

**A Roadmap for Monitoring
Brazilian Actions and
Greenhouse Gas
Emissions Reduction**

Under the supervision of the Ministry of Environment

Center for Strategic Studies and Management
Science, Technology and Innovation

President

Mariano Francisco Laplane

Executive Diretor

Marcio de Miranda Santos

Board of Diretores

Antonio Carlos Filgueira Galvão

Fernando Cosme Rizzo Assunção

Gerson Gomes

Graphic Design / *CGEE Graphic Design Staff*

Centro de Gestão e Estudos Estratégicos (CGEE)

SCS Qd. 9, Torre C, 4º andar

Ed. Parque Cidade Corporate

70308-200 Brasília-DF Brasil

Tel.: +55(61) 3424-9600

FAX: +55(61) 3424-9659

www.cgEE.org.br



A Roadmap for Monitoring Brazilian Actions and Greenhouse Gas Emissions Reduction

SUPERVISION

Antonio Carlos Filgueira Galvão

CONSULTANT

Marcelo Theoto Rocha

CGEE TECHNICAL TEAM

Marcelo Poppe (coordinator)

Marcio Pontual

SUMMARY

- Presentation
- Legal context
- The Modular System for Monitoring Actions and GHG Emissions Reduction (SMMARE)
 - Introduction
 - The Monitoring System
 - The Electronic Platform
 - An Example of a Monitoring Module
- Potential future use: the relation to the ICA

PRESENTATION

The objective of this text is to present the roadmap that is being followed for monitoring Brazilian mitigation actions and reduction of greenhouse gas (GHG) emissions, to fulfill the request of the Brazilian Ministry of Environment (MMA). In the domestic context, this process focuses in assisting the follow up of the national voluntary commitment established by the National Climate Change Law¹. However, its potential use in relation to the International Consultation Analysis (ICA) is also being considered, without prejudging any impact on the negotiation results.

LEGAL CONTEXT

In December 2009, Brazil passed a National Climate Change Law with actions that will lead to an expected reduction of 36.1% to 38.9% regarding the projected GHG emissions by 2020.

The Law also established mitigation and adaptation plans to support the national voluntary commitment referred above. Moreover, the Law prescribes the use of Clean Development Mechanism (CDM) and Nationally Appropriate Mitigation Actions (NAMAs)².

In December 2010, a decree³ established that the GHG projected emissions for 2020 would be of 3,236 million tons of CO₂eq; and, to fulfil the Brazilian national voluntary commitment it would be necessary to promote a GHG emissions

¹ Law 12,187 of December 29th 2009. Available at: http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2009/Lei/L12187.htm (in Portuguese).

² For the initial list of Brazilian NAMAs please visit: http://unfccc.int/files/meetings/cop_15/copenhagen_accord/application/pdf/brazilphaccord_app2.pdf.

³ Decree 7,390 of December 9th 2010. Available at: http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2010/Decreto/D7390.htm (in Portuguese).

reduction between 1,168 and 1,259 million tons of CO₂eq by 2020. To achieve the national voluntary commitment, the following mitigation plans, which will be under the responsibility of different governmental ministries, were established:

MITIGATION PLANS ⁴	ACTIONS INFORMED TO PARTIES TO THE UNFCCC AFTER COP 15
Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) – Ministry of Environment	80% reduction in annual deforestation rates in the Amazon in comparison to the average of 1996-2005
Action Plan for the Prevention and Control of Deforestation in the Cerrado (PPCerrado) – Ministry of Environment	40% reduction in annual deforestation rates in the <i>Cerrado</i> biome in comparison to the average of 1999-2008
Decennial Energy Plan (PDE) – Ministry of Mines and Energy	Supply expansion of hydroelectric and alternative renewable sources, especially wind power, small hydro and bio-electricity, biofuels, and increase in energy efficiency
Low Carbon Agriculture Plan (ABC Plan) – Ministry of Agriculture, Livestock and Food Supply; and Ministry of Agrarian Development	Recovery of 15 million hectares of degraded pastures; Expansion of integrated crop-livestock-forest systems in 4 million hectares; Expansion of direct seeding practice in 8 million hectares; Expansion of biological nitrogen fixation in 5.5 million hectares of farmland, replacing the use of nitrogen fertilizers; Expansion of plantation forests in 3 million hectares; Expansion of technologies for treating 4.4 million m ³ of animal waste.
Steel Mill Plan – Ministry of Development, Industry, and Foreign Trade	Increase in the use of charcoal in iron and steel production originated from planted forests, and improve the efficiency of the carbonization process

⁴ Article 3 and paragraph 1 of Article 6 (Decree 7.390).

ADDITIONAL MITIGATION PLANS ⁵	ADDITIONAL DOMESTIC ACTIONS UNDER THE NATIONAL CLIMATE CHANGE LAW
Industry Plan (Aluminum, Lime, Cement, Iron and Steel, Chemical, Pulp and Paper, and Glass) – Ministry of Development, Industry, and Foreign Trade	5% reduction regarding the projected GHG emissions by 2020 Gradual establishment of a MRV system
Low Carbon Mining Plan – Ministry of Mines and Energy	Energy source shift Use of new technologies
Transportation and Urban Mobility Plan – Ministry of Transport; and Ministry of Cities	Cargo modal shift Growth of public transportation systems

THE MODULAR SYSTEM FOR MONITORING ACTIONS AND GHG EMISSIONS REDUCTION (SMMARE)

Introduction

The Brazilian government is developing and implementing a modular system to monitor actions and, to the extent possible, their GHG emissions reduction achieved through the several actions of the Mitigation Plans called “SMMARE”⁶. This system also has the purpose of helping the analysis and management of the mitigation actions.

A first step to establish the Brazilian monitoring system for GHG emissions reduction was to understand the difference between it and the national GHG inventory, as well as the biennial update reporting (BUR).

⁵ Paragraph 2, Article 6 (Decree 7,390).

⁶ In Portuguese: “Sistema Modular de Monitoramento e Acompanhamento das Reduções das Emissões de Gases de Efeito Estufa (GEE) – SMMARE”.

NATIONAL INVENTORY AND BUR	SMMARE
<p>Legal background: Part of the Brazilian reporting requirements under Article 4, paragraph 1(a), and Article 12 of the Convention. Based on the Decision 17/CP.8 and Decision 2/CP.17, paragraphs 39-42 and annex III of decision 2/CP.17.</p> <p>Methodological background: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories; Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories; Good Practice Guidance for Land Use, Land-Use Change and Forestry; 2006 IPCC Guidelines for National Greenhouse Gas Inventories</p> <p>Current status: Up to now Brazil has presented its Second National Communication, including the national GHG inventory for 1990-2005⁷ and it is in the process of developing its first BUR⁸</p> <p>Sectors: Energy; Energy; Industrial Process; Agriculture; Land Use, Land Use Change and Forestry; and Waste Therefore, the national GHG inventory and the BUR are documents officially presented by Brazil to the UNFCCC as part of its reporting obligations under the UNFCCC</p>	<p>Legal background: National Climate Change Law (of December 2009) and Decree 7,390 (of December 2010) The Decree does not specify the “methodologies and appropriate mechanisms to assess compliance”; but stipulate that each mitigation plan should have “indicators for the monitoring and evaluation of its effectiveness”</p> <p>Methodological background: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories; Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories; Good Practice Guidance for Land Use, Land-Use Change and Forestry; 2006 IPCC Guidelines for National Greenhouse Gas Inventories</p> <p>Current status: under development and implementation</p> <p>Sectors: each monitoring module will cover a specific Mitigation Plan Therefore, the SMMARE will be an official system based on international standards to assess and manage the results of the Mitigation Plans and its achievement under the Brazilian National Climate Change Law</p>

From the table above it can be concluded that there are no substantive divergences between the National Inventory/BURs and the SMMARE; each one will serve a specific purpose and will be complementary to the other. The National Inventory alone cannot serve as a monitoring system due to the way it is elaborated (time and costs involved) and its disaggregation level would not allow to assess the specific impacts of the actions from the Mitigation Plans in the individual emissions level of specific segments and/or agents.

⁷ For Brazil's Second National Communication visit: <http://www.mct.gov.br/index.php/content/view/326984.html>.

⁸ For the initial GHG estimates (in Portuguese) visit: <http://www.mct.gov.br/index.php/content/view/347281.html>.

The Monitoring System

A group of experts from each sector, with wide experience on national GHG inventory planning, implementation and review, was invited to develop the Monitoring Modules (i.e. the procedures and methodologies necessary for monitoring the GHG emissions reduction achieved through the several actions of the Mitigation Plans). The coordination of such development was conducted by the Center for Strategic Studies and Management (CGEE – a non-profit organization with the mission of rendering Science, Technology and Innovation as Brazil's best allies for economic growth, competitiveness and well-being)⁹ under the supervision of the Ministry of Environment. The system was conceived during a one year process and extensive and continuous dialogue with all the Ministries responsible for each Mitigation Plan.

The SMMARE is being implemented based on 2 scenarios:

- **Possible scenario:** in which, based on the existing data and/or data that can be easily obtained, the monitoring of GHG emissions reduction could be done in the short-term at the national level;
- **Ideal scenario:** in which it would be necessary to improve the data collection in order to make the GHG emissions reduction monitoring in a more disaggregated level (e.g. emissions reduction at the territorial-unit level, due to decrease in deforestation; emissions reduction at the plant level due to implementation of a specific technology; etc.).

Since the Mitigation Plans are in different stages of implementation and are substantially different in terms of mitigation actions, each Mitigation Plan will have a "Monitoring Module" in the SMMARE that will be implemented in different points of time. All Modules are based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories¹⁰, and each module will consist of:

⁹ To know more about the CGEE visit: http://www.cgee.org.br/sobre/cgee_english.php.

¹⁰ In particular, Volume 1 (General Guidance and Reporting), chapters 2 (Approaches to Data Collection); 3 (Uncertainties); 4 (Methodological Choice and Identification of Key Categories); 5 (Time Series Consistency); and 6 (Quality Assurance /Quality Control and Verification).

- List of mitigation actions assessed (including their degree of implementation);
- Methodological assumptions;
- Results per mitigation action – "Indicators" (disaggregated at the appropriate level, and to the extent possible, according to the scenario in which the monitoring takes place);
- Quality Assurance and Quality Control procedures.

Several institutions are being invited to participate in the SMMARE design and implementation. The table below is an indicative line-up of such institutions, and the final list will depend on the results of on-going negotiations:

MITIGATION PLAN/MODULE	INDICATIVE INSTITUTION
PPCDAm	National Institute for Space Research (INPE)
PPCerrado	INPE and/or Brazilian Institute of Environment and Renewable Natural Resources (IBAMA)
ABC	Brazilian Company for Agricultural Research (EMBRAPA)
PDE 2020	Energy Research Company (EPE) National Agency of Petroleum, Natural Gas and Biofuels (ANP) Brazilian Electricity Regulatory Agency (ANEEL)
Industry	Technical Commission of the Industry Plan (CTPIn)

It is worth mentioning that all these institutions have the necessary technology and human capital to implement the Monitoring Modules, under the supervision of correspondent Ministry responsible for the Mitigation Plan (please refer to example in 3.4).

As results of the development and implementation of the SMMARE it is possible to say that:

- 1 The participation of technical experts, with wide experience in national GHG inventory planning, implementation and review in the development phase is vital to achieve methodological robustness;

- 2 Each Mitigation Plan should have a Monitoring Module, able to assess the GHG emissions reduction achieved through the actions implemented by each Plan;
- 3 The on-going dialogue with the Ministries responsible for each Mitigation Plan will provide the necessary political and operational guidance for each Monitoring Module;
- 4 The use of "external" institutions, with the necessary technology and human capital, will produce the key Indicators for each Monitoring Module in a cost-effective manner;
- 5 A software platform connecting all Monitoring Modules, will ensure transparency and cost effectiveness of the system;
- 6 A general coordination is necessary to promote synergies and avoid the duplication of efforts.

The Electronic Platform

The SMMARE is planned to be supported by a software platform that will be responsible for ensuring transparency and cost effectiveness to the system. Each Monitoring Module - directly related to a specific Mitigation Plan - will have its own software application with features to gather the data and to calculate the indicators of the GHG emissions reduction required to assess the goals established in the Mitigation Plan.

All Monitoring Modules are expected to share information through standardized interfaces, in order to provide centralized coordination and supervision of the efforts undertaken by the country.

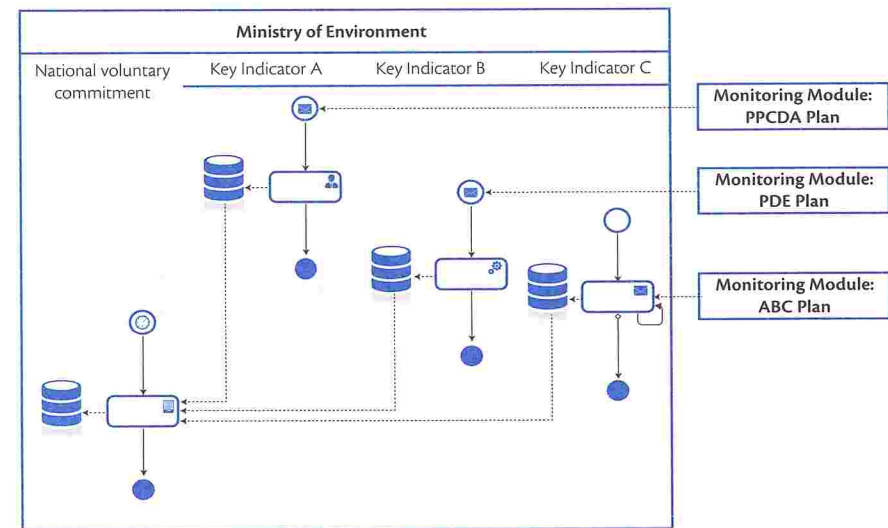


Figure 1: SMMARE software platform

Source: CGEE, 2013.

An Example of a Monitoring Module

One of the Mitigation Plans that have been implemented and is obtaining good results is the Action Plan for Protection and Control of Deforestation in the Amazon (PPCDAm), under the responsibility of the Ministry of Environment. Since its implementation in 2004, deforestation rates in the Amazon region have been decreasing (a 84% reduction in comparison with 2004), despite an increase of more than 300% in the GDP (Figure 2).

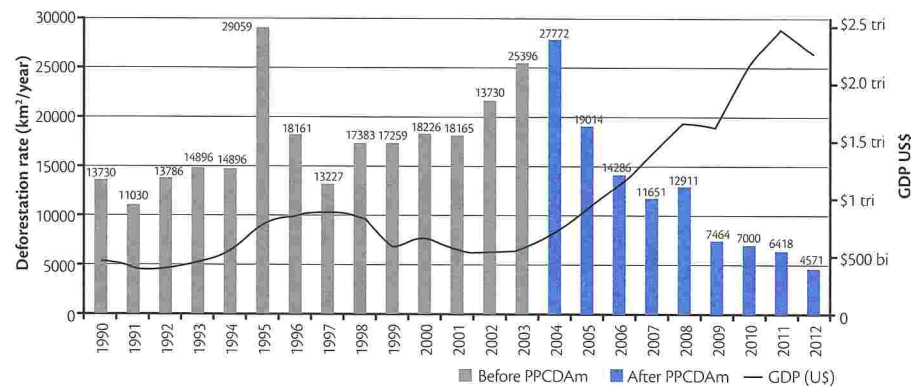


Figure 2: Deforestation rates in the Amazon Region and the Brazilian GDP

Source: MMA, 2013.

With the aim of monitoring the GHG emissions reduction associated with the actions implemented by the PPCDAm, a specific monitoring module of the SMMARE is being developed based on a generic spatially explicit modelling framework to estimate carbon emissions from deforestation (INPE-EM)¹¹. An indicator for monitoring the GHG emissions reduction achieved by PPCDAm will be the reduction of tons of CO₂ per hectare in deforested areas, obtained as described in Figure 3.

The INPE will be responsible for producing the Indicator, under the supervision of the Ministry of Environment, for each geographic area in which a specific PPCDAm action was implemented (e.g. the establishment of protected areas, and/or inspection campaigns).

Once the indicator is produced, the Ministry of Environment can compare the Indicator before and after the action's implementation and assess the effectiveness of such initiatives. It is important to highlight that the indicator is a crucial element for such assessment, but is not the only metric to assess effectiveness.

¹¹ For more information about the INPE-EM, please consult AGUIAR APD, Ometto JPH, Nobre CA et al. (2012), Modeling the spatial and temporal heterogeneity of deforestation-driven carbon emissions: the INPE-EM framework applied to the Brazilian Amazon. Global Change Biology.

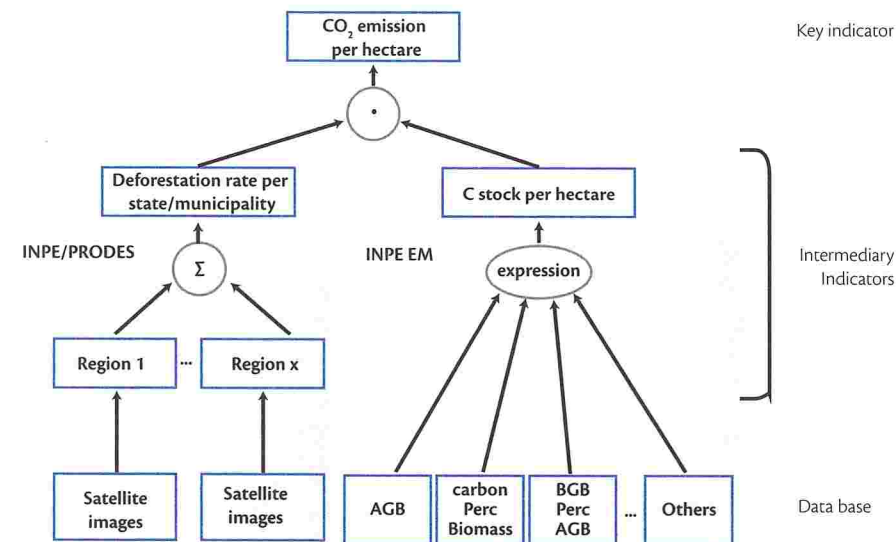


Figure 3: PPCDAm GHG monitoring indicator

Source: CGEE, 2013.

Other Plans will have different key indicators, under the supervision of the respective Ministries, that will also be used to assess the GHG emissions reduction achieved by the implemented actions. A general coordination is needed to promote synergies and avoid the duplication of efforts. In the case of the SMMARE, the general coordination is in charge of the Ministry of Environment.

POTENTIAL FUTURE USE: THE RELATION TO THE ICA

According to the agreed modalities and guidelines¹², the international consultation analysis (ICA) "will be conducted in a manner that is non-intrusive, non-punitive and respectful of national sovereignty; the ICA will aim to increase the transparency

¹² Annex IV of decision 2/CP.17.



of mitigation actions and their effects, through analysis by technical experts in consultation with the Party concerned, and through a facilitative sharing of views, and will result in a summary report”.

The ICA process will consist of the following two steps:

- (a) A technical analysis of the biennial update reports submitted by Parties not included in Annex I to the Convention either as a summary of parts of their national communication in the year in which the national communication is presented, or as a stand-alone update report by a team of technical experts in consultation with the Party, resulting in a summary report. The information considered should include the national greenhouse gas inventory report, information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, the progress made in their implementation and information on domestic measurement, reporting and verification, and on the received support.
- (b) A facilitative sharing of views, which will have as input the biennial update report and summary report referred to in paragraph (a) above.

The SMMARE is designed to be a tool able to provide additional information, in particular in relation to the mitigation actions implemented in each Mitigation Plan and its “associated methodologies and assumptions, the progress made in their implementation and information on domestic measurement, reporting and verification”. As the “discussion on the appropriateness of such domestic policies and measures is not part of the process”, the interest of the SMMARE in this matter is to support the Country to provide additional information to the team of technical experts to better understand the analysis of the impacts of mitigation actions to the extent possible.