

# Approaches to REDD+ Nesting: Lessons Learned from Country Experiences

## APPENDIX: Case Studies

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This informal paper is an appendix to the publication *Approaches to REDD+ Nesting: Lessons Learned from Country Experiences*. It details six case studies that provided information and input into the main synthesis paper.

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## Abbreviations

A/R	afforestation/reforestation
ACS	Acre Carbon Standard
BNDES	Brazilian Development Bank
BSP	benefit-sharing plan
CAFI	Central African Forest Initiative
CAR	Environmental Rural Cadaster (Cadastro Ambiental Rural) (Acre)
CCA	community conservation area (Zambia)
CDSA	Company for Development of Environmental Services (Companhia para o Desenvolvimento de Serviços Ambientais) (Acre)
CEMEC	Center for Monitoring and Evaluation (Guatemala)
CF	Carbon Fund
CFI	Carbon Farming Initiative (Australia)
CFP	Community Forest Program (Zambia)
CONAREDD+	National Commission for REDD+ (Brazil)
CPRS	Carbon Pollution Reduction Scheme (Australia)
EEZ	ecological-economic zoning
ER Program	Emission Reductions Program (DRC)
ERF	Emissions Reduction Fund (Australia)
ERPA	emission reduction purchase agreement
ERPD	emission reductions program document
FIP	Forest Investment Program
FPI	Forest Productivity Index (Australia)
FREL	forest reference emission level
FRL	forest reference level
GHG	greenhouse gas
GOFC/GOLD	Global Observation of Forest and Land Cover Dynamics
IES Carbon Program	Incentive for Environmental Services Carbon Program (Acre)
IMC	Institute for Climate Change (Instituto de Mudanças Climáticas) (Acre)
INAB	National Institute of Forests (Guatemala)
IPCC	International Panel on Climate Change
ISFL	Initiative for Sustainable Forest Landscapes
JNR	Jurisdictional and Nested REDD+
LMP	Landscape Management Project (Zambia)
LZRP	Lower Zambezi REDD+ Project (Zambia)
MAGA	Ministry of Agriculture, Fishery and Nutrition (Guatemala)
MARN	Ministry of Environment and Natural Resources (Guatemala)
MINFIN	Ministry of Finance of Guatemala (Guatemala)
MRV	measurement, reporting, and verification
NDC	Nationally Determined Contribution
NGGI	national greenhouse gas inventory
NGO	nongovernmental organization
ODA	official development assistance
PES	payment for environmental services
PINFOR	Forestry Incentives Program (Guatemala)
PINPEP	Program of Incentives for Smallholders (Guatemala)

PIREDD	Integrated REDD+ Project (DRC)
PMU	Program Management Unit
R-Package	Readiness Package
SEDENS	State Secretariat for Development of Forestry, Industry, Commerce and Sustainable Services (Secretaria de Estado de Desenvolvimento Florestal, da Indústria, do Comércio e dos Serviços Sustentáveis) (Acre)
SF	stock and flow
SISA	System of Incentives for Environmental Services (Acre)
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
WWC	Wildlife Works Carbon (DRC)
ZIFL-P	Zambia Integrated Forest Landscape Program

## A. BRAZIL: THE AMAZON

By Donna Lee<sup>1</sup>

In 2004, the Brazilian government unveiled the Action Plan for Prevention and Control of Deforestation in the Legal Amazon (figure A.1) and enacted a range of policies that resulted in a stunning 75–80 percent reduction of deforestation over the next five years. This first phase of the action plan involved the expansion of protected areas and the implementation of command-and-control policies, including transparent monitoring and strong enforcement (including cracking down on illegal loggers and corrupt government officials). Federal-level policies also included changes to agricultural subsidies and the imposition of deforestation moratoria, and the creation of a “blacklist” of municipalities with the highest deforestation rates that were denied rural credit from the federal government. These policies together provided strong incentives for reducing deforestation.

### The Original Amazon Fund

In 2007, the Brazilian government announced the Amazon Fund at COP-13 in Bali. The Amazon Fund was a tool created by the Ministry of Environment (and managed by BNDES, the Brazilian Development Bank) to raise funds to support the reduction of deforestation in the Amazon. It receives payments for REDD+ performance (gross deforestation only) in the Amazon Region.



Figure A.1 Amazon Biome versus Legal Amazon

Source: Brazilian Institute of Geography and Statistics (IBGE).

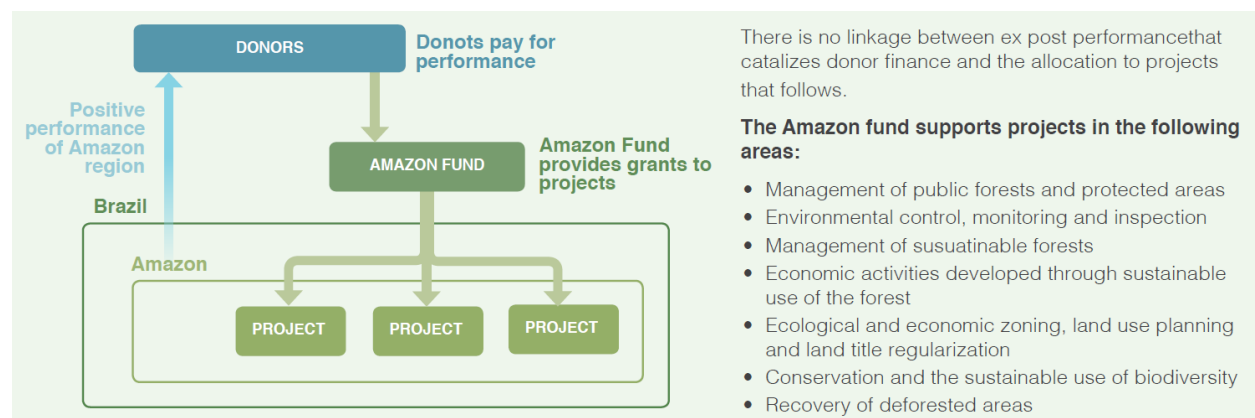
The Amazon Fund was designed as a jurisdictional program only; it does not recognize or reward carbon performance at lower levels. The national government provides the measurement and monitoring system that covers the entire Amazon biome. Once performance is verified (by a technical committee), the government invites voluntary “donations” to the fund. Since the launching of the Amazon Fund, Norway, Germany, and Petrobras (a Brazilian petroleum company) have provided voluntary donations that total more than US\$1 billion.

How the funds are then distributed did not originally relate to emission reductions or other performance metrics. Instead, the funds were used to finance projects that further reduce deforestation. BNDES set seven criteria for the types of projects the Amazon Fund will support (see figure A.2) and then invited project proponents to apply for funding based on the criteria. The proposals go through an analysis, and the applying institutions are also evaluated for management capacity, their track record, and other aspects as part of the due diligence process by BNDES. By the end of 2016, 86 projects had been approved; project proponents include universities, nongovernmental organizations (NGOs), municipalities, states, the federal government, and other organizations.

It is worth noting that in addition to funding projects in the Amazon, up to 20 percent of the monies received by the Amazon Fund can be used to develop systems to monitor and control deforestation in other Brazilian biomes and in tropical forests in other countries. Funding was also made available to states within the Brazilian Amazon to implement state-level activities.

<sup>1</sup> With appreciation for the inputs received from Leticia Guimares, Tasso Azevedo, and Magaly Medeiros. The author is fully responsible for the content.

Figure A.2 Amazon Fund (Original)



The original Amazon Fund model is simple and avoids technical challenges with nesting. However, it also requires a government to have adequate resources to pay for actions that lead to up-front performance.

### The Brazilian States and the Proposed Stock-Flow Methodology

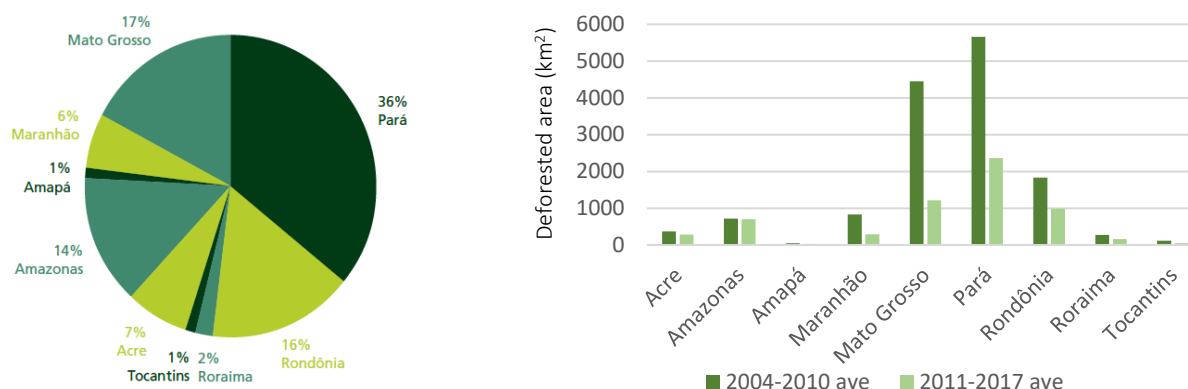
In May 2015, leaders within the nine states that comprise the legal Amazon called for direct access to international results-based funding for REDD+ by signing a letter, making it public, and then delivering it to then president Dilma Rousseff. In June, a coalition of 30 NGOs supported the states' letter, called the "Pact for the Valuation of the Forest and Reduction of Emissions from Deforestation (REDD+) in the Brazilian Legal Amazon."

One of the letter's demands was the adoption of a "stock and flux mechanism," to allocate the reductions of avoided deforestation among the Amazon states and the federal government: 20 percent of the total emission reductions would go to the federal government, with the remaining 80 percent going directly to states in the Amazon region. The states would be allowed to monetize the emission reductions through a variety of means, including through the Amazon Fund.

The stock-flow proposal provided a new approach for managing the allocation of emission reductions to subnational units that experience different forest dynamics and that may be at different places on the "forest transition curve." A challenge faced by the states was their differences in size, amount of forest, rate of deforestation, and success in tackling deforestation. For example, Pará (comprising around 27 percent of the Amazon forest) was responsible for the largest amount of deforestation in 2004-2010; it also had the strongest performance reducing deforestation in recent year (2011-2017, figure A.3<sup>2</sup>). By contrast, Amazonas has the largest area of forest (45 percent of the Amazon forest), but relatively low deforestation. Mato Grosso (around 10 percent of the Amazon forest) has relatively less forest than Amazonas or Pará, but relatively high deforestation.

<sup>2</sup> Quantified values for deforestation by states in the Amazon are taken from INPE's PRODES dataset provided at: <http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes>

Figure A.3 Comparison of Amazon states' forest area and deforestation over time



The “stock and flux mechanism” was developed by a group of six Brazilian states—with the assistance of several Brazilian NGOs—as a proposal to the national government on how results-based finance for performance measured at the level of the entire Brazilian Amazon could be shared among the states and national government. The proposal was only agreed upon after many meetings over a period of several years. The stock-flux method provides incentives both to conserve standing forests (carbon stock), as well as to reduce deforestation (that is, a reduction in the flow of emissions to the atmosphere). It does so by combining two metrics, or proxy measures: (i) the amount of forest area within each state as a percent of the total forest area in the Amazon, and (ii) the amount that each state reduced its area of deforestation as a percent of the total area reduced in the Amazon. The average of (i) and (ii) forms the percent of overall Amazon emission reductions that would be apportioned to each state. This is illustrated in table A.1.

Table A.1 Division of Stock and Flux for Each State of the Brazilian Amazon, Referent to 2013

State	Estock (km²)	Estock (%)	Reduction of Deforestation (km²)	% of national reduction	U-REDD+ (%)	U-REDD+ (tCO <sub>2</sub> )
	Forested area of states in 2013 (PRODES)	Forested area of states in relation to Brazilian Amazon	Historical deforestation – verified deforestation (PRODES)	Reduction of deforestation in relation to reduction of deforestation in Brazilian Amazon	Allocation based on stock-flux mechanism, considering 50% to stocks and 50% to fluxes	
Acre	148,700.00	4.6%	380.52	2.8%	3.7%	19,658,819.74
Amazonas	1,452,267.00	45.0%	286.82	2.1%	23.5%	125,518,077.71
Amapá	110,266.00	3.4%	17.59	0.1%	1.8%	9,448,935.98
Maranhão	40,127.00	1.2%	546.00	4.0%	2.6%	13,898,259.88
Mato Grosso	312,691.00	9.7%	6,518.13	47.4%	28.5%	152,176,765.82
Pará	876,635.00	27.1%	3,908.60	28.4%	27.8%	148,175,572.77
Rondônia	125,926.00	3.9%	1,843.32	13.4%	8.6%	46,132,840.74
Roraima	152,469.00	4.7%	70.64	0.5%	2.6%	13,963,380.47
Tocantins	9,803.00	0.3%	187.49	1.4%	0.8%	4,444,055.11
<b>Total</b>	<b>3,228,884.00</b>	<b>100%</b>	<b>13,759.10</b>	<b>100%</b>	<b>100%</b>	

Source: Governors Climate and Forest Taskforce, 2014.

In the proposal, each Amazon state would be allowed to receive a proportion of certified emission reductions (based on the stock-flux method). States would then have autonomy in fund-raising from diversified sources, including from external carbon markets. The proposal also suggested that the Amazon Fund could purchase carbon credits from REDD+ projects in the Amazon (following “MRV protocol and registration”).

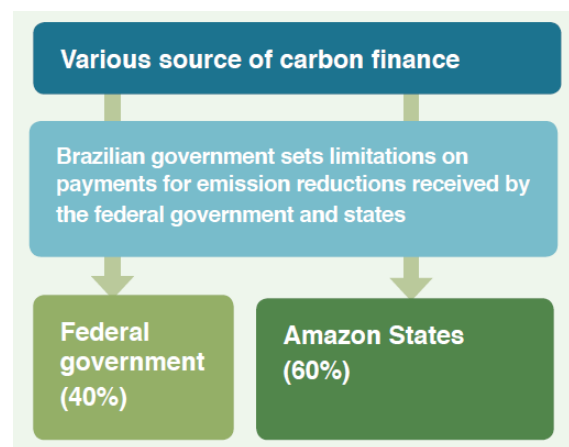
### The Revised Amazon Approach

In 2015, Brazil adopted a National REDD+ Strategy and formally established the National Commission for REDD+ (CONAREDD+), a governmental body responsible for coordinating and monitoring the implementation of the strategy, through Decree 8,576.<sup>3</sup> The adoption of the strategy resulted in new discussions on benefit sharing, which resulted in a change in fund-raising for emission reductions (ERs) achieved through reduced deforestation within the Amazon.

On July 6, 2017, CONAREDD+ issued Resolution 6, which outlines a new system for the Amazon that will allow states and the federal government to raise funds, subject to a set of defined limitations. The system includes a combination of performance- and nonperformance-based allocations of results at the higher (Amazon-wide) scale. The original Amazon Fund did not allow states to raise funds, nor did it recognize or reward carbon performance at the state level. Under the new system, individual states within the Amazon will be incentivized to contribute to overall performance, as they will be allocated, collectively, the right to raise funds up to a 60 percent share of the Amazon-wide performance. That 60 percent share is divided among states based on the stock-flow method.

The government will receive 40 percent of the proceeds, as illustrated in Figure A.4.

Figure A.4 New Amazon Incentive structure



According to the CONAREDD+ Resolution, the percentage of results (that is, 40 percent) reserved for the federal government is justified by the efforts it makes at the national level to reduce emissions from deforestation, including the conservation of native forest in conservation units and indigenous lands. The remaining 60 percent of the results are allocated to individual states that comprise the legal Amazon—Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia, Roraima, and Tocantins—for emission reductions achieved through avoided deforestation and conservation of native forest area. States are therefore incentivized to contribute to overall Amazon performance.

In the early years of the Amazon Fund, the federal government was able to reduce deforestation through command-and-control measures. The Action Plan for Prevention and Control of Deforestation in the Legal Amazon had always intended to be implemented in phases—with a later phase focused on efforts to build more sustainable production chains and encourage agricultural intensification (versus expansion). It is now more critical to develop new systems of economic growth that delinked from forest loss. In this second phase, states may play a more critical role—and therefore the new incentive structure makes logical sense.

<sup>3</sup> Decree available at: [http://www.planalto.gov.br/ccivil\\_03/\\_Ato2015-2018/2015/Decreto/D8576.htm](http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2015/Decreto/D8576.htm).



This allocation is illustrated by the chart below (found in the CONAREDD+ Resolution). Each state is allowed at least 2 percent of the total finance received by the Amazon Fund. Thereafter, the percentage is a function of performance on the two metrics.

Table A.2 Calculation of fund-raising limits for each State in the Amazon region

State	Criteria I: % of Amazon native forest area	Criteria II: % contribution to reduced forest loss	Criteria I + Criteria II	Distribution of “catch” limits among states*
Acre	1.35%	0.6%	1.92%	2.00%
Amazonas	13.45%	0.6%	14.04%	13.28%
Amapá	1.05%	0.0%	1.05%	2.00%
Maranhão	0.32%	1.6%	1.95%	2.00%
Mato Grosso	2.93%	13.0%	15.93%	15.06%
Pará	8.22%	9.8%	18.01%	17.03%
Rondônia	1.16%	3.7%	4.90%	4.63%
Roraima	1.43%	0.3%	1.70%	2.00%
Tocantins	0.09%	0.4%	0.49%	2.00%
TOTAL	30%	30%	60%	60%

\*The final percentages are adjusted to allow a minimum 2 percent share for each state.

One notable design element of the new system is that it does not create emission reduction units, or assets (that is, with title) that are distributed to each state. Rather, the system allocates *percentages* of an overall envelope of performance achieved at the entire Amazon level and allows each state the right to raise funds (receive payment for results) up to the predefined percentage. The Brazilian government has made clear that all performance will be considered part of Brazil’s Nationally Determined Contribution under the United Nations Framework Convention on Climate Change (UNFCCC); thus, states are not allowed to engage in commercial transactions with the carbon units. States that receive payments for results are required to report them through a government “Info Hub,” hosted by the Ministry of Environment. Currently the states of Acre and Mato Grosso have agreements for such payments with the German KfW Development Bank through the REDD Early Movers Program.

## Conclusions

**Start simple.** The beauty of Brazil’s original Amazon Fund design is that it was simple—measuring gross deforestation (only), use of a single conservative carbon stock estimate, use of funds for ex ante grant-based finance to projects (that could support future reductions in deforestation) rather than a complex nested design, and no generation of carbon assets. Brazil simply invited donors to provide payments for performance.

**Evolve over time.** Brazil’s experience also shows that a country may revise a REDD+ payments program over time. Over the years, demand by the states and a need to change the incentive structure resulted in the proposed new, and more complex, design for the Amazon Fund. It is a good example of how a country can take a stepwise approach to designing REDD+ payment systems—starting simple and refining over time.

**Nesting of sub-jurisdictions is easier than projects.** Brazil’s newly proposed Amazon Fund structure nests states into its Amazon Fund structure by providing ex post performance-based rewards. This is

considerably easier than nesting projects. States have clear boundaries, and together they comprise 100 percent of the Amazon territory. In addition, state-level performance is measured using the same monitoring system as the Amazon region (PRODES)—which may not be possible at the smaller project scale.

**Allocate jurisdictional performance.** The original conception of nesting is that subunits within a jurisdiction can generate, issue, and sell emission reductions separately from the higher-level jurisdiction. Rather than allow this to occur, Brazil's system *allocates* the finance generated at the regional level to states. State-level performance does not lead to the right to generate emission reduction units—rather, it is translated into the right to a *percentage* of the finance received for overall jurisdictional performance. This avoids problems with double counting as well as achievement of Brazil's Nationally Determined Contribution.

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## B. AUSTRALIA

By Rob Waterworth and Geoff Roberts

### **Australia's Political System and Effect on Programs**

The Australian political system is a federation of six states and two territories. The states have the constitutional responsibility for the management of the public land sector, except for species or communities that are of national significance. While the states are responsible for the management of the state's public lands, the national government is responsible for reporting on the national greenhouse gas emission and removals from the land sector.

Australia has a long history of developing land sector abatement programs. Both the state and federal governments have designed and implemented programs that aim to decrease emissions and increase removals of greenhouse gases in the land sector. Australia also has a history of considering methods of including the land sector in emissions trading systems, starting with a series of discussion papers in 1998/99 through to green and white papers on emissions trading on 2007/8, the Carbon Farming Initiative, and now the Emissions Reduction Fund. Most of these programs have focused on the role of forests. Programs have generally covered natural forest protection from both deforestation and forest harvesting, new plantings of both native and commercial plantations, and changes in savanna burning practices. Recently, there has been increasing interest in other opportunities in grasslands and croplands.

Although Australia signed the Kyoto Protocol in 1998, the federal government in late 2000 decided not to ratify it. As a result, the few federal programs were slowly ended. As such, from 2000 until 2008 programs were mainly implemented by the states. Each of these programs referred to the Kyoto Protocol and used some of the key rules (such as the definition of forest and the use of a 1990 baseline for determining areas of reforestation and deforestation), but they tended to have state-specific rules as well. This led to inconsistency in the data and methods used to estimate emissions and removals, the accounting rules applied, how carbon rights were applied, the number of units issued, and how those units were to be treated through time.

Climate change became a major political issue in the 2007 federal election, and both major parties promised a move to a national emissions trading system. With the development of the proposed Carbon Pollution Reduction Scheme (CPRS), post-2008 the focus moved to the design and implementation of national systems. Bringing the existing state-based programs into the national system proved a challenging task. While this is not the focus of this paper, the experiences have direct relevance to the situation in many developing countries where there is a mix of project types that may or may not be brought in under Nationally Determined Contributions (NDCs). Even with the failure of the federal government to pass the CPRS legislation, the movement toward nationally consistent and administered systems continued, first with the Clean Energy Futures package and now the Emissions Reduction Fund.

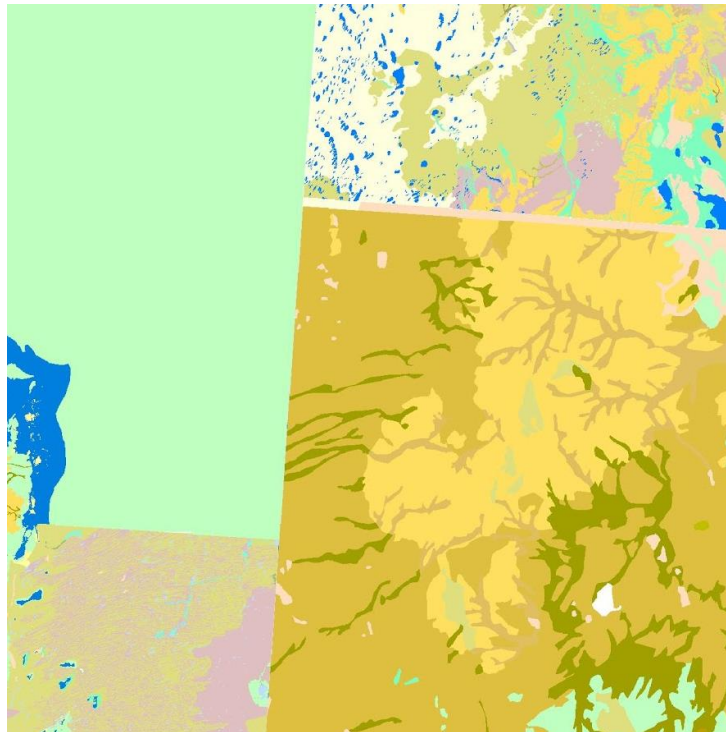
### **Designing and Implementing Australia's System for Estimating GHG Fluxes from the Land Sector**

Australia's signing of the Kyoto Protocol led to an immediate need to gain a better understanding of emissions and removals so that the targets could be better understood and to inform policies and program implemented to achieve them. Compared to other Annex I countries under the Kyoto Protocol, the land sector formed a large proportion of Australia's emissions in the base year (1990), primarily because of deforestation and a significant amount of removals in the commitment period owing to rapid expansion of the commercial plantation estate. In many aspects, Australia's land sector resembled a developing country: large expanding frontiers of agriculture driving large amounts of land clearing with

efforts to restore areas cleared in previous decades. However, although land clearing was a known issue at the time of the Kyoto Protocol signing, the extent of clearing, the trends, the key drivers, and the emissions and removals associated with the clearing were largely unknown.

While there was a policy requirement for information on land sector greenhouse gas (GHG) emissions, Australia lacked a national system for systematically collecting and analyzing data that could be used for estimating emissions and removals. Australia had not completed a traditional nationally coordinated, and consistent, national forest inventory. The data that did exist was largely collected by the states, which have constitutional responsibility for forest management as well as for data from research bodies. Each state had a different system for data collection (figure B.1). The circumstance was akin to that currently faced by many non-Annex I countries with their measurement, reporting, and verification (MRV) system, in particular as they pursue REDD+ activities and develop a forest reference emission level/forest reference level (FREL/FRL).

Figure B.1 Major Vegetation Groups as Defined by New South Wales, Queensland, South Australia, and the Northern Territory, with State and Territory boundaries clearly identifiable. State based differences required a national approach to ensure consistency.



Source: <http://www.environment.gov.au>

Given the lack of national forest inventory data coverage, and inconsistencies at the state-level processes, it was necessary for Australia to develop an MRV system that would allow it to meet its obligations under the Kyoto Protocol without relying on historical data sets. The data issues were overcome by developing a multiphase national inventory process.<sup>1</sup> This approach involved developing a spatially explicit national Forest Productivity Index (FPI) based on historical and contemporary climate and soil properties. By using biomass data collected from various sources, a relationship between FPI and maximum forest biomass

<sup>1</sup> Gary P. Richards. 2001. "The FullCAM Carbon Accounting Model: Development, Calibration and Implementation for the National Carbon Accounting System." National Carbon Accounting System technical report 28, Australian Greenhouse Office, Canberra.

was quantified. This approach allowed Australia to overcome the data limitations associated with not having a traditional national forest inventory while maintaining consistency. The Australian system then uses disturbance or management events to increase or decrease the biomass, such as fire or planting events. This approach allowed Australia to estimate historical forest biomass, as well as providing a consistent framework to monitor changes in biomass through time. Events are triggered through changes detected through remote sensing, such as forest cover loss, or through applying management events based on statistical data, which could be applied as an area-based statistic or a relative frequency. This process of tracking forest biomass through time in a spatially explicit process is managed through specialized software called the Full Carbon Accounting Model (FullCAM).<sup>2</sup> In the development of FullCAM, explicit consideration was given to nesting projects. To enable nesting, it was determined that the national system would need to the following:

- Be spatially explicit.
- Include all pools and gases.
- Be flexible enough to be able to be adjusted and recalibrated for site level estimates.
- Be able to provide core tools for project proponents.
- Provide the core national datasets as the initial basis for estimation.

FullCAM is an open access tool that allows users to model forest growth or clearing for any location in Australia using the same underpinning data (FPI) as the national system. A key difference between the use of FullCAM for the national system and that of for public users is that the national system is fully spatially explicit, where every pixel (~25mx25m) is stimulated, whereas public users select one pixel (a point) that is “representative” of the forest they are looking to model. Ten years after the inception of FullCAM, these decisions had a significant influence on how nesting projects were managed when Australia introduced incentives for project-level activities.

### **History of Subnational Activities and Approaches to Nesting**

Australia’s Carbon Pollution Reduction Scheme is a cap-and-trade system designed in 2010 but never implemented due to a lack of broader political support for the design. Notwithstanding, the issue of nesting was deeply considered within the design. The scope of the inclusion of the land sector, which only included reforestation, was to match the Kyoto reporting requirements. Deforestation was considered; however, because of the potential complexities with estimating emissions from deforestation that hasn’t occurred (that is, accurately estimating the counterfactual), it was not included in the first phase of the CPRS. Deforestation and other land activities were planned to be included as the system matured. When considering the land sector tools and methods for nesting, they were all part of a much larger system for managing trading of units across all sectors.

There were numerous considerations in establishing a fully nested scheme:

- How to ensure consistency between the national accounts and the abatement programs
- How to maximize abatement by maximizing return on projects by providing:
  - Increased certainty to industry
  - Reducing transaction costs, in particular measurement and auditing
  - Providing estimates that are financially viable
  - How to protect commercial data
  - How and when to use commercial data in the national system
- The role of government versus industry in improving estimates of emissions and removals

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<sup>2</sup> Full Carbon Accounting Model - <http://www.fullcam.com/FullCAMServer/help/>.

- How to make the process as cheap and easy for proponents as possible
- The ability for government to project forward emissions and removal estimates from current and future projects to allow for ongoing analysis of policy
- The amount of technical effort required to implement the system within the whole national system
- Where the risk sat—government, the purchaser, or the seller—for the following:
  - Under- or overestimation of emissions/removal units
  - Changes to the national system through ongoing improvements
  - Natural disturbances, such as wildfire
  - Interannual variability, such as drought, when accounting over shorter periods
- How to reduce these risks as much as possible to maximize abatement outcomes

In consideration of these points, four main approaches for nesting projects were considered in the design of the system:

1. Using the national methods only, with all proponents
2. Using measurement-based systems only
3. A hybrid-approach of approach 1 and 2, depending on the choice of the project proponent
4. A hybrid-approach where, if project data is used, it is used to recalibrate the national methods for the project

Under all of these methods, it was assumed that the following definitions and rules would be applied consistent with the national approach:

- Definitions of forest and each land use
- Definitions of carbon pools (above- and belowground biomass, deadwood, and litter and soil)
- Kyoto accounting rules, including the base year (1990) and use of different accounting rules as needed (Articles 3.3 and 3.4)
- All other relevant Australian legislation and regulatory requirements would be met

**National methods only.** This approach required projects to estimate abatement using the same methods as those used by the national system. This approach reduced the transaction costs to project proponents, as they did not need to demonstrate the validity of their approach. However, it also meant there was reduced certainty over the project abatement because changes in the national system, which the proponents have no control over, could affect the credited abatement.

Under this model, the government was responsible for all ongoing improvements, and the cost to the proponents was low. However, many potential project proponents opposed this option. They felt that the national system models would not provide accurate enough estimates for project-level estimates and wanted to be able to include their own data in their estimates.

**Measurement-based systems only.** This approach was favored by proponents who: (a) had ready access to high quality data, such as large commercial plantation operators; or (b) could build business models around the measurement of forests.

Experience with the Bush for Greenhouse program showed how difficult it was to measure individual projects with any degree of accuracy, even in plantations. Although forest managers had good information at the tactical level, they often did not have good data, even for volume, at the individual stand level. Furthermore, measurement-based systems were typically not able to develop baselines in a manner consistent with the measurements; hence, they were limited in their ability to cover other land uses and activities. In addition, measurements largely only included aboveground biomass. Other assumptions, such as root:shoot ratios, deadwood, and litter and soil carbon pools, all needed to be included and this presented challenges. Measurement-only systems also did not support other land uses well—in particular, crop and grasslands—and they had very limited capacity for projections.

**Hybrid Approach 1: Choose between project-specific or national systems.** Proponents could use measurement data or the national system. The main aim of this model was to reduce costs for smaller proponents while giving others the flexibility to use their own data. The issues for this method included gaming (choosing whichever system provided the most units for each project) and the difficulties of including project-level estimates into the national accounts due to the likelihood of selection bias (and how to ensure that did not occur). At first glance, this option appeared the best of both worlds; in reality, however, the inability to ensure consistency, the cost of regulation, and the potential for bias made this unappealing to government.

**Hybrid Approach 2: National system, but with the option to use project data to calibrate the national model for specific projects.** This hybrid approach aimed to provide flexibility while also reducing costs for smaller players and helping to ensure consistency with the national account. This hybrid approach included three tiers of options for proponents:

1. *Use the national system defaults:* Project proponents would use the national modeling system and default data. All the proponents would need to show is that the activity had taken place (for example, the land had been reforested). The activities would be tracked by the national system. A small proportion of the projects would be audited to ensure compliance, in particular where the national systems did not detect the activities.
2. *Use the national system with some changes to default data:* Project proponents would use the national system and default data, but they could change some of the input data, in particular on management practices, such as changing forest harvesting plans, thinning, fertilizer application, and site preparation methods. In this case, project proponents would be required to show not only that the activity had been carried out, but also that the additional management actions were done. It was expected that the majority of proponents would use this option. A greater number of these proponents would be audited.
3. *Use project-specific data to calibrate the national systems:* The project proponents would use the national system but recalibrate the models using their own data. The project proponents would need to provide all their own data, details of the calibration method, and plans for ongoing measurement. It was expected that large-scale operators with good existing data would use this option (for example, large commercial forestry companies).

At the time that the CPRS was dropped, the focus was increasing on Hybrid Approach 2 because it struck a balance between ensuring that the national system could be maintained and providing project proponents with sufficient flexibility where necessary.

However, with the political failure of the CPRS, funding for building the systems behind the CPRS was removed and development ceased, including work on the new tools required to enable Hybrid Approach 2 to be implemented. The pressure from the global financial crisis led the government to seek low-cost options, leading to the move toward using the older existing tools with some modification. These tools were developed for the Carbon Farming Initiative under the Clean Energy Futures package and then the Emissions Reduction Fund.

### **Carbon Farming Initiative/Emissions Reduction Fund**

The Carbon Farming Initiative (CFI) was launched in 2011. It was used as a mechanism to provide incentives for the land sector to reduce greenhouse gas emissions while not being covered by a carbon price. Projects recognized under the CFI could undertake specified activities and then report on and receive credits for abatement generated by their project. The approach was taken as it allowed broad coverage (that is, the land sector) while minimizing the administrative burden to landholders who were actively seeking to reduce their emissions. With the abolishment of the carbon pricing mechanism in 2013, the CFI was expanded to the non-land sector, under the Emissions Reduction Fund (ERF). While expanded, the processes of nesting between the CFI and ERF were comparable.

For estimating abatement from projects under the CFI and ERF, an approach between Hybrid Approach 1 and 2 described above, was adopted, where the project proponents could do either of the following:

1. Use the national system with some changes from national default data (for example, management regimes).
2. Use project-specific data (this data could be used to calibrate the national models).

This approach created parallel reporting for ERF projects and the national greenhouse gas inventory (NGGI). Projects registered under the ERF estimate abatement using methods prescribed through legislative instruments (methodology determinations) that aim to only recognize abatement that can contribute to Australia's international obligations. Reported abatement is formally recognized with Australian Carbon Credit Units, as issued by the Clean Energy Regulator, and managed through the centralized Australian National Registry of Emissions Units. These credit units are directly exchangeable for Kyoto units, and can then be traded, surrendered, or canceled through the registry. In parallel, the project activities should be detected by the national inventory system, with abatement estimated using the national system, and ultimately be reported through the NGGI. That is, the project-level estimates are essentially used for the domestic scheme, while the national inventory system is used for tracking against Australia's international obligations, as reported through the NGGI. This parallel process has the effect being that, if a project is issued a credit for abatement that can't be reconciled through the national inventory system, then the Australian government has this as a financial liability (for example, the Australian government will have overpaid for abatement). However, by relying on the national inventory system for the NGGI, there is no risk of double counting projects. If Australia directly incorporated the project-level estimates into the NGGI, then the national inventory system would have to include processes for excluding project areas and activities to avoid double counting. There are various approaches adopted to manage the risk of differences between project-level estimates and the NGGI as well as ensuring continuous improvement of the national inventory system using project-level data, including minimizing the differences in methods for estimating abatement between projects and the national inventory. The environmental plantings method under the ERF sets an example of both approaches available to proponents.



The environmental plantings method is premised on the establishment of forests with native endemic species on cleared land.<sup>3</sup> The definition of forest was the same as that used for Australia's NGGI, and should be detectable through Australia's spatial analysis system. To estimate abatement, the project proponent chooses to either use the national system with some changes to the national default data or use project-specific data.

For proponents using the national system, abatement is estimated using FullCAM, the same modeling system that underpins Australia's NGGI. However, unlike the approach used for the NGGI, project-level information is used for estimating abatement, as opposed to regional or national default values. For example, the project proponent enters specific management events relevant to their forests (planting dates, fertilizer treatments, and so on), as opposed to the management regime being applied through a relative frequency. The resulting estimate of abatement from any one project will differ from the abatement for the project using the national approach, given project-specific management regimes. However, if the management regimes applied across all environmental planting projects, on balance, reflect those within the NGGI, the abatement estimates will be comparable. That is, any one project may differ from the NGGI, but at the scheme level, this difference is likely to be minimized.

Alternatively, proponents with environmental planting projects can opt to measure their forest areas through traditional forest measurement approaches (for example, stratified random samples or systematic sampling). This includes development or validation of appropriate allometric equations for aboveground biomass, and optional belowground biomass. Similar to using project-level management information, the measured results will differ from the national systems that use FullCAM. One study found more than 300 percent variation between FullCAM and measured values for some sites.<sup>4,5</sup> However, as FullCAM can be updated using project-level data, such differences may not result in misalignment between the scheme and national inventory estimates of abatement.

These two examples reiterate the importance of considering where accuracy is required and should be assessed. They also show how critical continuous improvement is for a national system. By considering accuracy at the scheme level rather than at the project level, there is a cost-saving to project proponents and a degree of risk mitigation for the national government. Through continuous improvement, it is also possible for the national government system to better replicate projects. In the mid to longer term, this will significantly reduce the cost of estimating abatement for proponents, as well as reduce uncertainty of the national system.

The ERF is one approach to nesting, and it highlights the need to consider the balance between project participation (ease and cost of participation) and risk of abatement not being fully reconcilable through the national inventory. As discussed previously, part of this risk lies with the likelihood of bias through the flexibility afforded to project proponents in selecting their methods. That is, the modeling approach is more likely to be selected when it provides a higher estimate of abatement than measurement, and measurement will be selected where the estimate of abatement is higher than the model (and justifies the additional expense). As any bias can be alleviated through time as the national system improves, the approach adopted by Australia necessitates that project-level information be incorporated into the national inventory system. To date, incorporation has not been carved out (that is, abatement directly

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<sup>3</sup> "Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2014." Federal Register of Legislation. <https://www.legislation.gov.au/Details/F2015C00581>.

<sup>4</sup> [www.environment.gov.au/system/files/pages/c9547241-6714-485f-8f1e-de75db952e52/files/estimation-biomass-accumulation.pdf](http://www.environment.gov.au/system/files/pages/c9547241-6714-485f-8f1e-de75db952e52/files/estimation-biomass-accumulation.pdf).

<sup>5</sup> The variation was detected in a program of work aimed at improving the calibrations. Project-level data collected as part of the project was used to improve the national inventory.

attributed to an area), but rather the project information has been used in conjunction with existing data to improve the modeling framework. Care must be taken when incorporating project-level information into a national system, as this can introduce bias.

## **Conclusion**

With the Australian examples, multiple levels of policy influenced the final approach for nesting. These examples resulted in the Australian government accepting the risk for differences between the project- and national-level estimates of abatement, and to some degree the risk of non-permanence. The Australian government has included measures accounting for non-permanence, including civil penalties if a project proponent deliberately reverses abatement, and a risk of reversal buffer. The Australian examples also introduced hybrid approaches for assigning responsibility for the data collection process, as well as how data collection shifts between the federal government and the project proponents. Where there are differences between the national- and project-level estimates, any liability or benefit caused by differences are borne by the federal government. In the original concept of the CPRS, the difference would have been borne by the project proponent.

As discussed above, the Australian ERF approach, allowing proponents to select the method for estimating abatement from their projects, necessitates continuing improvement of the NGGI.

By Donna Lee and Daniela Goehler

## Background and History

Meanwhile, in 2011, Wildlife Works Carbon (WWC)—a REDD+ project developer located in California—obtained the “exploitation rights” of two large logging concessions, including nearly 300,000 hectares of forestland adjacent to Lac Mai Ndombe. Instead of logging the forest, WWC created a “conservation covenant” on the concessions and, in order to finance protection of the forest and improve livelihoods in and around the concession, began developing a Verified Carbon Standard (VCS) project to allow the sale of offsets. In 2012, WWC registered the “Mai Ndombe REDD+ Project” with the VCS and CCBA and was validated by both organizations. That same year, WWC verified over 2.5 million tons of carbon credits. To date, the project has issued over 2.5 million credits with vintages from 2011 and 2012. The Mai Ndombe REDD+ Project is located within the Mai Ndombe jurisdictional program as shown in figure C.1.

WWC's Mai Ndombe Project

**Program key-activities (indicative)**

- Reinforced check point
- Community based reforestation/savannah protection
- Reduced Impact logging
- Conservation concession
- Small-scale agro-systems
- Industrial agroforestry

**Land cover**

- Water bodies
- No Data (within DRC)
- Woodlands
- Primary humid tropical forests
- Secondary humid tropical forests
- Non-forest areas

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Starting in 2018, the Mai Ndombe REDD+ Project is expected to be fully nested within the jurisdictional Mai Ndombe ER Program. WWC has stated that it will not generate VCS credits (that is, Verified Carbon Units, or VCUs), using its VCS baseline, during the emission reduction purchase agreement (ERPA) term.

Table C.1 Timeline for the jurisdictional program and REDD+ project

Mai Ndombe (jurisdictional) ER Program	Year	Mai Ndombe REDD+ Project
Early idea for an ER program first presented to FCPF Carbon Fund (CF)	2011	Wildlife Works Carbon obtains the rights to two logging concessions, which determines the official project start date: March 14, 2011.
	2012	The Mai Ndombe REDD+ Project is validated by the VCS and CCB in 2012 and verifies its first emission reductions (2,548,715 tCO <sub>2</sub> e) for the period March 2011 to October 2012, using the baseline in its Project Design Document (2012).  Throughout 2012–17, WWC issues over 2.5 million credits (vintages as above, 2011–12).
First ER Program Idea Note (ER-PIN) submitted to the Carbon Fund	2013	
ER Program selected into CF pipeline Letter of Intent signed with FCPF	2014	
	2015	
Emission Reductions Program Document (ERPD) enters portfolio of the CF	2016	
In 2017, the two programs merged into a nested REDD+ program		
ERPA negotiations with the CF ER generation expected to start in 2018 Benefit-sharing consultations held to determine allocation of payments	2018	WWC will not generate credits (e.g., VCUs) using its VCS baseline; instead, it will be fully nested within the Mai Ndombe jurisdictional program.

### The Benefit-Sharing Plan

Key to the nested system for Mai Ndombe is the structure of its benefit-sharing plan (BSP). The BSP was consulted at multiple levels (national, provincial, and local) throughout the development of the ERP as documented in the ERP. Finance received for performance at the jurisdictional scale will be split into two categories. Category 1 has “senior rights” to ERPA payments (that is, these payments are made first, following receipt of funds from the sale of jurisdictional ERs and includes fixed operational and “variable” costs, as explained below). Category 2 is performance-based payments for subprojects.

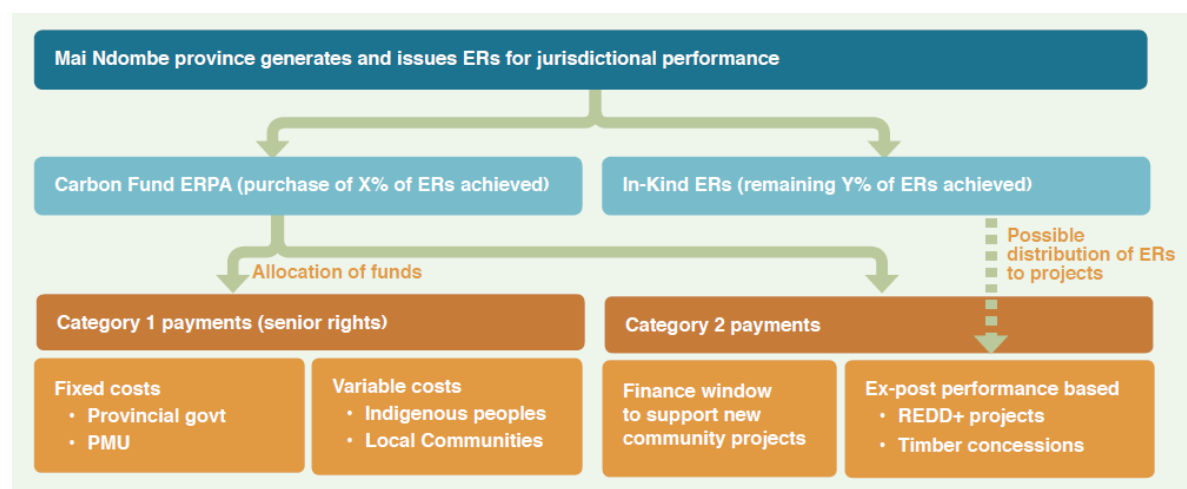
**Fixed costs financed by the ERPA.** This includes support for a Program Management Unit (PMU) that assists the provincial government in managing the ER Program, including monitoring and reporting, coordination with subprojects, capacity building, assistance to the private sector and communities, the sale of ERs, and monitoring of safeguards. Fixed costs also include institutional support for the provincial government.

Other “fixed costs” (financed through the Central African Forest Initiative, or CAFI) include funding for the maintenance of a national REDD+ registry, a feedback and grievance redress mechanism, support to national REDD+ institutions and civil society, tenure and land use planning reforms, sustainable agriculture and forest management, and finalization of the national forest monitoring system. Many of these programs are national in scope, benefiting the entire country, not just Mai Ndombe.

**Variable costs.** The BSP also envisions a certain percentage of the ER Program’s proceeds to be provided to: (a) indigenous peoples, and (b) local communities. Two percent of the total value of the ERPA will be provided to each group.

**Payments to subprojects.** After the fixed and variable costs are fulfilled, the remaining funds from the ERPA would be used to provide performance-based payments to subprojects.<sup>2</sup> Some of these may be based on the measurement of ERs against baselines for subprojects, such as WWC’s Mai Ndombe REDD+ Project, others will be dedicated to communities in rural areas, which have contributed to the success of the overall jurisdictional program performance.

Figure C.2 Mai Ndombe benefit-sharing plan



According to the BSP, no single private sector or large community-driven subproject can receive more than X percent of the total ERPA payment to ensure finance is not concentrated in these stakeholder groups. In order to balance this risk for projects that may perform well (in relation to the jurisdiction), such projects may receive additional in-kind ERs that are held in the national REDD+ transaction registry—since the Carbon Fund only intends to purchase X percent of the verified ERs, the remaining Y percent may be distributed as needed to stakeholders (against their agreed baselines). Projects that receive additional in-kind ERs may find buyers to monetize them.

If, however, jurisdictional performance is negative or insufficient to provide adequate benefits to the subprojects that have performed well, this is a risk for such projects—and therefore may dampen interest from the private sector in investing in projects in the DRC.

### “Phasing In” to Accommodate Existing Projects

The DRC, as is the case in many instances, had an existing project within the jurisdictional program boundary by the time it developed a full-fledged ER program. When this occurs, it may be necessary to accommodate existing projects to allow for a transition period. The Mai Ndombe ER Program has therefore defined two phases:

- *Phase 1:* The BSP integrates existing subprojects, that is, the WWC’s conservation concession and ongoing activities, such as the Integrated REDD+ Project (PIREDD) Plateau, under the Forest Investment Program (FIP) and the PIREDD Mai Ndombe funded by CAFI. A project document for each of these subprojects describes the activities, which are part of the ER Program. Only WWC’s project requires a “subproject reference level.”

<sup>2</sup> The donors of the FCPF Carbon Fund have expressed that the use of reference levels for projects as well as the methodology applied as part of the benefit-sharing plan for the Mai Ndombe jurisdictional program should be viewed as an exceptional case and should not be interpreted as setting a precedence for other Carbon Fund programs if an ERPA is signed.

- *Phase 2:* The PMU will assist additional stakeholders—for example, groups of communities (represented by local development committees), nongovernmental organizations, forest concessionaires or agroforestry enterprises—to develop subproject proposals and become beneficiaries of the ERPA through Category 2 payments for performance. As the implementation of the ER Program progresses, the BSP will be adjusted to include these additional stakeholders/subprojects on the basis of their project documents.

**Allocating baselines.** A “transition” phase requires accommodation on both the part of the jurisdictional program and existing REDD+ projects, in particular an agreement on how baselines may be allocated to reward performance of existing projects. In nearly every case, the data and methods used to develop forest carbon project baselines will differ from those used to develop jurisdictional baselines, as illustrated in the chart below.

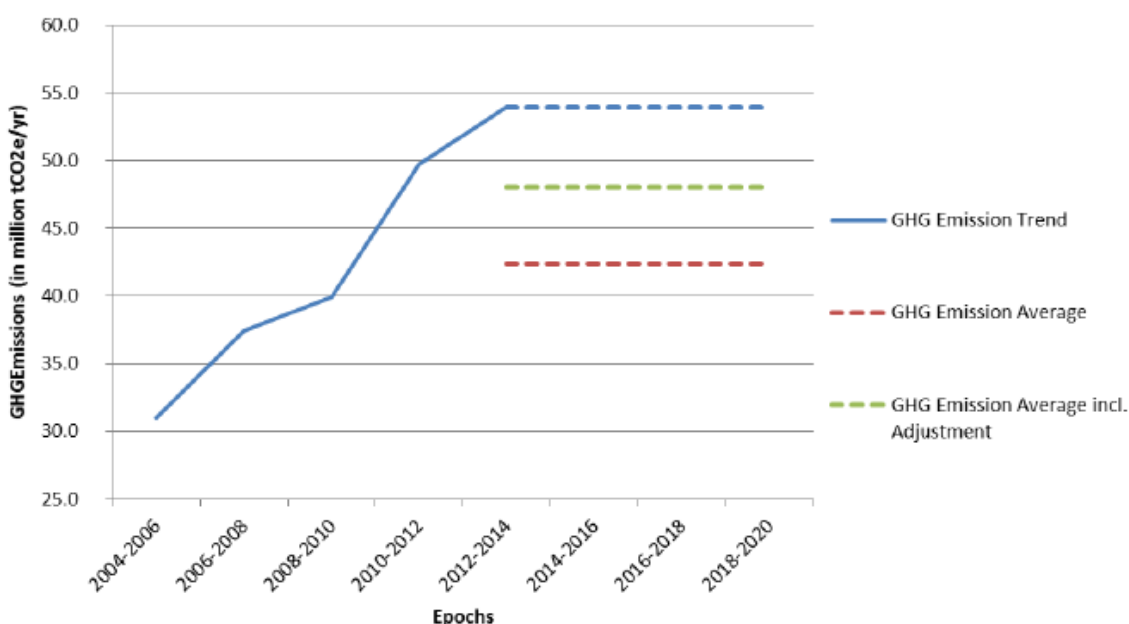
Table C.2 The ER Program Reference Level and the Mai Ndombe REDD+ Project Baseline

	Mai Ndombe ER Program reference level	Mai Ndombe REDD+ Project baseline
Methodology	Carbon Fund Methodological Framework (CF MF)	VCS, VM0009 methodology
Program/project area	12.3 million ha of total land area 9.8 million ha of forest	299,645 ha (concession area) 248,956 ha forest area
Reference period	2004–14	1987–2011
Forest definition and stratification	Areas > 0.5 ha, tree heights > 3m, canopy cover > 30% (National definition)  Stratification: primary (dense) forest, secondary (degraded) forests	Areas > 0.5 ha, tree heights > 5m, canopy cover > 10% (FAO definition)  Stratification: 4 forests classes (unlogged terra firma and swamp; logged >80 years go and selectively logged ~10 years ago)
Scope: Activities, pools, gases	<ul style="list-style-type: none"> <li>• Activities: Deforestation, degradation (primary→secondary forest), enhancement (NF→secondary forest and secondary→primary forest)</li> <li>• Pools: Aboveground biomass (AGB) and belowground biomass (BGB)</li> <li>• Gases: CO<sub>2</sub> only</li> </ul>	<ul style="list-style-type: none"> <li>• Activities: Deforestation, degradation (timber harvesting)</li> <li>• Pools: Above- and belowground merchantable and non-merchantable trees, soil organic carbon, wood products</li> <li>• Gases: CO<sub>2</sub> only</li> </ul>
Construction	Average historical emissions <i>over the program area</i> (i.e., Mai Ndombe Province) is both the accounting area and reference area	Reference area chosen as an area experiencing the same primary agent of deforestation (planned commercial harvest) and equidistant to the main market (Kinshasa); historical data from the reference area is used to develop a Baseline Emissions Model (logistical regression) that is applied to the project (accounting) area
Activity data	GIS analysis of Landsat imagery for all activities (deforestation, degradation, enhancement)  <i>Note: Uncertainties for enhancement are estimated at 32%–70% uncertainty at 90% confidence interval.</i>	Deforestation: GIS analysis using Landsat imagery; Degradation: Timber harvesting plans  Delimiting project area: Landsat imagery

Emission factors	Carbon stock data developed under the Carbon Map and Model program using LIDAR and (limited) sample plot data. C stock of AGB and BGB for primary forest is estimated at 165tC/ha.	Over 400 ground plots measured in randomly selected locations within the concession resulting in a mean AGB +BGB figure of 285 tC/ha for primary forest; soil C stock value from literature
Baseline emissions	For ERPD period 2018–22: 48.0 MtCO <sub>2</sub> eq/yr, derived from: average historical = 42.4 MtCO <sub>2</sub> eq + an upward adjustment (per CF MF guidance)	For period 2017–21: 6.3 to 10.7 MtCO <sub>2</sub> eq/yr (see chart below for year-on-year estimates) →CF baseline = 3.8 MtCO <sub>2</sub> eq/yr

One important difference between project baselines and jurisdictional programs is that projects tend to develop “business as usual” baselines, whereas jurisdictional programs—particularly those funded by donor governments—are required to use a historical average. For countries that have historically low deforestation but are experiencing rising deforestation, this results in a conservative baseline that may be lower than the actual business-as-usual level. In the DRC, even the allowed “upward adjustment” above the historical average is lower than the most recent historical period (2012–14), as illustrated in figure C.3.

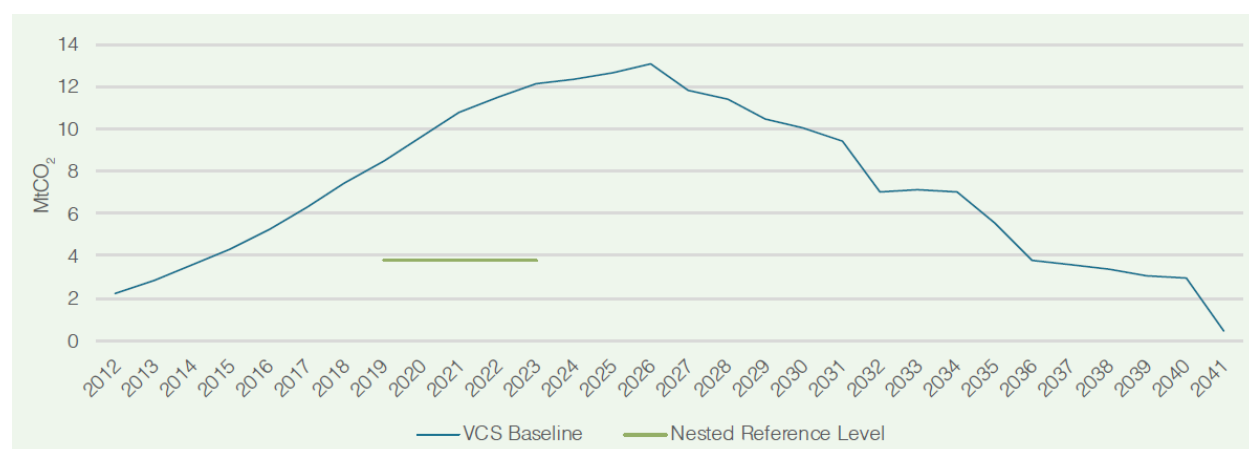
Figure C.3 Historical emissions in Mai Ndombe and reference level options



Source: DRC’s ERPD, figure 14 (page 142).

The WWC project, using VCS method VM0009, employs a logistic function of expected emissions based on emissions from a comparable “reference” area. From this, the project calculates baseline emissions, that is, expected emissions in absence of project activities, as illustrated in figure C.4.

Figure C.4 Comparison of WWC’s REDD+ project baseline (2012–41) and the subproject reference level during the ERPA period (September 2018 to August 2023)



During the ERPA period (2018–22) of the Carbon Fund, WWC’s baseline using the VCS method is calculated to range from 6.3 to 10.7 MtCO<sub>2</sub>eq/year. Starting in 2018, however, WWC will not generate emission reductions using the VCS baseline; instead, it has agreed to accept a subproject reference level for their project area of 3.8 MtCO<sub>2</sub>eq/year (table C.3). This figure was based on applying the historical average of the primary forest edge stratum, combined with WWC’s own carbon stock measurements. The government’s MRV system will determine the number of ERs generated by the ER Program and subprojects.

Table C.3 Comparison of WWC’s original versus nested baseline for the ERPA period

Mai Ndombe REDD+ Project		
Year	Estimated baseline emissions using VCS VM0009 (tCO <sub>2</sub> eq/year)	Subproject reference level negotiated for the ER Program (tCO <sub>2</sub> eq/year)
2019	8,524,210	3,800,000
2020	9,642,568	3,800,000
2021	10,724,028	3,800,000
2022	11,486,467	3,800,000
2023	12,156,738	3,800,000

To date, the Mai Ndombe REDD+ Project has verified 2,548,715 tCO<sub>2</sub>eq for 2011–12. Of these early vintage tons, over 2.5 million have been issued over the past five years. The project may still verify and issue tons for the period 2013–17.

For Phase 2, the PMU is expected to further develop guidance and information on how subproject reference levels may be developed for additional subprojects. The current BSP suggests that such subproject reference levels may be based on historical emissions in the project/accounting area, with adjustments based on “a number of criteria,” including a risk map (that is, allocated a higher proportion of the reference level to subprojects in high risk areas). The allocation of the overall provincial baseline to subprojects will be conducted by the PMU and validated at the program level by the Provincial Steering Committee.



**PES opportunities for local communities and indigenous peoples.** Under Phase 1 of the BSP, local communities and indigenous peoples receive 2 percent each of the nominal ERPA value. This is to recognize their historical role, as well as current efforts, in sustainable forest management. In Phase 2, however, groups of communities in rural areas may benefit from Category 2 (performance-based) payments. Incentives for communities through results-based payments for forest protection are being tested at small scale using payments for environmental services (PES) contracts in the PIREDD Plateau and PIREDD Mai Ndombe projects. These PES contracts are based on proxy indicators, for example, the number of agroforestry plantations planted by communities. The two PIREDD projects will build capacities at local levels over time and deliver important lessons learned on what does and does not work well for communities with regards to PES contracts.

**Legal basis for projects and subnational actions.** The Ministerial Homologation Decree for REDD+ projects/programs provides the legal basis and procedures for any REDD+ project or program.<sup>3</sup> According to the decree, all projects/programs (including the Mai Ndombe ER Program) must be registered in the national REDD+ registry, respect social and environmental REDD+ standards, apply safeguards instruments, and develop benefit-sharing plans. It also clarifies that a feedback and grievance redress mechanism needs to be in place and ER title transfer from the jurisdiction to projects.

## Conclusion

**Nesting is only possible when there are clear incentives to do so.** Mai Ndombe Province is ahead of other jurisdictions in developing a nested system. This can be attributed to the DRC moving more quickly than others under the FCPF Carbon Fund. The ER Program development has been key to driving progress and thinking on nesting. In addition, finance from the Carbon Fund (that is, the opportunity to sign an ERPA) provides incentives for projects and the government to cooperate in finding solutions to nesting. In other words, ERPA negotiations have forced consideration of the specifics on how to operationalize a nested system.

**Cooperation and compromise is key.** Particularly when projects exist before a jurisdictional program is in place, cooperation and a working relationship between key players (for example, the project and the government) are critical to developing a nested system. This may require sacrifices by each actor. Projects may need to abandon existing data and methods currently in use for the project (to prioritize government-generated data); they may also need to take a “haircut” on their baseline, which results in the generation of fewer credits. In return, governments need to provide a “fair share” of the finance generated at the jurisdictional level to projects.

**There are minimum technical requirements to make nesting work.** Reference levels need to reward those projects in higher-risk areas, which can be technically and politically challenging. Ideally, projects are driven to operate in “hot spot” areas, that is, where expected deforestation is relatively high. As such, they cannot simply apply the jurisdictional historical deforestation rate (doing so would have the opposite effect, driving projects to areas of low expected deforestation). Spatially explicit data is required not only for ensuring projects are driven to high-risk areas, but also for determining a fair baseline level of emissions for subprojects.

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<sup>3</sup> Arrêté ministériel fixant la procédure d'homologation des projets REDD+ (2012), which is currently under revision.

**Institutional structures are required to operationalize nested systems.** In the DRC, the PMU will be critical for nesting. The PMU will be responsible for encouraging and providing technical assistance to subprojects, setting subproject reference levels, and the monitoring and day-to-day management of subprojects. In addition, because nesting is not always easy for all stakeholders to understand, the PMU can ensure clear communication of the nested system, including how reference levels are set and how subprojects contribute to the overall program, and provide capacity building to stakeholders (including government officials and communities that wish to engage in projects).

Finally, **systems should be adaptive.** Many countries are developing carbon finance–based incentive systems for the first time. In this regard, benefit-sharing plans should remain flexible. A “final” such plan cannot be developed in the first instance. It needs to be a process of “learning by doing,” and simply getting started is a step in the right direction. There are often greater risks to forests in standing still than in implementing an imperfect plan.

## D. BRAZIL: STATE OF ACRE

By Pablo Llopis

### Background: Putting the Pieces in Place for a Nested System

The state of Acre identified the need to integrate the sustainable management of the vast forest resources of its territory in the decade of 1980. At that time, leaders from social movements campaigning against the expansion of the cattle business started to integrate into governmental bodies of the state and brought a different perspective to the process of decision taking (IPEA, CEPAL, and GIZ 2014). Currently, Acre is one of the most advanced REDD+ jurisdictions in the world.

The formulation of sustainable development policies began in the 1990s and considered the state's forestland as a source of growth and revenue for local communities (Carvalho et al. 2004). The first phase of the ecological-economic zoning<sup>1</sup> (EEZ) concluded in 1999. The EEZ has been, since then, the main instrument used by the state government for the formulation of social and environmental policies.

Between 2000 and 2006, the state government began implementing the policies formulated following the guidance provided by the first phase of EEZ. The second phase's conclusion in 2006 represented a significant advance in terms of resolution of the EEZ, going from land use planning at a scale of 1:1,000,000 in Phase 1 to a scale of 1:250,000 in Phase 2.

The EEZ was legally established in Acre by Law 1904 of June 5, 2007 (EEZ Law).<sup>2</sup> Acre started monitoring deforestation in 2004 and climate change was incorporated into the state's environmental agenda on 2008. Law 2025 of October 20, 2008, sanctioned the establishment of an incentives system for smallholders adopting socio-environmental sustainable production practices;<sup>3</sup> it was the first step toward the formalization of Acre's REDD+ jurisdictional system.

Law 2308 of October 22, 2010<sup>4</sup> (SISA Law), created the state's System of Incentives for Environmental Services (SISA, per its Portuguese acronym). It also created the Incentive for Environmental Services Carbon Program (ISA Carbon Program). The program REDD+ Early Movers (REM) from the German Federal Ministry for Economic Cooperation and Development has supported SISA since 2012 through payments of up to €25 million linked to performance.<sup>5</sup> These payments are not linked to a transaction of carbon credits but are instead part of a bilateral results-based payment agreement in the context of an official development assistance (ODA) program. In addition, in 2010 Acre signed an agreement with the state of California<sup>6</sup> to be eligible as a source of supply for REDD+-based emission offsets through California's cap-and-trade system.

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<sup>1</sup> Per the definition developed by the Food and Agriculture Organization (1996), the EEZ is defined as "an alternative approach to zoning which aims to correct the emphasis on physical factors and crop production [...] by including socio-economic factors and a wider range of land uses in zone definition. In principle, EEZ deals with both land and with people and their social organization."

<sup>2</sup> Lei 1.904, de 5 de Junho de 2007, "Institui o Zoneamento Ecológico – Econômico do Estado do Acre – ZEE." Law document available at: <http://www.al.ac.leg.br/leis/wp-content/uploads/2014/09/Lei1904.pdf>.

<sup>3</sup> Lei 2.025, de 20 de Outubro de 2008, "Cria o Programa Estadual de Certificação de Unidades Produtivas Familiares do Estado do Acre." <http://www.al.ac.leg.br/leis/?p=7383>.

<sup>4</sup> Lei 2.308, de 22 de Outubro de 2010, "Cria o Sistema Estadual de Incentivos a Serviços Ambientais – SISA, o Programa de Incentivos por Serviços Ambientais – ISA Carbono e demais Programas de Serviços Ambientais e Produtos Ecosistêmicos do Estado do Acre e dá outras providências." Law document available at: <http://www.al.ac.leg.br/leis/?p=8269>.

<sup>5</sup> The government of Acre signed two payment-for-performance agreements with the Global REDD Program for Early Movers of the German KfW Development Bank: in 2012, a four-year payment period; and in 2013, a single payment.

<sup>6</sup> More information available at: <http://stateredd.org/>.

Acre included benefit-sharing mechanisms in the design of SISA to ensure that the jurisdictional REDD+ program is successful and politically sustainable. The state recognizes benefit sharing as the key element causing the reluctance to accept REDD+ as a valid mechanism by some social movements and representatives of the civil society,<sup>7</sup> especially those interventions taking place in indigenous lands and conservation units (IPEA, CEPAL, and GIZ 2014; IPAM 2017).

To allow fairer benefit sharing, the state designed a jurisdictional structure that provided technical support for the implementation of SISA. This structure included provisions to consider not only the reduction of GHG flows being emitted but also activities such as the conservation of forests, carbon stock enhancements, and sustainable forest management in order to include the “+” component of the REDD+ acronym, as agreed by COP13 in Bali.<sup>8</sup> SISA includes in the processes of benefit sharing not only entities able to demonstrate reductions in GHG emissions but also entities promoting the conservation and expansion of existing standing forests.

The inclusion of “+” activities in SISA aims to include those actors that have historically undertaken efforts to preserve forests in the process of benefit sharing, that is, indigenous communities, traditional forest-dependent communities, and some landowners. The inclusion of the “+” component in the processes of benefit sharing is known as the “stock and flow” (SF) approach (IPEA, CEPAL, and GIZ, 2014). Brazil’s National REDD+ Strategy adopted the SF approach through Ordinance 370 of December 2, 2015, of the Ministry for the Environment.<sup>9</sup>

### **Institutional Elements of the System**

The establishment of SISA was planned and includes a governance system and a legal framework that regulates the juridical aspects linked to the generation of carbon assets (figure D.1). Other legal frameworks linked to aspects included under SISA, such as water services, conservation of soils, conservation of biodiversity, and valuation of traditional knowledge, present different degrees of development (CIFOR 2014).

To date, the State Secretariat for Development of Forestry, Industry, Commerce and Sustainable Services (SEDENS) has acted as the VCS Jurisdictional and Nested REDD+ (JNR) Program proponent, that is, it has assumed the responsibility of representing the state in front of the standards, organizations, and bodies interacting with SISA. The VCS JNR was selected by the government of Acre because it was the only certification scheme that allowed the certification of a jurisdictional REDD+ initiative undertaken at the subnational level.

Acre has made significant efforts to promote the regularization of land tenure in the state. The Institute of Land (ITERACRE) has the mission of implementing and promoting the regularization, ordination, and reordering of rural land, the allocation of public lands, collection of vacant lands, rural registration, and mediation of conflicts over land tenure.

The Institute for Climate Change (IMC) is responsible for the implementation of SISA. The IMC is also responsible implementing mitigation and adaptation action and for monitoring indicators from SISA and

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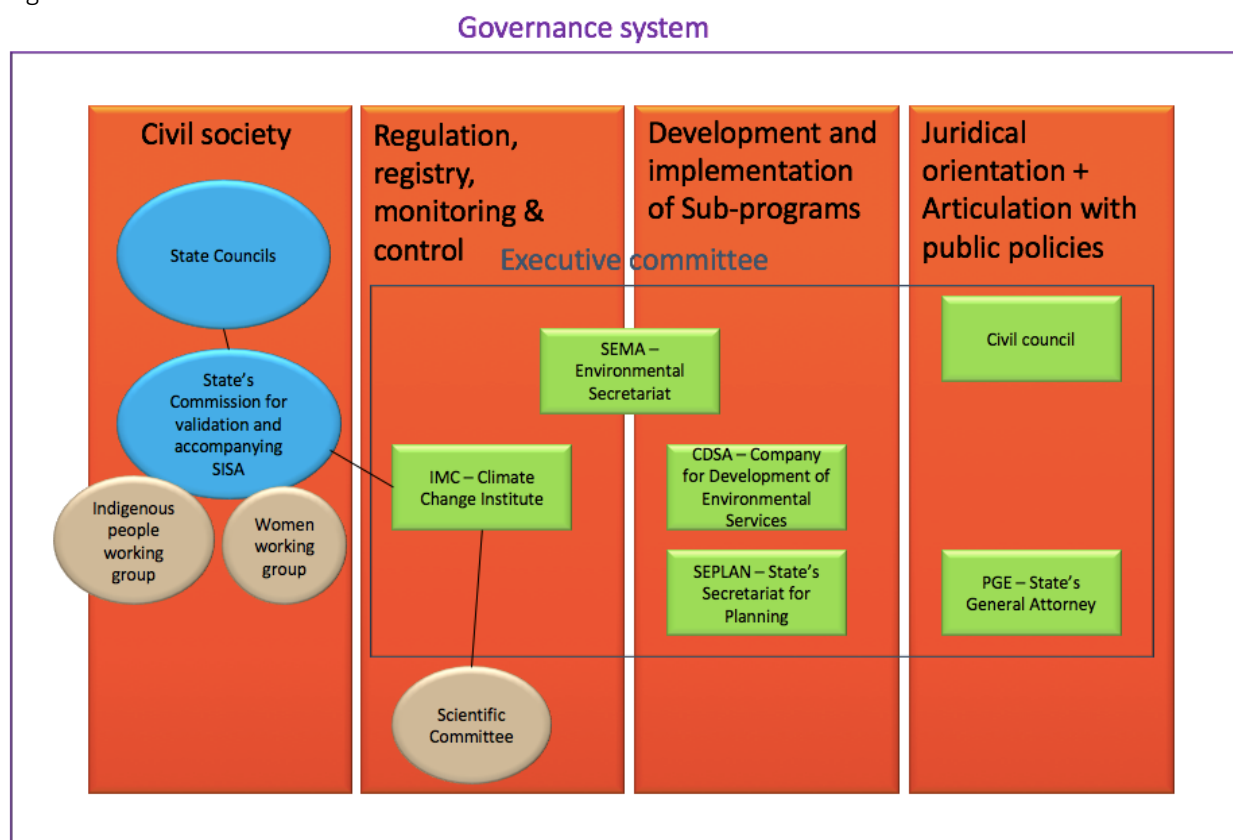
<sup>7</sup> <http://no-redd.com>; <http://www.redd-monitor.org/2011/09/22/no-redd-platform-issues-wakeup-call-to-funders/>; <http://terradedireitos.org.br/biblioteca/carta-de-belem-os-efeitos-das-mudancas-climaticas-e-a-politica-de-redds/>; [http://terradedireitos.org.br/wp-content/uploads/2012/03/encarte\\_publica%C3%A7%C3%A3o-final-1.pdf](http://terradedireitos.org.br/wp-content/uploads/2012/03/encarte_publica%C3%A7%C3%A3o-final-1.pdf).

<sup>8</sup> UNFCCC, Decision 1/CP.16, par. 70. Document available at: <https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf>.

<sup>9</sup> More information is available at the website of the Ministry for the Environment, Brazil: <http://redd.mma.gov.br/pt/estrategia-nacional-para-redd>.

other governmental programs with impact in climate change. The Company for Development of Environmental Services (CDSA) was created by the SISA Law to generate and retire carbon and other credit types resulting from activities developed in the context of SISA. The company was established in September 2012 and is authorized to represent SEDENS.

Figure D.1 Governance Structure of SISA



Source: Adapted from the IMC website. [http://imc.ac.gov.br/?page\\_id=66](http://imc.ac.gov.br/?page_id=66)

### Technical Elements (and Challenges) of Nesting

The state of Acre has followed the recommendations provided by the Global Observation of Forest and Land Cover Dynamics (GOFD/GOLD)<sup>10</sup> to set up an effective and transparent monitoring, reporting, and verification system. The source data used in the MRV system are originally generated through PRODES,<sup>11</sup> which is a program implemented by Brazil's National Institute of Space Research (INPE).

The development of a deforestation reference level is time and effort intensive and represents a significant percentage of the cost jurisdictions face when establishing a REDD+ program. Acre uses maps with a resolution 1:250,000 from the EEZ Phase 2 and a conservative average carbon stock value of aboveground living biomass of  $123 \pm 46$  tonnes of carbon per hectare<sup>12</sup> (tC/ha) (Salimon et al. 2011). This carbon stock value was chosen after reviewing information generated in different forest inventories carried out for the development of the second national greenhouse gas inventory and investment in generating subnational-specific statewide biomass carbon stocks for the jurisdictional REDD program in

<sup>10</sup> More information available at: <http://www.fao.org/gtos/gofc-gold>.

<sup>11</sup> Programa Despoluição de Bacias Hidrográficas.

<sup>12</sup> This value represents  $451 \pm 169$  tonnes of carbon dioxide per hectare (tCO<sub>2</sub>/ha).

Acre. Salimon et al. (2011) conducted this study. Considering the better state of many of its forests when compared with forests in other Brazilian states, Acre adopted a value more conservative than that used by the federal government for the calculation of Brazil's second national GHG inventory, which considers 132.2 tC/ha for any type of forest within the Amazon biome.<sup>13</sup> For the third national communication under the UNFCCC delivered by Brazil in 2016, a new carbon map was used in which the carbon stored in vegetation classes in each Brazilian biome was identified. The carbon stocks per vegetation class presented, in general, more conservative values than those considered for the second national communication (Englund et al. 2017). Hence, while Acre apparently followed a conservative approach when establishing the average carbon stock value of aboveground living biomass, these values may still experience adjustments in future revisions of Acre's deforestation reference level.

Acre's REDD+ jurisdictional system is operational and has already delivered benefits to stakeholders participating of the ISA Carbon Program under SISA.<sup>14</sup> SISA has pursued the validation and verification under the VCS JNR framework. The state government developed the Acre Carbon Standard (ACS)<sup>15</sup> as an internal standard<sup>16</sup> for use in tracking the performance against emissions reductions targets as Acre continued the pilot under the VCS JNR—that is, to not lose the overview on emission reductions and avoided deforestation while the process of certification under the VCS was completed. To date, it is unclear what role the ACS may play in the eventual scenario where projects nest in Acre's jurisdictional REDD+ program; the ACS is registered in the platform Markit as a standard, but the only documentation available is restricted to the documents that were developed for the validation of the jurisdictional program under the VCS.

The SISA considers a set of provisions for the nesting of private initiatives as long as they are recognized and integrated in the ISA Carbon Program. However, when the SISA Law was formulated, there were already REDD+ projects validated under the VCS that were neither recognized nor integrated in the ISA Carbon Program. These projects consider different REDD+ categories, carbon pools, and gases in their respective designs than those included within the boundaries of the jurisdictional REDD+ program. This has created a conflict when attempting to nest these private initiatives into the jurisdictional program.

The process of transition from stand-alone to nested activities is known as “grandparenting” and represents a critical accounting issue. Factors influencing the accounting of grandparented projects are the difference in deforestation rates considered in the reference level used for the calculation of net actual emission reductions, the carbon pools considered both in the reference level and in the with-project scenario, and the GHGs considered both in the reference level and in the with-project scenario. The grandparenting processes can be immediate or follow a gradual step-down from the original to the new reference level until full nesting is achieved over a fixed grace period agreed bilaterally between the jurisdiction and the proponents of private initiatives.

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<sup>13</sup> For more information, see:

[http://www.fundoamazonia.gov.br/FundoAmazonia/export/sites/default/site\\_pt/Galerias/Arquivos/CTFA/Nota\\_Tecnica\\_2012.pdf](http://www.fundoamazonia.gov.br/FundoAmazonia/export/sites/default/site_pt/Galerias/Arquivos/CTFA/Nota_Tecnica_2012.pdf).

<sup>14</sup> <http://www.ecosystemmarketplace.com/articles/jurisdictional-redd-long-deferred-soon-delivered/>.

<sup>15</sup> Details about the Acre Carbon Standard can be consulted at the Markit registry: [https://mer.markit.com/br-reg/public/project.jsp?project\\_id=103000000005599](https://mer.markit.com/br-reg/public/project.jsp?project_id=103000000005599).

<sup>16</sup> Internal or proprietary standards are those used to certify one or two projects or programs. Often, the motivation for users to develop internal or proprietary standards are avoiding high validation and verification costs under third-party standards, overcoming language barriers, and fulfilling the expectations of buyers who do not have concerns using internal or proprietary standards. In Acre, an internal standard was created to track the government's own goals while the validation under VCS JNR was still in process.

Table D.1 Comparison of Carbon Pools and GHG Included in Acre's Jurisdictional REDD+ Program and in the VCS-validated REDD+ Initiatives Present in Acre

Carbon pools	Baseline, reference level, and program activity		Baseline, reference level, and project activity (+leakage)							
	ISA Carbon Program of Acre		Envira Amazonia Project		Purus Project		Russas Project		Valparaiso Project	
	Included?	Gas	Included?	Gas	Included?	Gas	Included?	Gas	Included?	Gas
Aboveground tree or woody biomass	Included	CO <sub>2</sub>	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning
Aboveground non-tree or non-woody biomass	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.
Belowground biomass	Excluded	n.a.	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning
Litter	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.
Deadwood	Excluded	n.a.	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning
Soil (including peat)	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.
Wood products	Excluded	n.a.	Included	CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O for biomass burning	Excluded	n.a.	Excluded	n.a.	Excluded	n.a.

Note: As per the VCS documents AFOLU requirements and VCS JNR requirements, the term "baseline scenario" follows the guidance provided by the Glossary of CDM Terms and represents "the scenario for the A/R CDM project activity or A/R CPA that reasonably represents the sum of the changes in carbon stocks in the carbon pools within the project boundary that would occur in the absence of the A/R CDM project activity or A/R CPA." Please note that the term "baseline scenario" under the VCS JNR represents the same concept as the reference level, understood as the benchmarks for assessing performance of a country, program, or REDD+ project considered in UNFCCC's REDD+ terminology. n.a. = not applicable.

Acre has made significant strides in the establishment and operationalization of the key elements necessary for the implementation of REDD+ policies at the jurisdictional level: a forest reference level, a forest monitoring system, an action plan, and a safeguards information system (UN-REDD 2015). Acre's jurisdictional REDD+ reference level presents future scenarios of GHG emissions from deforestation in the absence of additional efforts to modify the practices that represent the business as usual.

The reference level was created using PRODES data, which are also used to monitor historic deforestation at the federal level. Acre's reference level considers the overall deforestation rates within the state without locating them in specific regions; that is, it is not geographically explicit. The conscious decision to use PRODES was unilateral and allowed the government of Acre to align its reference level and monitoring system with the work developed by the Brazilian Ministry of Environment in Brazil's National Policy on Climate Change and the National REDD+ Strategy.<sup>17</sup> The ISA Carbon Program, the technical and

<sup>17</sup> Brazil's National REDD+ Strategy had not been published when Acre's jurisdictional reference level was developed.

the scientific framework of Acre's SISA Law, was also developed, taking into consideration that the system would eventually nest into Brazil's National REDD+ Strategy.

Articles 23 and 24 of Brazil's Federal Constitution of 1998 open the possibility for states to legislate on payments for environmental services/REDD+. Per Brazil's Complementary Law 140/2011, each federal state has authority "to set general standards," and supplemental authority can be given to other federal entities, such as states and municipalities, so that the state entities can respond to their regional aspirations.

The methodology used for the calculation of the jurisdictional reference level considers that all the observable deforestation within state boundaries is unplanned.<sup>18</sup> However, this approach is not valid for private property located in Acre since, based on the applicable federal legislation, landowners with a land management plan approved by the state's Environmental Office can deforest specific patches of land originally covered with forest if the overall native forest cover within the property exceeds 80 percent.<sup>19</sup>

This conflict between unplanned deforestation on state land and planned deforestation on private land has a significant impact on the temporal dimension applicable to the generation of carbon credits. This issue can also affect the final amount of credits generated because the business-as-usual scenarios for the planned versus the unplanned approaches are different. Those private areas preserved but with legal permission to be deforested can certify their emission reductions and removals (ERRs) as carbon credits as soon as the area has an approved management plan and is registered as a REDD+ project under the VCS. The amount of carbon credits generated would be equivalent to the portion of undisturbed carbon pools present in the lands with legal permission to be deforested and selected for further monitoring in the project design document. On the contrary, those areas experiencing unplanned deforestation processes need an ex post measurement to define the amount of deforestation disturbance that has been avoided through the project activity. Annex D.1 provides a calculation of the credits eventually available for commercialization in the voluntary market by the government of Acre after registering the VCS JNR and after subtracting the credits generated by private initiatives.

In addition, in the jurisdictional reference level the overall rate of deforestation is applied to all forests without distinction, that is, the stratification of areas is absent, and forests' carbon stocks are accounted using a single carbon stock value. At the same time, VCS-validated projects occurring within the administrative boundaries of Acre can include and have included in their project design documents areas stratified in forest types with specific carbon stocks and diverse deforestation rates, which has allowed each project owner to optimize the generation of carbon credits in their project's territory. For the nesting process, Acre expected to apply the same emission factor (that is, carbon stock change for deforestation) to the jurisdiction areas and in the areas of VCS-validated projects. This was not attractive for the promoters of the VCS-validated projects and constituted a disincentive to join the jurisdictional REDD+ program.

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<sup>18</sup> Deforestation is a process of change in land cover that can occur due to a multitude of causes. Changes in land cover can be planned, that is, designated and sanctioned, to expand the agricultural frontier or establish new infrastructures. Planned deforestation is associated to a frontier deforestation spatial pattern. Changes in land cover can also be unplanned, that is, unsanctioned; unplanned changes usually occur in areas of poor governance and are associated with a mosaic deforestation spatial pattern (see the WWF's 2013 report *Assessing Risks to Forest Cover and Carbon Stocks: A Review of Tools and Approaches to Compare Business-as-Usual to REDD+ Scenarios*, <http://wwf.panda.org/?209271/REDD-MRV-tools>).

<sup>19</sup> Per Article 12 of the Brazilian Forestry Code (Law 12,651 of May 25, 2012), all rural property located in a forest area in the Legal Amazon must maintain with native vegetation cover an area of Legal Reserve representing a minimum percentage of 80 percent in relation to the area of the property, without prejudice to the application of the rules on Permanent Preservation Areas. Hence, properties presenting native forest covers beyond 80 percent in relation to the area of the property can legally deforest until reaching the threshold considered by Law 12,651.



## Nesting in Acre

Acre is one of the most advanced jurisdictions with regard to successfully implementing REDD+ activities. The state invested significant resources to get reliable data on land tenure and law enforcement. Acre took provisions to align with Brazil's GHG and REDD+ reporting requirements and with the National REDD+ Strategy. Moreover, Acre has managed to establish a system of payment for environmental services that rewards efforts to preserve natural capital in its territory by avoiding the emissions of GHG linked to deforestation and by undertaking activities of forest conservation, forest carbon stock enhancement, and sustainable forest management. SISA has been articulated through a series of instruments working on the following topics:

- Control, registry, participation, and management
- Economic and finance issues
- Implementation
- Planning

Acre is a jurisdiction that had nearly all the pieces in place to implement a nested system, including the necessary legal and institutional structures. It only required development of technical procedures associated with nesting in order to implement a nested program and to provide incentives to projects. However, Acre did not consider the nesting requirements applicable, and this was one major cause for the jurisdiction experiencing difficulties registering the jurisdictional REDD+ program under the VCS JNR. Not registering under the VCS JNR prevented Acre from accessing the voluntary carbon market, where jurisdictional credits could be commercialized in parallel to the bilateral agreements that the state had signed with a donor government. This has limited Acre's capacity to access additional finance to reward forest conservation efforts.

Until 2015, when the validation under the VCS JNR started, Acre had accessed ODA and other types of finance. Until that moment, the state did not have any incentive to investigate which private REDD+ initiatives were taking place within the state's administrative boundaries. Finance linked to avoided deforestation arrived at the state irrespective of the presence of privately driven avoided deforestation initiatives. During the validation process, it became necessary for Acre to attend the provisions the VCS had established to nest private initiatives into the jurisdictional scheme. This implied a series of concessions from both sides, that is, the private initiatives and the state, which was perceived by the state as an unexpected trade-off.

In sum, nesting has not been able to get off the ground in Acre. The state government ignored the approaches used by the VCS-validated projects and decided to apply the VCS JNR because it was the only standard allowing them to work at a subnational scale; it didn't understand the need to nest projects that had been developed and validated previously in their territory (this was only understood once the governmental program was at validation stage). During the validation process, the government of Acre requested the VCS invalidate the existing registered projects, but there was no mechanism (including within VCS) to do so. As a consequence, the nesting of independent activities in the subnational REDD+ scheme became a complex issue. Then, the state government decided to ignore the projects that were already validated and to install preconditions for any new projects developed in the region—that they should follow the jurisdictional reference level and accounting rules—in an effort to make nesting possible for these eventual projects once the jurisdictional program was registered under the VCS.

In addition, the German government did not consider solving the nesting issue prior to providing Acre funding through the REDD Early Movers program. As a result of that, combined with the state government's decision to simply ignore existing projects, today there exists no incentive to certify the jurisdictional scheme or to certify any additional private REDD+ initiative.

### **Conclusion: What Are the Key Lessons Learned?**

Acre had established the four elements identified by the UNFCCC as key to implementing REDD+ at a jurisdictional level: a forest reference level, a forest monitoring system, an action plan, and a safeguards information system.<sup>20</sup> However, the process of nesting projects that existed prior to the formulation of the jurisdictional scheme did not work satisfactorily. The main lessons learned from this experience are as follows:

- REDD+ independent initiatives occurred in Acre earlier than the formulation of the jurisdictional program and had advanced much faster in their certification. The experience from independent REDD+ activities in validation, registry, and verification processes could have been very useful for the government of Acre if adequate communication between these entities would have existed.
- All areas included in independent REDD+ initiatives were private and had to comply with the Environmental Rural Cadaster (CAR). The certification of the REDD+ activities undertaken in these private properties helped implement CAR in a smoother fashion and it could have been used to streamline the compliance of private properties with the requirements of CAR and include the achievements of the private sector in the context of SISA.
- One major aspect in the nesting discussion between the government of Acre and the proponents of independent REDD+ activities was the amount of credits that the jurisdiction would not be able to include in its credit accounting streams and the temporary dimension of this "cession," that is, planned versus unplanned deforestation generate different amounts of credits along the time.
- The government of Acre decided to certify its program under the VCS JNR, which implies assuming a series of requirements that are expressed on a standard that is established by a third entity, that is, the VCS. Assuming the requirements of a third party can be sometimes challenging for political structures that are used to acting as an executive power.

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<sup>20</sup> UNFCCC, Decision 1/CP.16, paragraph 71.

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Annex D.1 Analysis of Eventual Availability of Credits by the Government of Acre After Registration under the VCS JNR and Deducing the Amount of Credits Attributable to Private REDD+ Initiatives, per Year

Source of carbon credits		Years										TOTAL
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Acre Jurisdictional REDD+ Program	Ex ante	8,840,413	18,114,180	15,080,705	18,850,882	13,334,028	7,974,394	6,332,343	1,773,882	10,984,984	11,518,576	112,768,387
	Ex post											
Envira Amazonia Project	Ex ante								1,926,524	2,022,336	2,144,420	6,093,280
	Ex post								1,923,866	2,006,058		3,929,924
Russas Project	Ex ante							18,030	101,726	131,428	127,693	378,877
	Ex post						140,450					140,450
Valparaiso Project	Ex ante							38,780	183,460	179,569	182,449	584,258
	Ex post						306,774					306,774
Purus Project	Ex ante						57,243	69,273	65,490	81,057	112,394	385,457
	Ex post						163,055		51,864	51,648	90,922	357,489
Sum of credits potentially generated through the verification of Acre VCS JNR Program												112,768,387
Sum of credit generation calculated ex ante by REDD+ private initiatives in Acre												7,441,872
Sum of verified credits generated by REDD+ private activities in Acre												4,734,637

Legend:

Number of credits calculated ex ante
Number of credits verified by a third party. The cell border expanding over several years indicates the verification vintage, i.e. the years of project activity the amount of verified credits makes reference to.

## E. GUATEMALA

By Pablo Llopis

### History of Development of the Nested System

Guatemala—whose name stems the Nahuatl word *Quauhtlemallan*, meaning “land of many trees” (Goetz 2003)—gained its independency from Spain in 1821 and experienced a tumultuous second half of the 19<sup>th</sup> century. Between 1960 and 1996, internal armed conflict, caused to a great extent by land disputes, had a significant impact on the environment and the social structure of the country. In 2012, the observed annual deforestation for the period 2006–10 was calculated to be 38,597 hectares per year (INAB 2012). An updated calculation developed in 2017 quantifies the annual deforestation at 115,792 Ha\*year<sup>-1</sup>, which corresponds approximately to the greater metropolitan area of Berlin, every year.

The forests of Guatemala covered 3,722,595 hectares in 2010, representing 34 percent of the country’s emerged lands (INAB et al. 2012). Guatemala presents a high ratio of coastline length over country area, and it has a very mountainous topography. This has resulted in a wide range of climate regimes and remarkable biodiversity resources. The fragility of the equilibrium between ecosystems is notable and Guatemala was classified as the ninth country worldwide most affected by extreme weather events in the period 1996–2015 (GermanWatch 2017). Attending to this vulnerability, climate change, and more specifically REDD+, has been included in Guatemala’s political agendas since 2008.

The Ministry of Environment and Natural Resources (MARN) is the focal point for climate change and REDD+ in Guatemala and coordinates the Interinstitutional Coordination Group (GCI). The governance of forestlands in Guatemala is managed by two institutions: the National Council for Protected Areas (CONAP), which belongs to MARN, and the National Institute of Forests (INAB), overseen by the Ministry of Agriculture, Fishery and Nutrition (MAGA).

Forestlands in Guatemala experience deforestation and degradation phenomena driven by cattle ranching, drug trafficking, expansion of the agricultural frontier (for commercial and subsistence purposes), collection of firewood, establishment of human settlements, and occurrence of forest fires (IARNA 2013). The most recent assessment of drivers and agents of deforestation in Guatemala includes an unprecedented analysis of sectors such as mining, petroleum, and shrimp culture in those regions of the country where they are relevant (GCI 2018). Other aspects, such as the concentration of land ownership and social inequality, fuel the establishment of subsistence agriculture plots through irregular grabbing of forestland.

In 2012–13, the government of Guatemala explored, through funding facilitated by the U.S. Agency for International Development, the possibility of developing a subnational jurisdictional REDD+ program in the northern region of the country under the certification scheme VCS JNR. This certification process never materialized. Certifying such a program would have generated the possibility of issuing certified carbon assets tradable in the voluntary market through a jurisdictional program, something that any jurisdiction has achieved to date. The initiative was motivated by the alarming deforestation rates observed in high conservation value forests around the Maya Biosphere Reserve and the uncertainty associated with the financial resources available from the Guatemalan state for fighting against deforestation in the years to come.

At that time, two different small-scale independent REDD+ initiatives were under development in the region of Petén.<sup>1</sup> This situation had exposed the Guatemalan administration to the REDD+ nesting issue in 2012. Later, in 2013, the REDD+ Project for Caribbean Guatemala: The Conservation Coast was started in the Sarstún-Motagua subnational jurisdiction. All independent initiatives were being developed in areas consisting of a mosaic of lands with mixed tenure regimes and forest types, including state-owned lands managed by institutions from the public, private, and civil sector. As of February 2018, the three independent REDD+ initiatives had completed the certification cycle under the VCS and had issued credits that are being commercialized in the voluntary market. The implementation of two of the three certified projects is community-based.

In this context of exposure to the nesting issue, Guatemala developed its land use-oriented National Climate Change Policy and approved the framework law to regulate vulnerability reduction, obligatory adaptation to the effects of climate change, and the mitigation of greenhouse gases (Climate Change Law) in 2013.<sup>2</sup> The process received financial support from the Inter-American Development Bank (IDB), which in 2010 agreed to a US\$250 million dedicated loan. In parallel, the country had been looking for financing sources to implement REDD+ activities at subnational and national levels and had received a grant of US\$200,000 from the World Bank Forest Carbon Partnership Facility (FCPF) in response to their REDD+ Readiness Project Idea Note (R-PIN) proposal. After Guatemala submitted a REDD+ Readiness Preparation Proposal (R-PP), the FCPF facilitated access to a further US\$3.6 million grant.<sup>3</sup> Guatemala secured an additional US\$5 million from the FCPF in 2016 to finalize the readiness phase. In June 2017, the FIP Investment Plan for Guatemala was approved. This plan will provide access to US\$24 million (US\$3.15 million donation and US\$20.85 million concessional loan).

After a complex political transition in 2015 and 2016, Guatemala's Ministry of Finance (MINFIN) submitted a signed letter of intent to the World Bank in April 2017,<sup>4</sup> expressing conformity on the terms presented by the multilateral organization for the "Potential Purchase of Emission Reductions from the 'Guatemala National Emission Reduction Program: Through Strengthening Forestry Governance in Vulnerable Communities.'" Guatemala delivered its Readiness Package (R-Package)<sup>5</sup> to the FCPF in January 2018, including the first version of three baselines: (a) deforestation, (b) degradation, and (c) carbon stock enhancement. The submission of the R-Package was an important milestone of the FCPF REDD+ Readiness phase, and it can trigger the beginning of the implementation phase (Guatemala's REDD+ annual country progress reporting under FCPF, 2017).

Guatemala has requested few financing resources from the UN-REDD+ Programme. The country requested inclusion in the program in July 2013 and was accepted in August of the same year. Targeted support in the amount of US\$21,000 was requested to improve the governance of its REDD+ program. A diagnostic study was implemented between June 2014 and February 2015. The conclusion was that Guatemala needed to clarify tenure and carbon rights and benefit-sharing mechanisms, and respect indigenous people's rights in the context of the climate change law. The Country Needs Assessment of the UN-REDD+ Programme was implemented on May 2017 and identified areas for further improvement

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<sup>1</sup> Information on the Lacandon – Forests for Life REDD+ Project, is available at: [http://www.vcsprojectdatabase.org/#/project\\_details/1541](http://www.vcsprojectdatabase.org/#/project_details/1541).

<sup>2</sup> Law available at: [http://www.elaw.org/system/files/gt.ley\\_cambio\\_climatico.pdf](http://www.elaw.org/system/files/gt.ley_cambio_climatico.pdf).

<sup>3</sup> Data retrieved from the webpage "The REDD+ Desk" (<http://theredddesk.org/countries/guatemala>) and corroborated through informal interviews with stakeholders.

<sup>4</sup> The full document is available online:

<https://www.forestcarbonpartnership.org/sites/fcp/files/2017/May/816%20BM%20envio%20CdI%20suscrita%20280417.pdf>.

<sup>5</sup> The R-Package is collection of documents required by the FCPF at the end of the REDD+ Readiness phase. It consists of five core elements: (1) a REDD strategy, (2) an implementation framework, (3) a monitoring, reporting, and verification (MRV) system, (4) a reference level scenario (REL), and (5) safeguards.

on gender issues; the benefit-sharing mechanism arrangement; identifications of legal, institutional, fiscal, and economic aspects influencing the deforestation and forest degradation processes; land tenure; and information accessibility, including culture aspects and different languages (UN-REDD+ Programme 2018). In early 2018, the government of Guatemala together with relevant stakeholders conducted an auto evaluation of the progresses in the implementation of the country's REDD+ strategy.

### Technical Elements of the System

Guatemala started developing programs to incentivize investment in forestlands in 1975, which makes the country a pioneer in payments for environmental services. In 1996, INAB started implementing a Forestry Incentives Program (PINFOR) that established a primary form of payment for environmental services. INAB followed up this strategy with the Program of Incentives for Smallholders (PINPEP) in 2005. MAGA reports that the combined action of these two programs has resulted in the preservation and establishment of plantations and agroforestry systems totaling more than 300,000 hectares (MARN 2018). The preliminary forest reference emission level/forest reference level (FREL/FRL) developed by Guatemala for 2001–10 was published in mid-January 2018 and shows a significant drop below the deforestation average in 2007,<sup>6</sup> one year after PINPEP had been operational (GIMBUT 2017). The next three years (2008–10) show deforestation measures below the FREL/FRL average.

To establish the deforestation reference level Guatemala has considered the deforestation observed in the reference period 2001–10. The country was divided into five REDD+ subregions that do not coincide with the country's administrative boundaries, and a specific FREL/FRL was developed that considers only three out of the five possible REDD+ activities: reducing emissions from deforestation, reducing emissions from degradation, and enhancement from forest carbon stocks, as described by the UN-REDD+ Programme.<sup>7</sup> The names of the five regions are Costa Sur, Occidente, Centro Oriente, Sarstún-Motagua, and Tierras Bajas del Norte (figure E.1).

It should be noted that the latest available progress report from Guatemala to the FCPF (July 2017) lists different REDD+ activities that make reference to strategies conceived by the government to combat deforestation and degradation and support the carbon enhancement (box E.1), but they should not be considered as REDD+ activities, as described in the UN-REDD+ Programme.



Figure E.1 Guatemala's REDD+ Subnational Regions

<sup>6</sup> The document is available at: <http://www.marn.gob.gt/Multimedios/9385.pdf>.

<sup>7</sup> Guatemala does not consider the REDD+ activity "conservation of forest carbon stocks" or the activity "sustainable management of forests." Description of the activities is available at: <http://www.unredd.net/documents/global-programme-191/multiple-benefits/workshops-and-events-1/un-redd-asia-pacific-region-workshop-3282/11244-5-redd-activities-described-in-1-cp-16-unfccc-and-their-relationship-to-redd-actions-11244.html?path=global-programme-191/multiple-benefits/workshops-and-events-1/un-redd-asia-pacific-region-workshop-3282>.

### Box E.1 Activities Included in Guatemala's REDD+ Strategy

1. Sustainable management of natural forests for productive purposes
2. Promotion of agroforestry and silvopastoral systems
3. Reforestation and restoration
4. Monitoring, control, and surveillance
5. Compatible activities
6. Sustainable forest management

Source: Government of Guatemala 2017.

Guatemala's FREL/FRL has been calculated as an historical average of observed deforestation and accounts for GHG emissions of almost 45 million tCO<sub>2</sub>e/year for the reference period 2001–10. Similarly, the degradation<sup>8</sup> accounted for 4.5 million tCO<sub>2</sub>e/year and carbon enhancement for around 40,000 tCO<sub>2</sub>e/year for the same reference period (GIMBUT 2017). Aggregating all sources of GHG emissions and removals, Guatemala presents net GHG emissions of 49.3 million tCO<sub>2</sub>e/year. The subnational region of Tierras Bajas del Norte (that is, the Northern Lowlands)—where the first subnational jurisdiction was developed and VCS validated, and where a verified REDD+ project can be found—represents 54.4 percent of the overall net emissions reported in the reference period. The estimation of historic deforestation is geographically explicit (Figure E.2).<sup>9</sup> Guatemala is working on developing a FREL/FRL for the period 2011–16 as well as on a future deforestation model.

The quantification of degradation considers the estimation of GHG emissions as a result of forest fires. The process involved analyzing satellite images to determine which forest fires caused deforestation and which degradation, and only these last were included in the calculation. After this, the GHG emissions were estimated using emission factors extracted from bibliography. The quantification of carbon enhancements is based on data provided by the PINFOR and PINPEP programs, both registered and monitored by INAB. An overview of GHG emissions considered in the FREL/FRL per REDD+ activity and subnational region is provided in table E.1.

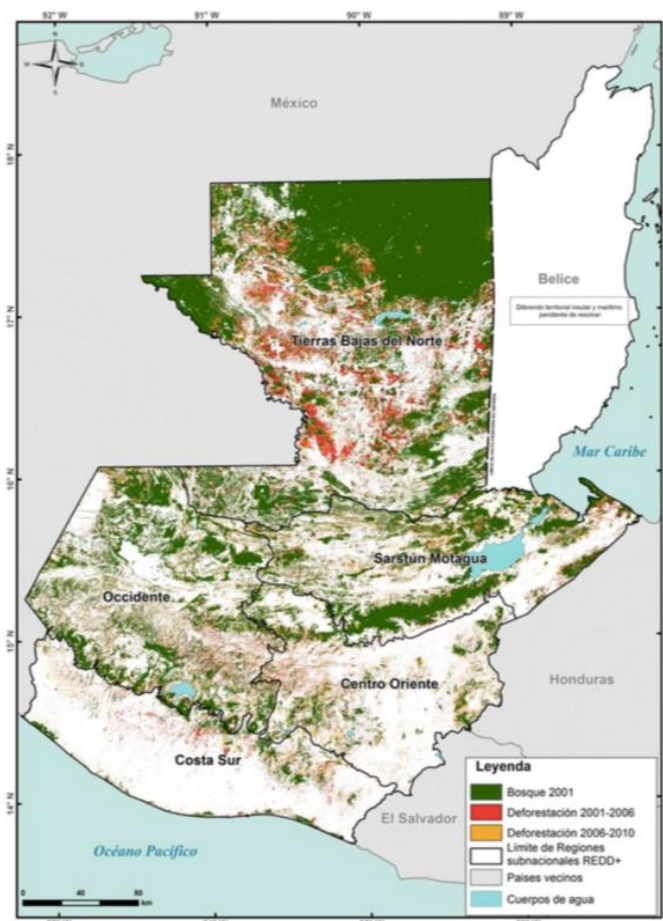


Figure E.2 Forest Dynamics for 2001–06 and 2006–10

<sup>8</sup> The degradation component includes exclusively emissions from forest fires. To date, Guatemala has not enough data to include forest degradation estimates as a result of use of forest biomass as energy source (that is, firewood).

<sup>9</sup> The concept of geographically explicit makes reference to the fact that the future deforestation model generated to establish the reference level locates geographically how much and where deforestation will happen.



Table E.1 Overview of GHG Emissions and Sequestration per REDD+ Activity and Subnational Region

Subnational region	REDD+ activity	tCO <sub>2</sub> e/year	% of total tCO <sub>2</sub> e/year
<b>Centro Oriente</b>	Deforestation	4,982,992	97.77%
	Degradation	117,826.3	2.31%
	Carbon stock enhancement	-4,085.59	-0.08%
	<b>Total</b>	<b>5,096,733</b>	<b>100%</b>
<b>Costa Sur</b>	Deforestation	2,639,720	99.40%
	Degradation	22,646.1	0.85%
	Carbon stock enhancement	-6,768.00	-0.25%
	<b>Total</b>	<b>2,655,598</b>	<b>100%</b>
<b>Occidente</b>	Deforestation	8,006,859	97.72%
	Degradation	197,743.4	2.41%
	Carbon stock enhancement	-10,550.13	-0.13%
	<b>Total</b>	<b>8,194,052</b>	<b>100%</b>
<b>Sarstún-Motagua</b>	Deforestation	6,423,715	98.01%
	Degradation	132,802.8	2.03%
	Carbon stock enhancement	-2,095.55	-0.03%
	<b>Total</b>	<b>6,554,422</b>	<b>100%</b>
<b>Tierras Bajas del Norte</b>	Deforestation	22,930,049	85.25%
	Degradation	3,984,087.9	14.81%
	Carbon stock enhancement	-1,6394.22	-0.06%
	<b>Total</b>	<b>26,897,743</b>	<b>100%</b>
<b>National value</b>	Deforestation	44,983,335	91.06%
	Degradation	4,455,106.5	9.02%
	Carbon stock enhancement	-39,893	-0.08%
	<b>Total</b>	<b>49,398,548</b>	<b>100%</b>

Source: GIMBUT 2017.

According to the Guatemalan Climate Change Law,<sup>10</sup> the proprietary rights of the environmental assets generated through independent forest and other carbon initiatives belong to the project proponents. As a prerequisite, the state establishes that project proponent candidate entities (that is, legal persons, individuals, or the state) must be registered with MARN. However, this implies that when a MARN-approved private entity certifies any REDD+ activity in Guatemala, under any certification scheme, the state will have to deduct the carbon credits certified from the state's GHG accounting system to avoid a double counting issue. This will condition the bi- and multilateral agreements linked to REDD+ and other landscape-based activities (for example, climate-smart agriculture, afforestation/reforestation [A/R], efficient cookstoves<sup>11</sup>) that Guatemala will sign post-COP21. To date there are three certified REDD+ stand-alone projects,<sup>12</sup> one stand-alone A/R project,<sup>13</sup> and one efficient cookstove project<sup>14</sup> with issued carbon credits (table E.2). It should be highlighted that several stakeholders have expressed that the characteristics of the Climate Change Law have conditioned the feasibility of REDD+ stand-alone initiatives.<sup>15</sup>

<sup>10</sup> Climate Change Law (Decreto 7/2013): [https://conred.gob.gt/site/documentos/base\\_legal/ley\\_cambio\\_climatico.pdf](https://conred.gob.gt/site/documentos/base_legal/ley_cambio_climatico.pdf).

<sup>11</sup> According to INAB, IARNA-URL, FAO/GFP 2012, cited by MARN (2018), Guatemala has an overall deficit of 6 million cubic meters of firewood per annum. Meeting the demand of biomass-based energy constitutes a relevant driver of forest degradation. More information is available on the MARN website: [http://www.marn.gob.gt/s/redd\\_/paginas/Importancia\\_REDD\\_para\\_Guatemala](http://www.marn.gob.gt/s/redd_/paginas/Importancia_REDD_para_Guatemala).

<sup>12</sup> Lacandon Forests for Life REDD+ Project, [http://www.vcsprojectdatabase.org/#/project\\_details/1541](http://www.vcsprojectdatabase.org/#/project_details/1541); REDD+ Project for Caribbean Guatemala: The Conservation Coast, [http://www.vcsprojectdatabase.org/#/project\\_details/1622](http://www.vcsprojectdatabase.org/#/project_details/1622); and Reduced Emissions from Avoided Deforestation in the Multiple Use Zone of the Maya Biosphere Reserve in Guatemala (GuateCarbon), [http://www.vcsprojectdatabase.org/#/project\\_details/1384](http://www.vcsprojectdatabase.org/#/project_details/1384).

<sup>13</sup> Promoting Sustainable Development through Natural Rubber Tree Plantations in Guatemala. [http://www.vcsprojectdatabase.org/#/project\\_details/514](http://www.vcsprojectdatabase.org/#/project_details/514).

<sup>14</sup> Stove Capital Guatemala Improved Stoves and Water Purification Project. [https://mer.markit.com/br-reg/public/project.jsp?project\\_id=103000000001609](https://mer.markit.com/br-reg/public/project.jsp?project_id=103000000001609).

<sup>15</sup> The project GuateCarbon was not able to complete the verification process, mainly due to carbon assets ownership issues.

Table E.2 Guatemala Stand-alone, Land Use–Based Projects with Issued Carbon Credits

Project name	Activity	Status	Net emission reductions or removals certified as of February 2018 (tCO <sub>2</sub> e)
Lacandon Forests for Life	REDD+	Operative	411,092
REDD+ Project for Caribbean Guatemala: The Conservation Coast	REDD+	Operative	2,447,922
Reduced Emissions from Avoided Deforestation in the Multiple Use Zone of the Maya Biosphere Reserve in Guatemala (GuateCarbon)	REDD+	Operative	1,230,583
Promoting Sustainable Development through Natural Rubber Tree Plantations in Guatemala	Afforestation / reforestation	Unknown	228,839
Stove Capital Guatemala Improved Stove and Water Purification Project	Efficient cookstoves and water purification	Operative	271,634

Guatemala’s R-Package to the FCPF was not available as of mid-February 2018. No other available information was found to be relevant regarding how the subnational regions in Guatemala will nest in the national program and how stand-alone REDD+ projects will be considered in the national system. Moreover, no information was found regarding the technical specifications of the future deforestation model that will be applied to each of the FREL/FRLs in each subnational jurisdiction. It should be highlighted that the financial feasibility of the two projects that used the subnational jurisdictional baseline and future deforestation model generated for the jurisdiction of Tierras Bajas del Norte—Lacandon Forests for Life REDD+ Project, and Reduced Emissions from Avoided Deforestation in the Multiple Use Zone of the Maya Biosphere Reserve in Guatemala (also known as GuateCarbon)—was highly influenced by the geographically explicit character of the future deforestation model developed for the subnational jurisdiction. This means the projects were developed where generating the emission reductions was more cost-efficient, and if they had used the subnational average they would not have been financially feasible (they would have been even less financially feasible if they had used the national average).

Guatemala will have to find a solution to the nesting issue before it can operate a national REDD+ program. However, the exposure that the government has had to the issue and the efforts that have been undertaken by the Guatemalan administration and the outcomes that have been generated by the private small-scale REDD+ initiatives have delivered very interesting lessons learned. The main outcomes achieved are described in box E.2.

**Box E.2 Main Outcomes of Previous Efforts to Establish a Jurisdictional REDD+ Scheme in Guatemala**

- Development and implementation of a geographically explicit subnational reference level and future deforestation model for the Northern Lowlands of Guatemala
- Identification of capacities at the local level and establishment of an institution with interministerial transversal character responsible for the technical implementation of the jurisdictional REDD+, the Center for Monitoring and Evaluation (CEMEC)
- Early exposure to issues such as nesting and the need to establish a benefit-sharing mechanism, which typically emerge at the secondary steps of implementing a jurisdictional REDD+ program
- The consideration of a grandparenting period, that is, a timeline for independent REDD+ initiatives to progressively adopt the baseline and monitoring requirements of the jurisdictional program into which they eventually would be incorporated

## Conclusion: What Are the Key Lessons Learned?

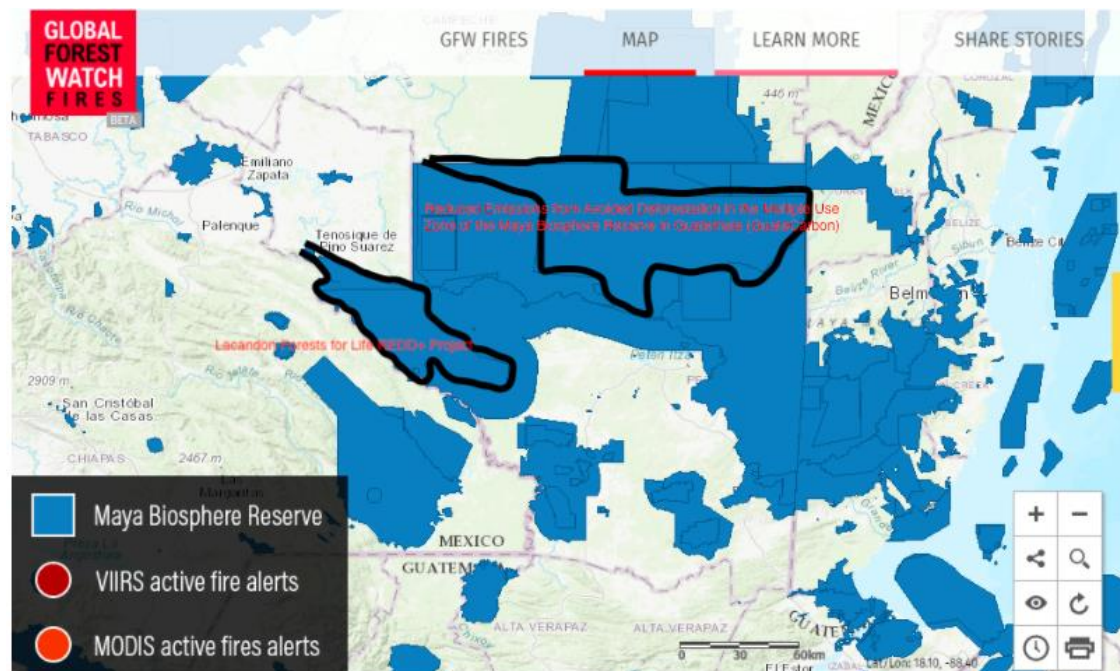
Several REDD+ initiatives have been implemented in parallel in Guatemala and thus it is vital to create the necessary conditions to implement REDD+ activities at the national level. Solving the nesting issue will be crucial for the adequate implementation of the country's REDD+ strategy and to avoid double counting issues.

In Guatemala, nesting is linked to the implementation of REDD+ activities at a jurisdictional level and cannot be considered an issue in isolation from other parameters affecting the implementation. The following bullet points summarize the most important lessons learned in the process of implementing a jurisdictional REDD+ program and how they relate to the process of nesting instances developed at lower levels than the national:

- The coordination between different governmental agencies is crucial for the REDD+ strategy to be implemented in a way that allows and creates the incentive for subnational and stand-alone initiatives to develop. The government of Guatemala has the challenge of incorporating the value generated in previous experiences—that is, the subnational baseline and deforestation model developed by CEMEC and the capacity of stand-alone initiatives to use the same FREL/FRL and future deforestation model—to the new setup of the technical team responsible for the implementation of the FCPF REDD+ program.
- Projects have shown to be more flexible identifying relevant deforestation agents and drivers, updating baselines and deforestation estimations to the requirements of a standard. They have also been more successful achieving REDD+ certifications that allowed monetizing the efforts undertaken to implement sustainable development practices in the Guatemalan land use sector. This has been a valuable source of lessons learned.
  - Stand-alone projects were able to use the geographically explicit FREL/FRL and future deforestation model developed for Tierras Bajas del Norte. This created the correct financial incentive for their smaller-scale operations because the model identified how much deforestation would happen in the future and where it would take place. The areas with the highest deforestation risks were those covered by the stand-alone projects and this allowed them to maximize their return for the efforts undertaken in stopping deforestation.
- Incorporating MINFIN as focal point in the relationship between the government of Guatemala and the FCPF created more agility in the negotiation process. Guatemala has an incentive to nest its stand-alone projects, and MINFIN is the institution charged to negotiate with the FCPF how this process will take place.
- Land tenure-related issues remain a strong disincentive to undertake REDD+ activities. Guatemala needs to invest on improving administrative procedures and ensuring consistency of spatial databases in different governmental bodies. This process of legal compliance check represents a bigger relative effort for stand-alone activities and is a disincentive to start new stand-alone activities.
- Stakeholder consultation mechanisms at national level are far more complex than at lower administrative levels. Guatemala is an ethnically mega-diverse country. For nesting procedures to take place, efforts should be made to maintain and improve the dialogue framework and space between the stakeholders, including at least private landowners, communities living in forest risk areas, the public sector (NGOs), and governmental representatives.
  - The PINFOR and PINPEP programs and stand-alone projects have established a very good structure and have been a source of lessons learned for the socialization of initiatives linked to the sustainable management of land use in Guatemala.

- Stand-alone projects were able to liaise with local stakeholders, including communities considered under an irregular status by the Guatemalan administration but that generate a non-negligible impact on forests. The stand-alone projects have been able to propose goals to their stakeholders in ways adapted to the local context, making it easier to demonstrate the positive impact of the project's achievement, gaining the trust of people living in and from the forest, irrespective of their legal status.
- Guatemala chose to define subnational jurisdictions based on biogeographical aspects, which do not coincide exactly with the country's administrative boundaries. This created uncertainty about which governmental bodies should take over certain tasks and it was decided to centralize the operation. This affects, among other things, the processes of nesting.
- The monitoring through satellite technology<sup>16</sup> shows that the incidence of fires in the areas covered by the stand-alone projects being developed in the northern lowlands of Guatemala is much lower than in neighboring areas (Sauls 2017), see figures E.3, 3.4 and E.5 below. This suggests that implementing stand-alone projects has had an impact on reducing the forest degradation component of the FREL/FRL.

Figure E.3 Location of Stand-alone REDD+ Projects within the Maya Biosphere Reserve

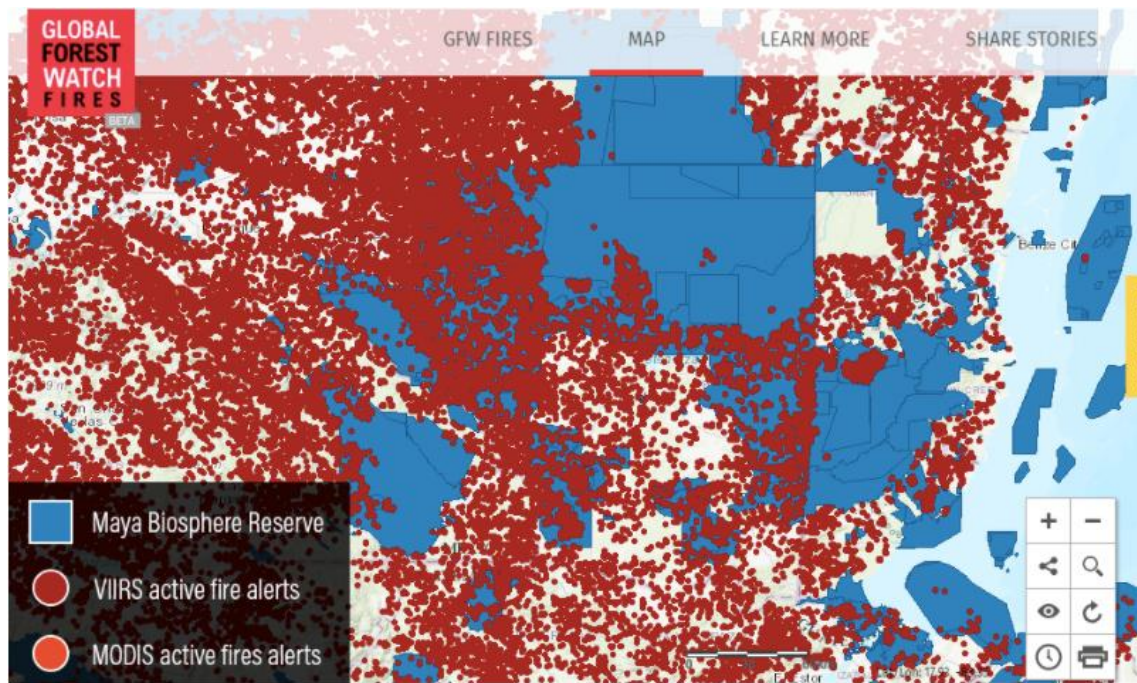


Source: Global Forest Watch.

<sup>16</sup> VIIRS and MODIS sensors are used to monitor fire occurrence. More information at: <http://www.un-spider.org/news-and-events/news/detecting-forest-fires-satellites-modis-and-viirs>.

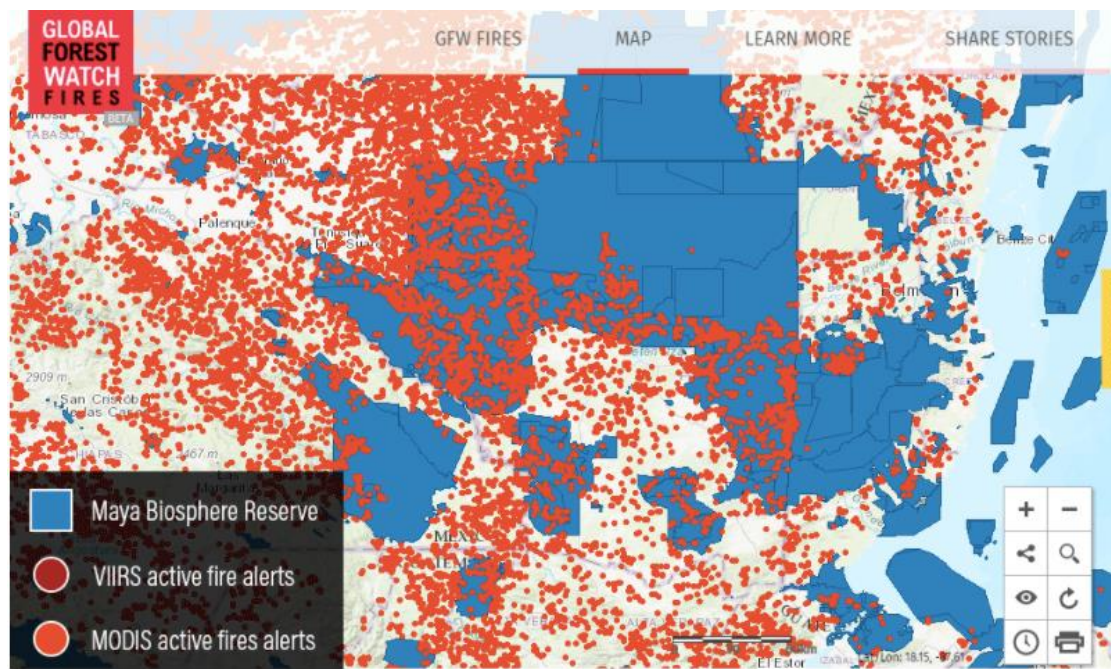


Figure E.4 VIIRS Sensor Active Fire Alerts



Source: Global Forest Watch.

Figure E.5 MODIS Sensor Active Fires Alerts



Source: Global Forest Watch.

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## F. ZAMBIA: EASTERN PROVINCE

By Donna Lee<sup>1</sup>

Eastern Province, Zambia represents a “nested” situation that could be representative of other jurisdictions that have embedded projects that have moved more quickly than the larger scale provincial program. The Zambian government is one of several participants within the BioCarbon Fund (BioCF) Initiative for Sustainable Forest Landscapes (ISFL) program designing the Zambia Integrated Forest Landscape Program (ZIFL-P) for Eastern Province. The BioCarbon Fund program provides an opportunity for the government to sign an emission reduction purchase agreement (ERPA), an advance contract to pay for results, with donors at the **subnational** scale.

The government of Zambia has also submitted a national forest reference emission level (FREL) to the UNFCCC. Emission reductions at the **national scale** will be monitored by the national measurement, reporting, and verification (MRV) system. The National REDD+ Strategy states FRELs should enable subnational activities and programs. In addition, Zambia’s national FREL submission to the UNFCCC also states it is the intent of the government to develop more refined subnational FRELs at the provincial level while also monitoring national-level performance using the national FREL (see box F.1).

Box F.1 Excerpt from Zambia’s FREL submission to the UNFCCC (Section 2.0)

*“There are 10 provinces in Zambia and it is the intent of the Government to develop, as data improves, subnational FRELs at the provincial level—but to continue monitoring performance at the national level against the national FREL. This means modifications and considered improvements on both the activity data and emission factors may be proposed as more refined estimates may become available applying the same methodology but possibly intensifying data collection to be representative at the subnational scale. The sub-national processes shall also follow the step-wise approach by refining the methodologies and techniques available to generate information for constructing FRELs at that level in a more transparent and organized manner without duplication of efforts and resources.”*

Currently, there are several Verified Carbon Standard (VCS) projects operating in Zambia. Two projects—BioCarbon Partners’ (BCP) Community Forest Program (CFP) and the COMACO Landscape Management Project (LMP)—are located within Eastern Province. COMACO’s LMP has generated and sold carbon credits; the CFP also hopes to do the same. These may be integrated into the subnational program—although whether and how this can be done is still to be determined. In addition, another existing REDD+ project (Lower Zambezi REDD+ Project) in Lusaka Province has already verified and sold Verified Carbon Units (VCUs) issued under the VCS. There are also at least four cookstove projects generating and selling VCUs. Table F.1 summarizes the scales at which REDD+ results are being measured in Zambia.

Table F.1 Scales at Which REDD+ Results Are Being Measured in Zambia

Scale	Purpose	Name of program
National	Nationally Determined Contribution	All countries that join the Paris Agreement will be required to demonstrate achievement of NDCs
	Potential access to results-based finance	The government submitted a REDD+ FREL to the UNFCCC in 2016; it may be used to request results-based finance in the future

<sup>1</sup> This case study is summarized from paper written for the Government of Zambia, funded by the UN-REDD Programme through FAO.

Subnational	Implementation of REDD+ strategy; potential access to finance	The government of Zambia is developing the ZIFL-P for Eastern Province under the BioCarbon Fund, which offers both up-front finance and results-based payments for achieved emission reductions
Existing projects	Potential access to voluntary carbon markets and other finance	BCP: Lower Zambezi REDD+ Project (LZRP), Lusaka Province
		COMACO: Landscape Management Project (LMP), Eastern Province
		BCP: Community Forests Program (CFP), Eastern Province
		Tuev Nord: Musokotwane REDD+ Project, Southern Province
		Multiple fuel-efficient (cook) stove projects

### The Challenge: Differences between Project and Jurisdictional Accounting Methods

One of the issues Zambia faces is that the projects in place each use different data and methods—compared to the national system—to estimate emissions, and also to measure performance (table F.2). At the national level, the government follows UNFCCC guidance; the projects, on the other hand, use methods under the Verified Carbon Standard.

Table F.2 Jurisdictional Accounting Methods

	Methodology used
National FREL	UNFCCC guidance
ZIFL-P	ISFL Emission Reductions Program Requirements <sup>2</sup>
BCP's LZRP	VCS, VM0009
COMACO's LMP	VCS, VM0015 and VM0017
BCP's CFP	To be decided (considering VCS, VM0015)

Scaling these up to the provincial, and then national, levels may prove challenging as in some cases there are inherent inconsistencies in the methodologies being used.

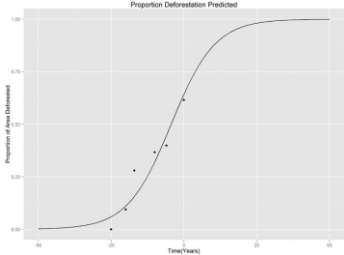
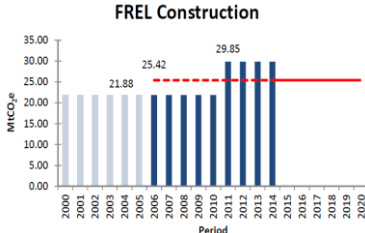
### Baseline Construction Methodologies

Table F.3 outlines the differences between three baseline construction methods currently in use. BCP's Lower Zambezi REDD+ Project assumed that future deforestation would occur in a sigmoid function (first accelerating and then decelerating once forests go toward exhaustion), resulting in expected emissions of over 189,000 tCO<sub>2</sub>/year in the first 10-year period, on an area of forestland around 40,000 hectares. By comparison, the COMACO Landscape Management Project used a model to calculate expected emissions on 288,810 hectares of forestland of around 226,000 to nearly 700,000 tCO<sub>2</sub>/year. The assumed LZRP deforestation rate is, on average, two times higher than that of LMP, raising the question: Is the Rufunsa Conservancy (private land) two times more threatened (or three times higher risk of forest loss) than the community conservation areas identified by COMACO? If so, then the calculated baselines are fair. If not, then the baseline methods should be adjusted to ensure equity between projects.

<sup>2</sup> It is assumed that the ZIFL-P will use the requirements of the BioCarbon Fund's ISFL program found at: <https://www.biocarbonfund-isfl.org/methodology>.



Table F.3 Differences between Three Baseline Construction Methods

	BCP's LZRP	COMACO's LMP	National FREL
Construction methodology	Ref. period: 1984–2009 Method: Logistic function 	Ref. period: 2002–13 Method: Modeled emissions TerrSet Land Change Modeler was used to calculate expected deforestation based on the assumption that small-scale farmers are the main agent of deforestation; therefore, the key variables used in the model include distance to settlements and roads and topography.	Ref. period: 2006–14 Method: Historical average 
Reference level	<b>127,104 tCO<sub>2</sub>e</b> on average per year over the first 10-year period <b>OR 3.1 tons/ha/yr</b>	Ranging from <b>226,746 to 695,112 tCO<sub>2</sub>e</b> on average per year over the first 10-year period (not including leakage and reversal discounts and ERs generated from non-CO <sub>2</sub> gases from reduced forest fires) <b>OR 0.8 to 2.4 tons/ha/yr</b>	<b>25.42 MtCO<sub>2</sub></b> per year which is equivalent to <b>0.3 tons/ha/yr</b> (It is expected that a national FREL would have a lower per hectare expected emissions rate since projects, ostensibly, choose higher-risk areas in which to operate)

Different historical reference periods were also used, as illustrated in table F.4. Under VCS, a project must revise its baseline at least every 10 years. The UNFCCC does not provide guidance on a reference period, or the length of time a FREL may be valid.

Table F.4 Historical Periods for Three Baseline Construction Models

	BCP's LZRP	COMACO's LMP	National FREL
Reference period	1984–2009	2002–13	2006–14
Baseline validity	2009–19, to be revised every 10 years	2013–23, to be revised every 10 years	Not specified

#### Accounting Areas versus Reference Areas

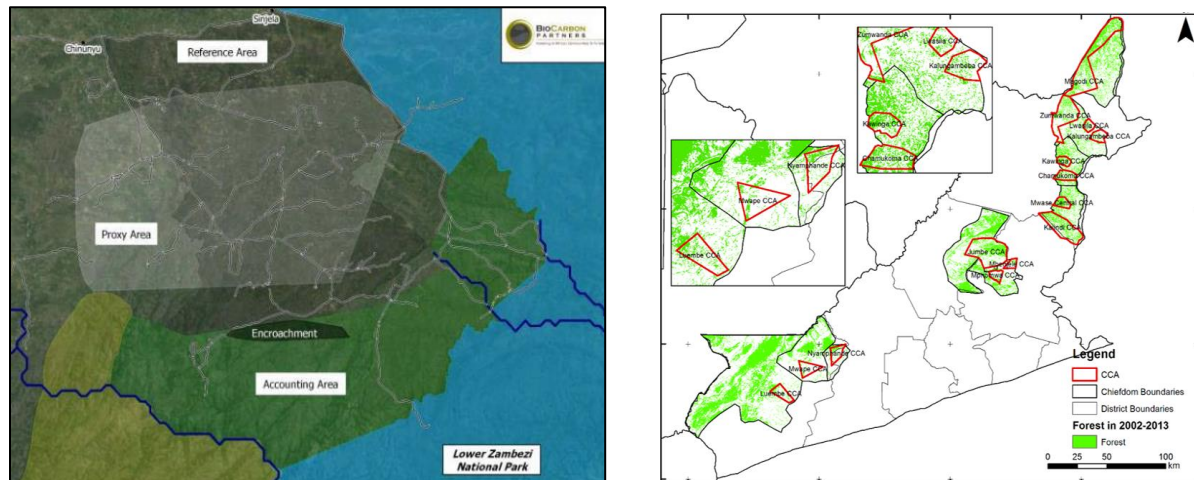
One complicating factor relates to how projects and jurisdictional programs (for example, provincial scale) define accounting areas differently. Project “accounting areas” only include forested areas, whereas jurisdictional accounting includes the entire landscapes (forest and non-forest areas). Projects also define an area where they intend to measure results separately from a “reference area” that is used to develop a baseline:

- Project accounting area: Areas that have identified forests at the start of the first monitoring period. For some methods, this area is distinct from a reference area.
- Reference area: Area is used to define the baseline, that is, an area that is considered similar to the accounting area. Data from the reference area are used to construct the baseline for the project area with the justification that similar deforestation or forest degradation would occur in the accounting area absent actions taken by the project.

Figure F.1 illustrates these two areas for two projects. On the left is BCP's LZRP, where the accounting area is the Rufunsa Conservancy (private land) and the reference area is an area located north of the

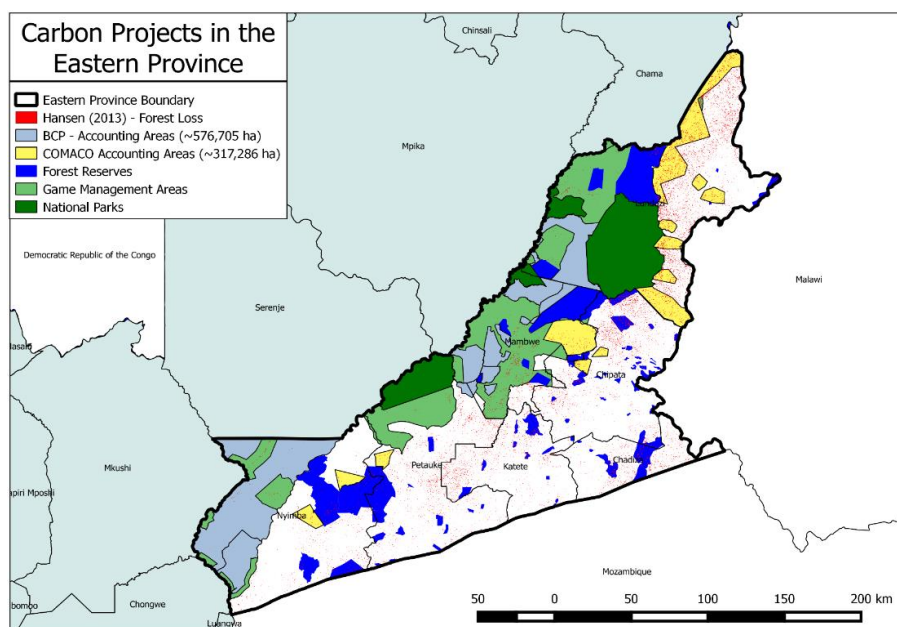
conservancy. For COMACO's LMP, on the right, the accounting area is made up of community conservation areas (CCAs), that is, areas identified by communities for conservation, whereas the reference area is the total area within the nine chiefdoms where the CCAs are located.

Figure F.1 Project Accounting Areas versus Reference Areas



In a jurisdictional program, *the accounting area is the same as the reference area*. For example, it is expected that for the ZIFL-P program, historical data related to deforestation and forest degradation would be estimated for the entire Eastern Province. These data would then be used to construct a baseline for the program—and “results” monitored across the entire jurisdiction. Marrying these two systems (project and jurisdictional) is a challenge because projects cannot be simply aggregated up to the subnational level. In addition, deforestation is not evenly spread across the jurisdiction, nor across the REDD+ projects (figure F.2).

Figure F.2 Carbon Projects in Eastern Province<sup>3</sup>



<sup>3</sup> Map produced by FAO as part of study for the Government of Zambia.

Activity data. While projects and the national FREL use Landsat imagery to assess historical data, each uses a different method (table F.5). The use of different methods for developing historical land cover change can result in differing data used as a basis to develop reference levels.

Table F.5 Three Methods of Assessing Historical Data from Landsat Imagery

BCP's LZRP	COMACO's LMP	National FREL
Landsat imagery from 1984, 1989, 1992, 1999, 2002, and 2009 of the reference area	Landsat imagery for 2002, 2007, and 2013 for entire reference area	Landsat imagery for 2000, 2010, and 2014 across entire country
Stratification: Forest and nonforest	Stratification: Forest and non-forest (agriculture, burned areas or water)	Stratification: Forest and non-forest
Statistical sampling method using stratified random grid of 2,600 points analyzed using visual interpretation to classify (into forest or non-forest) and this data used to create the logistic function applied to the accounting area	Wall-to-wall land cover change using semiautomated detection; validation with high-resolution imagery from Google Earth (Digital Globe imagery, 1m resolution)	Wall-to-wall land cover change using semiautomated detection; base map = 2010 land cover map (89% accuracy on forestland, 85.5% overall accuracy); 2000 and 2014 map created based on direct change detection per pixel
Uncertainties of baseline estimation calculated and assumed to be insignificant	Map (LULC) accuracy assessed, but a bias correction not employed for calculating the baseline	Olofsson method used for accuracy assessment (using higher resolution imagery for validation) leading to area adjustment (i.e., bias correction).

Emission factors. The estimation and use of emission factors can also impact the overall calculation of the baseline and subsequent REDD+ "results." The three examples compared in this case study used differing emission factors. Table F.6 compares the aboveground carbon stock estimates provided by different studies, including the IPCC Emission Factor Database, independent research (literature), ILUA I (used as a basis for COMACO's LMP) and II (used as a basis for the carbon map developed for the national FREL), and those used by each project and the national FREL.

Table F.6 Carbon Stock in Aboveground Biomass (tC/ha)

Source	IPCC (2003/6)*	Gibbs & Brown (2007)**	FRA 2010***	ILUA I	ILUA II****	BCP's LZRP	COMACO LMP	FREL+
Area/region								
African tropical moist deciduous forest (Northern Zambia)	122 (70-211)							
Sub-Saharan Africa, tropical seasonal forest		27						
African tropical dry forest (Southern Zambia)	56 (53-64)	12						
Zambia	56-122 (53-211)		21	15-39	14.6-33			7-41
Eastern Province				30.4	18.4		24	
Lusaka Province				32.81	17.7	61-62		

\* Mean value obtained by multiplying default carbon fraction (Table 4.3, IPCC, 2006) with aboveground biomass (tons dry matter/ha) in forest (Table 4.7, IPCC 2006) for the FAO ecological zones in Zambia.

\*\* In Gibbs et al., 2007; total biomass is converted to aboveground biomass by multiplying with 0.72 (based on IPCC 2006 BGB ratio of 0.28).

\*\*\* FRA 2010 growing stock (56m<sup>3</sup>/ha) is converted to biomass using BCEF default factor 0.8 (Table 4.5, IPCC 2006) and converted to ton C using carbon fraction 0.47 (Table 4.3, IPCC 2006).

\*\*\*\* Range of AGB by province; [http://zmb-nfms.org/iluall\\_results/](http://zmb-nfms.org/iluall_results/)

+ The FREL used ILUA II data; the range was calculated by developing a carbon map to stratify EFs (not by province).

Table F.7 provides estimates used for other pools, which show additional variations:

- For belowground biomass (BGB), LZRP uses a higher root:shoot ratio from literature; LMP assumes 1/10 of the biomass is released per year for 10 years after land conversion; the national FREL assumes instant oxidation of the BGB in the year of land use change.
- For soil carbon, LZRP made its own measurements while LMP used a (lower) IPCC default factor; different assumptions were made about decay over time.
- Only LMP included non-CO<sub>2</sub> gases from biomass burning.

Table F.7 Estimates Used for Other Pools

All figures in tC/ha	BCP's LZRP	COMACO's LMP	National FREL
Aboveground biomass	61 to 62	24.4	7.5 to 41.2 (a carbon map was developed with 5 strata of varying carbon densities, based on ILUA II data)  BGB root:shoot = 0.28*
Belowground biomass	33 to 33.5 BGB root:shoot = 0.54 (rf: Chidumayo 2013)	6.3 BGB root: shoot = 0.26 Assumes linear decay over a 10-year period	
Deadwood	Not included	Not included	
Litter	Not included	Not included	Not included
Soil	52.9 decaying to 35.9 at a rate of 20% per year	31 (IPCC 2003); stock change factor 0.58 (IPCC 2006) decaying over 20 years (linear)	Not included
non-CO <sub>2</sub> gases	Not included	1.2 (per hectare forest fires assumed burned in the project area)	Not included

\*The national FREL submission notes that "Results from destructive sampling of trees in the Zambian Miombo woodlands suggested root:shoot ratios of 0.54 and 0.77 in old-growth and regrowth woodland, respectively (Chidumayo 2014), which may indicate the current ratio applied underestimates the root biomass and can therefore be considered a conservative value."

### Nesting in Zambia: Considerations

There are a number of different ways in which nesting may be achieved in Zambia to take into account carbon and other positive community collective actions. Two nesting scenarios are discussed here, but they are by no means the only possibilities.

Scenario A: Carbon Accounting. Under this scenario, projects (for example, BCP's LZRP and the COMACO LMP) and the ZIFL-P jurisdictional project generate and engage in carbon transactions. If this is the case, a methodological approach for harmonizing, to the extent possible, measurement and monitoring methods of REDD+ projects as well as the provincial-level program needs to be achieved:

- *Consistency in how emissions and emissions reductions are measured among projects and with the higher-level program as a whole:* If projects operate under different methodologies, this can result in apparent inequities from project to project regarding the receipt of carbon benefits. Eventually, the use of different methodologies can also cause inconsistencies and raise risks at the higher jurisdictional level.
- *Avoidance of double counting of emission reductions:* This is particularly a problem between projects and a higher-scale program in the case of deforestation, but it may also be an issue between certain types of projects—for example, fuel-efficient (cook) stove programs may be double counting emission reductions if the assumed "nonrenewable biomass" is leading to deforestation or if the higher-level jurisdiction begins to account for degradation.

In the absence of such harmonization, it will be difficult to nest projects within a national or provincial-level program and it may eventually pose risks for the government in meeting its Nationally Determined Contribution to the UNFCCC under the Paris Agreement.

Scenario B: Conservation Compliance Scoring.<sup>4</sup> Conservation Compliance Scoring is a system used by COMACO to provide rewards to communities operating in the project area of Eastern Province (figure F.3). Formerly, positive scores led to off-take agreements that provided “premiums” to farmers, 10–20 percent above market price; more recently, funding is provided to farmer cooperatives. The Conservation Compliance Scoring system works by rating all participating chiefdoms on conservation farming practices (for example, fire management, minimum tillage, crop rotation, use of residues and compost, nonburning of farm), wildlife protection (for example, poaching, habitat protection), forest conservation (for example, illegal logging, charcoal production), and conservation and community leadership.

Figure F.3 Use of scoring to provide premium prices to farmers



Scoring is based on information from COMACO’s internal auditing of conservation farming practices as well as from additional information on wildlife and forestry. Scoring is adjusted for the varying landscapes in which chiefdoms reside. Those located in plateau areas have their sustainable agriculture and forestry scores more heavily weighted, while scoring for those located in valley areas are more heavily weighted for sustainable agriculture and wildlife protection. This weighting takes into account that the plateau has lost most of its forests, while the valley is home to a variety of wildlife.

Local communities’ ability to invest in untapped alternative livelihood options is key to addressing deforestation. One can envision that a system such as this could also be used as a basis for distributing carbon finance. Building on other revenue streams, such as agriculture or tourism, allows for a broader set of incentives than carbon and more diverse revenue streams, which can mitigate the risks of an uncertain future carbon market.

<sup>4</sup> Information from “2016 Conservation Compliance Scores for COMACO Participating Communities in Eastern Province.”

## Conclusion

Both scenario A and B require stakeholder participation to agree on the best approach in order to improve or implement so that it is beneficial to the custodians of the natural resources. Other options may be developed for Eastern Province. The choice of how to manage the situation in Eastern Province should be made in the context of an overall vision for Eastern Province that takes into account economic development and other goals, such as the protection of watersheds and critical ecosystems, or perhaps the conservation of wildlife. Regardless, development of a nested system in Zambia will require cooperation from relevant stakeholders—including the project proponents, communities, and civil society—ideally led by the government to design a system that maximizes both mitigation potential as well as economic development and community benefits.

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