasture is, the longer it takes for the animals to be slaughtered and the higher the GHG emissions produced by their digestive system. Emissions increase in a substantial manner when animals are over 24 months old, going from 23kg to 122kg of CO₂e per head when they reach 48 months (Table 2). Hence, the “CIDE-Carbono” taxation on the late slaughter of cattle would start at a fixed amount per head, increasing according to the animal age, and varying from area to area. The tax



would be levied on slaughterhouses and the revenue collected would also be used to stimulate livestock farmers to improve their pastures. For that, the industry should adopt a simple and efficient tracking system to determine the actual age the animals were when they were killed. With the purpose of adapting the sector for the new taxation, the measure would come into effect between four and five years after the editing of the proposed law (IPAM, in press).

Beyond “CIDE-Carbono”: tax benefits to the forest sector

Today, taxation on the forest sector is over 35%. Tax reduction, along with sustainable, regulated, and certified activities, as well as financial aid for reforestation, could provide great benefits to Brazilian forests. Some of them would be the value added to native products and the deterrent effect on illegal wood trade practices. The relief of the Brazilian federal excise tax on wood products (currently at 5% to 10%) and reductions in the rates of other taxes, such as PIS (Social Integration Program) and Cofins (Social Security Financing Contribution), would lead to a decrease in taxation (IPAM, in press).

The Brazilian Market for Emission Reduction - MBRE

In addition to redirecting tax expenditures towards sustainable activities and using CIDEs to lead high emissions industries to desirable behaviors, other innovative mechanisms may arise from the national and global discussions on the GHG emission trading. In Brazil, a potential trading system may be regulated with the implementation of the Brazilian Market for Emission Reduction (MBRE), set forth on the National Policy on Climate Change (PNMC, Federal Law n° 12.187/2009). The MBRE may also benefit from a new negotiation cycle that will be initiated at the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, pointing towards a mandatory global system of GHG emission reduction starting in 2020. For Brazil, this represents an even stronger need to maintain low GHG emission levels, no matter what the emitting sources are - be they the Amazon and Cerrado deforestation or structural sectors of Brazilian industry. The linking of these sources through the implementation of the MBRE may bring a comparative advantage to Brazil regarding measures to achieve future GHG emission reduction goals.

The creation of the MBRE is bound to a market, which could be conducted in such a way that would incorporate emission reductions from deforestation, combining them with those from other activities. Initially, this market could be operated by commodities exchanges, stock exchanges and over-the-counter markets, with the purpose to negotiate securities that would be representative of certified GHG emissions (Moutinho et. al., 2011 p. 68).

Considering the (voluntary) national GHG emission reduction goals set by the PNMC – a reduction of between 36.1% and 38.9% of projected emissions by 2020 –, the sectors regulated by sector-specific plans (determined in the PNMC) would have to meet emission reduction goals. Depending on the case, this could mean impossible production costs and a loss of their competitive edge, and, consequently, a demand for certified emission reductions related to the reduction of deforestation in Brazil. These certifications could then be provided, up to a point, by the forest sector, once

the deforestation process was reduced (especially in the Amazon). This would allow part of the emission reduction goals set for companies and carbon-intensive activities to be complemented by the certified emissions that were avoided by a reduction of deforestation processes. Transference of these certified reductions could take place by means of annual auctions. In order to deal with the time gap between the creation of forest reduction offers (up to 2020) and the market demand during the same period, particularly since the goals are voluntary, the federal government could give incentives (such as tax relief) to companies that decided to take part in the MBRE. Resources generated by this transaction could be used by an entity appointed by the federal government to finance the implementation of actions related to the REDD+². That amount could be divided in a number of ways. For example, one of them could apply the concept of stock and flow, which would benefit areas and states with high deforestation rates (such as Mato Grosso and Para) that are able to reduce their emissions to a level that is even lower than the reference standard, as well as those regions (such as Amazonas) that still have large preserved forest areas (stock), thus avoiding perverse incentives (MMA, 2012, p.31). The employment of this concept was fundamental to building a political consensus on the topic among the states that contain part of the Amazon rainforest.

There are currently many initiatives for developing the MBRE in Brazil. This discussion is further along in the state of Rio de Janeiro. One of the reasons for that is the active participation of the state government in the form of the Rio de Janeiro Department of Green Economy, and the market in the form of the Green Rio de Janeiro Exchange (BV-Rio). There is also a group comprised of the Acre state government, the Rio de Janeiro state government, BV-Rio, and the Brazilian Development Bank (BNDES) that works together to build the foundations of the MBRE. On the other hand, at the federal level, discussions are scattered amongst several ministries. It is important that the economic sectors understand the MBRE's potential in Brazil's process of transition to a low-carbon economy and its key role in the creation of an effective mechanism to finance the REDD+ up to 2020 and guarantee the long-term sustainability of achieved goals.

² REDD+ is a topic under negotiation in the United Nations Framework Convention on Climate Change that deals with the compensation paid to developing countries related to the results achieved by the forest sector for the mitigation of greenhouse gas emissions by undertaking the following activities in accordance with the decision 1/CP.16 (§70) of the UNFCCC: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (MCTI, 2013).

Financial Instruments related to Brazil's National REDD+ Strategy

The concept of REDD+ concerns the reduction of GHG emissions from deforestation and forest degradation, the conservation of forests, the sustainable management of forests, and the enhancement of forest carbon stocks. Brazil's REDD+ Strategy is an essential to the country's ability to seize opportunities that REDD+ offers (MMA, 2013). Multilateral rules on methodology requirements and the allocation of resources to reward developing countries for the results they achieve were defined by the Warsaw Framework for REDD+ in the scope of the UNFCCC. In light of this, each country presents their results and searches for bilateral partnerships or international financial entities that are willing to provide financial compensation. Thus, Brazil's REDD+ Strategy proposes that fundraising based on results achieved by the country is done in a decentralized way. The estimated potential fundraising for REDD+ in Brazil could exceed R\$ 65 billion by 2020 (MMA, 2013). However, up to this point, less than 10% of the results achieved in the Amazonian biome were compensated by international donations. It is necessary to improve fundraising methods and increase payments in Brazil.

In Brazil's REDD+ Strategy, economic instruments are included in the investment plans that will be conducted in order to implement actions. Brazil's REDD+ Strategy considers the following instruments to be the main financial tools concerning climate change and alterations to forests in the country (MMA, 2013):

- >> **Amazon Fund** – aids non-reimbursable projects for: i) management of public forests and protected areas; ii) environmental control, monitoring and inspection; iii) sustainable management of forests; iv) economic activities resulting from the sustainable use of forests; v) ecological and economic zoning, territorial arrangement and property regularization; vi) preservation and sustainable use of biodiversity; and vii) restoration of deforested areas.
- >> **Climate Fund** – aids non-reimbursable projects for: i) technological development and dissemination; ii) adaptation practices for the sustainable development of the Sertao (the Brazilian outback\backcountry); iii) ecosystem and society adaptation; iv) education, qualification, training, and mobilization; v) monitoring and assessment. The Climate Fund also aids reimbursable projects for: i) fighting desertification; ii) infrastructure; iii) renewable energy; iv) industry; v) sustainable cities and climate change; vi) native forests; and vii) carbon management and services.
- >> **National Environment Fund** – supports actions for: i) management and multiple use of native forests; ii) agro-ecological practices; iii) restoration of modified and degraded areas; and iv) consolidation of the National System of Conservation Units.
- >> **ABC PLAN** – counts with a credit line to support the following programs: i) Restoration of Degraded Pastureland; ii) Integration of Agriculture-Livestock-Forest (iLPF) and Agroforestry Systems (SAFs); iii) Direct Planting System (SPD); iv) Biological Nitrogen Fixation (BNF); v) Planted Forests; vi) Animal Waste Treatment; and vii) Adaptation to Climate Change.

Payments for Environmental Services

The advancement and intensification of the debate, the consideration of the importance of biodiversity conservation and the fight against the massive loss of environmental services and assets related to it have become even more imperative due to the large-scale destruction of natural resources and the impacts that have resulted from changes in land use. As indicated in the Millennium Ecosystem Assessment, social groups that already live in poor conditions, particularly those in rural areas, will be more affected by biodiversity losses, since they depend directly on benefits created by ecosystems (CBD, 2006). Therefore, sectors such as the agricultural industry, one of the main actors responsible for the strain on biodiversity, will have to be reconsidered insofar as they must reduce their expansion, but, at the same time, increase their efficiency, among other measures. These measures will require incentives, such as the creation of valuation systems for environmental services.

Payments for Environmental Services (PES) is the greatest innovative strategy to promote preservation efforts since the Earth Summit 92 (Wunder, 2005). It is characterized by a voluntary transaction in which a specific environmental service or instance of land use that can be guaranteed is purchased by one or more buyers from one or more providers under the condition that the provider assures the service will be rendered (Wunder et. al. 2008). A payment plan for environmental services can be couched in several contexts. According to Eloy et. al. (2013), for example, PES not only compensate farmers for maintaining the standing forest, since this means they had to forgo the use of the area, but also support those who wish to restore deforested areas or adopt low-impact production practices. Payments for Environmental Services can also be seen as an alternative to current flaws in the market, which does not consider positive externalities associated with services provided by ecosystems (Tejeiro & Stanton, 2014).

Sectors such as the agricultural industry, one of the main actors responsible for the strain on biodiversity, will have to be reconsidered insofar as they must reduce their expansion, but, at the same time, increase their efficiency.

It is important to highlight that, until recently, Brazil was responsible for 20% of global emissions related to land use and changes in land use. Between 1970 and 2007, the Amazon rainforest alone lost around 18% of its vegetation (World Bank, 2010). Moreover, according to the World Bank report (2010), the main drivers for deforestation in the Amazon area have been the expansion of agriculture and livestock farming, the construction of new roads, and immigration. Although deforestation rates have been dramatically reduced since their peak of 27,000 km² of deforested area (PPCDAM, 2008 p.11) in 2004, changes in Brazilian environmental law can present serious threats to the conservation of Brazilian biomes and the environmental services related to them. As stated by Alencar et. al. (2013), for example, the modifications in the Forest Code will bring about a 95% reduction of the Legal Protected Areas liability in the settlements of the Amazon biome. This makes it obvious that economic instruments should be created to deal with these setbacks. In order to promote environmental conservation it is not enough to stop at command and control actions.

Subnational Experiences to promote sustainable development in Brazil

For that, it is essential to develop economic incentives for preserving, recovering, and regularizing forests (IPAM, ISA e AMAZON, 2014, p.6). According to Tejeiro and Stanton (2014, p.16), PES is one of the tools of the “economic instruments” concerning management practices that guarantee services provided by the ecosystem will be developed and/or maintained. These are considered strategic services that bring about conditions of economic, social, and environmental welfare and help in the mitigation of and adaptation to global climate change.

In the following sections, we will present some subnational experiences carried out in Brazil related to two of the main economic instruments concerning the promotion of sustainable development in the country: Payments for Environmental Services (PES) and the REDD+ mechanism, which focus on the valuation of forest assets.

The Water Producer Program

The Water Producer Program was developed by the National Water Agency (ANA) with the main purpose of encouraging sustainable practices with payments for environmental services (ANA, 2012, p.11). The program supports the improvement, recovery and protection of water resources in strategic watersheds based on actions carried out in rural areas to reduce erosion and aggradation in order to increase the quality of the water and to make its supply more regular (ANA, 2012, p.4). The concept of environmental services within the program considers the need for human intervention through practices that minimize negative impacts that may affect the maintenance or provision of environmental services.

The PES plan of the Water Producer Program regards the following as potential sources of financial resources that can be used to pay for environmental services and implement actions that may be necessary to the plan’s execution: the general federal, state, and city budgets, state funds for the environment and water resources, the National Environment Fund, banks, international agencies, non-governmental organizations, foundations, public and private companies, watershed committees, Clean Development Mechanism, and others. The amount of the payments for environmental services is determined according to economic studies specific to the project’s field and is based on the most common farming activity in the area. In the Water Producer Program, the valuation of environmental services is based on a Reference Value (RV), that is, the opportunity cost of the use of one hectare (10,000 m²) of the area contained in the project stated in R\$/hectare/year (ANA, 2012, p.21).

It is the ANA’s responsibility to install hydrological monitoring equipment to evaluate the program’s performance, suggest appropriate standards, indicators, and goals to the project, and assess the program’s results. The proponent of the project supported by the ANA must monitor the enforcement of the terms established in the recipients’ contracts related to PES and demonstrate that the criteria for introducing the program are met and that its goals are being fulfilled (so that PES installments can be allocated). One of the indicators of project performance is the engagement level of farmers in adopting low-impact practices on their properties. Data drawn from it are of the utmost importance in evaluating created benefits and, thus, help make any adjustments that may seem necessary to improve the program.

The “Bolsa Floresta” Program (Amazonas)

The “Bolsa Floresta” Program came from a public policy developed by the Amazonas state government. The program came into effect in September 2007 and has since been implemented by the NGO Sustainable Amazonas Foundation (Fundação Amazonas Sustentável) (Viana, et. al., 2012 p.203). The “Bolsa Floresta” Program benefits traditional communities that live in Conservation Units in the state of Amazonas, encouraging the conservation of natural resources by preserving forests (IMAZON, 2012, p.33). In these areas, totaling nearly 10 million hectares, it aids more than 35,000 people (Viana, et. al., 2012 p.202). The program emphasizes environmental services related to the conservation of natural resources by preserving forests (IMAZON, 2012, p.34). It is divided in four different components (Viana, et. al., 2012 p.203): i. “Bolsa Floresta Renda” (incentives to sustainable production); ii. “Bolsa Floresta Social” (investments in education, health, transportation, and communication); iii. “Bolsa Floresta Associação” (enhancement of the association and social control of the program); and iv. “Bolsa Floresta Familiar” (involvement of families to reduce deforestation). The Sustainable Amazonas Foundation was created with the purpose of fundraising and managing the program’s resources as well as handling the endowment fund income that made it possible. Initially it received a R\$ 20 million donation from the Amazonas state government and an additional R\$ 20 million donated by Bradesco Bank. In 2009, it received another R\$ 20 million donation from Coca-Cola Brazil (IMAZON, 2012, p. 34).

According to May et al (2011, p.52), areas supported by the “Bolsa Floresta” program still do not experience a strong pressure to change their forestland. That is why payments offered to families must be seen as rewards to those who have had a historical role in forest conservation. In this program, the inspection and monitoring process of carbon stocks from forestland and biodiversity in public forests and state Conservation Units is carried out by the Monitoring Deforestation in Conservation Units in the State of Amazonas Program (IMAZON, 2012, p. 35).

State System of Incentives for Environmental Services (SISA)

The Incentives System for Environmental Services (SISA) in the state of Acre deals with a set of principles, guidelines, institutions, and instruments that can provide economic appreciation for environmental preservation by way of incentives to ecosystem services. The program is known as one of the first jurisdictional REDD public policies and is considered to be the most advanced in the world (WWF-Brazil, 2013, p.6). The SISA’s legal makeup was established by Law 2.308/2010, which includes principles and an institutional structure that allow the state of Acre to forge relationships with emerging environmental services markets (Alencar et. al., 2012, p.11).

The system requires a joint effort from the Environment State Department, the Forest Department of the State of Acre, Brazilian and international institutions, and several sectors of society represented by the State Councils of the areas, among other partners. The SISA consists of seven programs: i) environmental services incentives – carbon; ii) conservation of social and biological biodiversity; iii) conservation of water and water resources; iv) conservation of natural scenic beauty; v) climate regulation; vi) strengthening of traditional ecosystem knowledge; and vii) conservation and

improvement of the soil (IMAZON, 2012). The Incentives for Environmental Services Program – Carbon (also known as “ISA Carbono”) is the only program that refers to activity-inspection systems that monitor forestlands in order to ascertain reduction of CO2 emissions from deforestation and forest degradation compared to a baseline (IMAZON, 2012, p.42).

It is also required that these emissions be reported to competent authorities at the national and international level. The Institute for Climate Change (ICM) is responsible for monitoring ISA Carbono’s activities. The institute must provide carbon registration and oversee transactions and computation of emission reduction credits with the support of the Central Unit for Geoprocessing and Remote Sensing (Alencar et. al., 2012, p.11).

The following entities and elements are SISA’s financial and economic instruments, as well as those that may be created by future rules: the State Forest Fund; the Special Environment Fund; economic, tax, administrative and credit incentives provided to SISA’s recipients and proponents; national public funds, donations from national and international private and public entities; budget resources; and others.

Sustainable Settlements in the Amazon Project – PAS (Para)

The Sustainable Settlements in the Amazon Project (PAS) has been developed since 2012 by IPAM together with the Live, Produce, Preserve Foundation (FVPP) and the National Institute for Colonization and Agrarian Reform (INCRA) and has been supported by the Amazon Fund. The project benefits families of small farmers from three settlements in western Pará and 350 families living near the Transamazonica highway area of influence. These 350 families are distributed throughout thirteen community groups that were involved in the implementation of “Proambiente” in the past. “Proambiente” was a socio-environmental development program for family agricultural production in the Amazon that was adopted by the federal government in 2004 but was not effectively consolidated.

In the Sustainable Settlements in the Amazon Project, 350 families residing in the Transamazonica highway area receive, like the others, assistance in conducting environmental adequacy of their properties, getting technical help, and adopting low-impact production practices, in order to enhance local production chains and community forest management, among other services. Moreover, within this support strategy, these families also benefit from a system of Payments for Environmental Services. In this context, PES should be seen as a system of incentives to compensate farmers for their efforts in adopting low-impact production alternatives. However, when these alternatives start to generate economic earnings, the proportion of the PES contribution for the family income gradually decreases.

The System of Payments for Environmental Services of the Sustainable Settlements in the Amazon Project sets the following criteria for the valuation of environmental services provided and/or maintained by the recipients: i. conservation and/or restoration of Permanent Preservation Areas; ii. conservation and/or restoration of forestland; and iii. adoption of improved production practices. There is a limited amount totaling roughly R\$ 1,600 per year to be distributed to each recipient family. IPAM is responsible for monitoring the project, which involves: i. examining changes

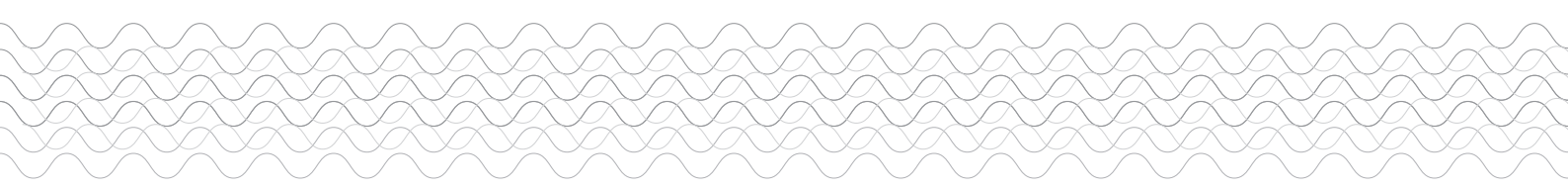
in forestland and soil use according to satellite images; ii. applying performance indicators; and iii. conducting participatory evaluations to check if commitments determined in Community Agreements are being fulfilled.

Conclusion

The prevailing economic model based on production and consumption growth has put an unprecedented strain on natural resources. This model, advanced since the Industrial Revolution and related to the heavy use of natural resources, has brought on yet another problem: the exhaustion of the planet's natural systems' ability to recycle waste resulting from the growing consumption of those resources. An example of this process is global climate change. The soaring use of fossil fuels and the conversion of forests into agricultural lands has increased GHG concentrations in the atmosphere, mainly CO₂, which has intensified the greenhouse effect and global warming. We are taking carbon from underground and releasing it into the atmosphere by burning fossil fuels. In this case, the natural process of reversal would take millions of years, i.e., the time needed for natural cycles to turn the CO₂ released into the atmosphere into fossil fuels again, such as oil, natural gas and coal. In this context, forests also have a very important role, since they are great carbon sinks and provide a series of environmental services. Restoring degraded forest areas withdraws carbon from the atmosphere and restores most environmental services provided by them, such as conservation of the soil, adjustment of local climate, and preservation of water resources, among many others.

Since the Industrial Revolution, at the end of the 18th century, the present economic model has grown even stronger. It reinforces an economic reality that is mainly measured by the growth of a country's gross domestic product, which is formed by the results obtained by different production sectors. In general, the basis of the main production sectors is the transformation of natural resources into consumer goods. The production chain of these consumer goods demands the use of many natural resources. Some of these final goods also require natural resources in order to be used (such as vehicles and electronic devices). After certain amount of time, they turn into waste. Therefore, in order for this economic model to be sustainable in the long run, the Earth would have to provide infinite sources of natural resources as well as infinite waste disposal sites. Both of these are impossibilities. It is physically impracticable to maintain this economic model for a longer period, especially in a context of social inequality.

It is thus mandatory to develop and improve this economic model. One way of contributing to this process is by identifying mechanisms and actions that allow value to be produced and added to the less intense activities related to the use of natural resources and waste production. Developing proposals to redirect fiscal and tax policies is a key element in this equation. It is necessary to burden production cycles that do not comply with sustainable practices and unburden those that can add to the economy with lower environmental impact. This approach can be implemented in a short period of time and help the economic system in its transition to a new development model.



At the same time, we must consider the need to strengthen economic instruments that are able to reverse the historical patterns of land use that have been leading to a massive loss of biodiversity and environmental services provided by ecosystems. These instruments must be designed in such a way that it is viable to implement them according to the required level and urgency. In spite of the ongoing efforts to execute subnational initiatives that aim to promote the valuation of environmental services, the federal government has yet to consolidate the definition of a legal framework to enforce a National Policy for Payments for Environmental Services. Bill 792, from 2007, establishes the National Policy for Payments for Environmental Services, the Federal Program for Payments for Environmental Services, the Federal Fund for Payments for Environmental Services, and the National Register of Payments for Environmental Services. Notwithstanding its long processing period, the proposal has passed in three House of Representatives Committees: the Agriculture, Livestock, Supply and Rural Development Committee; the Environment and Sustainable Development

It is necessary to burden production cycles that do not comply with sustainable practices and unburden those that can add to the economy with lower environmental impact.

Committee; and the Tax and Finance Committee. For this proceeding to be concluded and subsequently referred to the Senate, the bill must also be passed in the Justice Committee. One of its guidelines is the use of payments for environmental services as instruments to foment social, environmental, economic, and cultural development of traditional populations, indigenous people, and family farmers. Promoting a sustainable and environmentally healthy economy in the Amazon and other biomes is a challenge that demands valuation mechanisms for the standing forest that can reconcile socioeconomic progress with the conservation of its natural resources.

Key Elements

1. Global climate change represents the biggest environmental crisis humanity has ever faced. Therefore, it is mandatory that we look for a development model that has the following concerns as its compass: low greenhouse gas (GHG) emissions, preservation of the ecosystem's ecological functions, and, at the same time, economic prosperity and social welfare to an increasing number of people.
2. Emission reduction from deforestation has dropped 78.2% between 1990 and 2012. Yet, emissions from other industries have increased greatly (energy – 85.9% – and farming – 31.2%). The current Brazilian emission profile bears a strong resemblance to the one from developed nations. The increasing emissions of these sectors indicate that there is still no economic scenario to support an attitude change.
3. Despite being among the countries with highest emission rates in the world and changing its emission profile, Brazil has seen great advancement in the last few years towards creating a legal scope that enables agents to take concrete actions for mitigating global climate change. The main progress has been the approval of the National Policy on Climate Change – PNMC (Law n° 12.187/2009). For the first time, there was an official policy defining goals to be achieved to reduce GHGs emissions.
4. The Brazilian tax policies work against sustainable development. A great deal of tax expenditures (tax benefits) are directed towards economic activities that affect the environment and have high GHG emission rates.
5. As indicated in the Millennium Ecosystem Assessment, social groups that already live in poor conditions, particularly those in rural areas, will be more affected by biodiversity losses, since they depend directly on benefits created by ecosystems.
6. Brazil's admission to a permission market is under negotiation. The creation of the Brazilian Market for Emission Reduction (MBRE), set forth at the National Policy on Climate Change (PNMC, Federal Law n° 12.187/2009), is connected to the market, which could be conducted in a way that would combine emission reductions resulting from deforestation with those from other activities.
7. The Incentives System for Environmental Services (SISA) in the state of Acre deals with a set of principles, guidelines, institutions, and instruments that can provide economic support for environmental preservation by means of incentives to ecosystem services. The program is known as one of the first jurisdictional REDD public policies and is considered to be the most advanced one in the world.



Recommendations

1. It is necessary to burden production cycles that do not comply with sustainable practices and unburden those that can add to the economy with lower environmental impact.
2. Mechanisms such as “CIDE-Carbono” can be interesting tax-based responses. CIDE-Carbono is an attempt to address the main GHG emissions activities in Brazil: the livestock industry and fossil fuel burning. According to the reference year of 2010, they are responsible for 21.4% and 30.6% of total emissions within the country, respectively.
3. Brazil’s National REDD + Strategy is an essential element for the country to seize opportunities that REDD+ offers. Multilateral rules on methodology requirements and the allocation of resources to reward developing countries for achieved results were defined by the Warsaw Framework for REDD+ under the auspices of the UNFCCC.
4. The present economic model reinforces an economic reality that is mainly measured by the growth of a country’s gross domestic product. However, the production chain of consumer goods produced by industries and commercialized within and among countries demands the use of many natural resources. Some of these final goods also require natural resources in order to be used (such as vehicles and electronic devices). Thus, it is important to reconsider production and consumption patterns to promote global sustainability.

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PATHWAYS TO THE FUTURE WE WANT >>

The Project “Pathways to the Future We Want” represents the continuance of efforts promoted by CEBRI with the intention to improve knowledge of the international agenda for sustainable development. The main objective of this initiative is to contribute for the public debate, seeking to provide innovative ideas that help implementing the decisions settled by countries in multilateral agreements.

The brazilian experience related to the employment of economic instruments and financial incentives that can strengthen sustainable development constitutes the main topic of this article.

