Forest Carbon Partnership Facility

Baselines Based on Sector Policies and Extrapolation of Historical Trends:

Example of Reference Levels for REDD+

Ken Andrasko

World Bank/Environment/Carbon Finance Unit and FCPF Facility Management Team

At PMR Technical Workshop: Baseline-setting: Overview of Issues and Insights from Different Approaches and Registries: An Introduction
Cologne, Germany    May 27, 2012
REDD+ as a Sector for Baseline Exploration

- Reducing Emissions from Deforestation and Degradation - plus conservation, enhancement of carbon stocks.

- REDD+ not in scope of PMR- but offers early sectoral experience.

- REDD+ has:
  - No CDM REDD+ experience.
  - No direct measurement of emissions, & uses periodic inventories and remote sensing data.
  - Populations living inside the means of production (forests).
Example: Guyana

- Current deforestation rate ~ 0.2 % per year (very low).

- Former President Jagdeo’s Low Carbon study projected 4.3 % rate in 10 years – from gold mining & ag cropland expansion from Brazil.

- Q: Is 20-times rate reasonable?

- How do we review this scenario? . . . Given no standard methods?
REDD+ Activities Occur on Complex Land Use Mosaics

Berau Forest Carbon Program, Berau District, East Kalimantan, Indonesia (2.2 million hectares) (The Nature Conservancy slide)

Timber Concessions:
Reduced Impact Logging / Certification

Oil Palm Plantations:
Land Swaps

Protection Forests:
Protected Area Management, Sustainable Funding

Spatial planning
Information for Decision-making
Governance & enforcement
REDD+ Strategies Designed Across Heterogeneous, Dynamic Land Uses, Carbon Stocking, & Governance To Find Optimal Interventions

- REDD Opportunities Vary by Opportunity Cost (OC) of Land, Carbon Density, and Threat of Deforestation

- Trick: To identify high priority interventions, with low barriers to implementation...

- And governance conditions likely to allow implementation of REDD+ programs ...

- ... with benefit sharing an minimal environmental and social risks.

Deforestation Threat & C Density Class, for East Kalimantan (Gibbs and Brown, 2007)

Reference Level (RL) Challenges for FCPF Countries

1. **Define national interests** in RL issue in UNFCCC negotiations

2. **Construct** a RL, **reflecting drivers of deforestation**, and REDD+ strategy programs, & to **monitor** them

3. **Resolve** national / subnational RLs and C accounting

4. **Identify** if “**national circumstances**” exist to make case for RL other than historic trends **projections**

5. **Adapt** IPCC GPG, GOLFC-GOLD & other methods to the REDD RL problem, including projections

6. **Consult** RL with stakeholders & address RL in **MRV** design.
Countries Are Using 3 Major Approaches (for both historic and forward-looking RLs)

1. **Historic** approach: Use forest inventory or remote sensing data periodic estimates

2. **Projections forward in time:** using
   a) Historic data
   b) **Economic modeling** approach: use economic and other variables to model nonlinear relationships driving land use.

3. **Geospatial (GIS)** approach: Use key variables to represent current land use change patterns, and predict future patterns.

Point: **Most FCPF countries use combination of 1 and 2a, and some plan to use economic modeling (e.g., Congo Basin).**
Brazil’s Amazon Fund: Historic Reference Scenario Using Annual + Default Data (top down)

AVERAGE DEFORESTATION RATE

- Using 10 years average
- ADR revised every 5 years

Carbon density data limited, so use conservative 100tC/ha as default.

<table>
<thead>
<tr>
<th>Year of Reference</th>
<th>Period for ADF calculation</th>
<th>ADF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006 to 2010</td>
<td>1996 to 2005</td>
<td>1,95 million ha</td>
</tr>
</tbody>
</table>
Example: Simple Stratification + Downscale Modeling

CAR Proposes to Divide Country into 4 zones for Sub-national RL -> National RL, & to Use Regional Modeling

- 4 Biome Zones:
  (i) southwestern forest
  (ii) Bangassou Forest or southeastern range
  (iii) pseudo steppe with acacias and grassland savannas
  (iv) transition between the humid forest and the Sahelian zone

- RL Approach:
  1. Model a simple scenario based on a few input data for each zone.
  2. Verify it with national map of the probabilities of deforestation produced by GEOMOD (geospatial)
  3. Develop national reference level using CongoBIOM sub-regional modeling.
  4. Compare bottom-up national reference level to a top-down national reference level.

Source: CAR R-PP available at http://www.forestcarbonpartnership.org/fcp/
Example: Lao PDR’s National REL Draft Uses Historical Rates of Change and Inventory Data (1982 – 2002), Factoring in National Development Objectives Projected to 2020

- Average deforestation rate computed 0.8%/yr, & degradation 1.12%/yr
- Results: annual emissions 95.3 m tCO$_2$e (in 1982), 60.6 million tCO$_2$e (by 2010), and 51.1 million tCO$_2$e (by 2020)
- Combining it with development objectives, estimated annual emission for the 2010-20 period is 65 m tCO$_2$e

Q: National development objectives: Is this “national circumstances”? 

Source: LAO PDR R-PP available at http://www.forestcarbonpartnership.org/fcp/
Example of Geospatial + Modeling Approach: Amazonia High-Capacity Complex
SimAmazonia Model Results: Opportunity Costs of Land for Soy, Logging, Cattle (Soares-Filho et al. 2006)

Opportunity costs
Indonesia: Top-Down RL with Regional Consultation

Target: 1.560.000.000 ton CO$_2$ e

NATIONAL STRATEGY FOR REDD+

Agreed REL/RL

Source: Stranas (Bappenas, 2010)

Area of emission sources
Area of carbon sink

REL is defined by National and clarified with local governments. ER will be designed based on Regional Medium-Term Development Plan (RPJM Daerah) and Province Spatial Plan (RTRW Provinsi)

Source: Slide from Rizaldi Boer, Indonesian analyst
Example: What Might “National Circumstances” Mean for Indonesia? [Dr. Rizaldi Boer slide, Indonesian analyst]

- Ministry of Forestry has allocated 22.7 million ha of convertible production forest (HPK). This forest is likely to be released for non-forest activities and subject to planned deforestation.

- National circumstances:
  - Expansion of districts and provinces
  - More than 500 proposals from district to release forest area

- Without carbon incentive (REDD), very likely all HPK forested land will be converted in the future.

- For this forest area, simple forward-looking baseline should be acceptable: under BAU, all convertible production forest will be released for non-forest activities. [emphasis added]
Reference Levels: Requires Harmonizing Global Guidance with Country National & Subnational RL Requirements

Global Reference Level Guidance (UNFCCC):
- Modalities guiding country RLs and compensation levels
- Policy decision -- via negotiations
- Methods & Good Practice Guidance

Country 1 - Implementation of UNFCCC Reference Level Guidance:
- Relation of national to subnational
- To implement global rough guidance

Country 2 - Nested Reference Case:
Requires Allocation to Jurisdictions

Jurisdiction A Reference Level

Jurisdiction B Reference Level

Project Reference Level

Subnational Reference Level
ISSUES TO RESOLVE:

- Harmonizing reference scenarios & MRV across voluntary vs. domestic vs. international crediting schemes:
  - National scale,
  - Subnational regions,
  - REDD projects.

- “Grandfathering” early projects into later jurisdictional or UNFCCC regimes

- Adding up to get only 100%.
Bottom-Up Nesting Approach Example: Peru
San Martin state (+ 3 other states) (Lucio Pedroni slides)

- 3 local REDD+ initiatives coordinating with regional and national governments.

- Plan: add up states to national Reference Level
Deforestation projection, by stratification.

- Factor maps for projecting the location:
  - Distance to roads
  - Elevation
  - Slope
  - Distance to settlements

- Model calibration using historical data.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.19%</td>
<td>0.23%</td>
<td>Historical average 0.21%</td>
</tr>
<tr>
<td>2</td>
<td>0.19%</td>
<td>0.32%</td>
<td>Historical average 0.25%</td>
</tr>
<tr>
<td>3</td>
<td>0.58%</td>
<td>0.65%</td>
<td>Historical average 0.61%</td>
</tr>
<tr>
<td>4</td>
<td>0.23%</td>
<td>0.20%</td>
<td>Historical average 0.22%</td>
</tr>
</tbody>
</table>
Peru: San Martin

Projected reference (activity data)

- 2010-2020

Lucio Pedroni slide
• 466 existing plots.
• 433 passed screening.

Carbon stocks in above-ground tree biomass (CO$_2$-e/ha):

- 317.0 ± 12.8
- 267.2 ± 11.0
- 253.3 ± 53.5
- 261.4 ± 96.4
- 201.8 ± 78.7

Field measur
Expand VCS to allow baseline development and crediting for REDD+ at multiple “jurisdiction” and project scales, e.g.:
  ✓ national
  ✓ state/province
  ✓ project

• **Multiple crediting pathways to give flexibility**
  ✓ Project crediting only (with jurisdictional baseline)
  ✓ Jurisdictional and project crediting
  ✓ Jurisdictional crediting only

• **“Nesting” can occur at multiple scales**
  ✓ Project within jurisdiction
  ✓ Subnational jurisdiction within national jurisdiction
VCS: Developing a nested system

- Requires addressing **technical issues** such as:
  - Defining boundaries
  - Developing and nesting baselines (inc. scope, pools, additionality, updating)
  - Grandfathering
  - Leakage
  - MRV
  - Crediting (inc. timing, distribution, double counting)
  - **Reversals** (non-permanence) (inc. crediting implications in nesting)
1. Review & seek data needed (NFI, remote sensing)
2. Develop C density, deforestation, & forestation maps
3. Set scope of RL: Which regions, activities, gases
4. Rely on foreign experts to develop draft RL and MRV system ... then build in-country capacity.

5. Estimate historic emissions (land cover activity data X carbon density by forest stratum)

6. Set a crediting baseline below RL, reflecting domestic actions & international regime investments

7. Perform projection to inform Many FCPF Countries Following Rough Progression of Historic + Projections Activities:
Most FCPF Countries Plan Projections

- **Projections** being done for several reasons:
  - Durban UNFCCC REDD RL text stresses historic approach... But: 2/3 of FCPF countries plan projections.
  - Explore modalities of setting RL, & defining “national circumstances”
    - what are the arguments, and what difference could it make?
  - Identify where to focus REDD programs & investments efficiently
  - Help “allocate” national RL down to provinces.
Thinking Thru RLs: Costa Rica’s Draft Options to Reduce Emissions (REDD+) - It gets tricky . . .

<table>
<thead>
<tr>
<th>Opción</th>
<th>Régimen de Tenencia</th>
<th>Opción de Reducción de Emisiones</th>
<th>Área de PSA (ha)</th>
<th>Toneladas CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bosques Privados y Reservas Indígenas</td>
<td>Area adicional de PSA para Deforestación Evitada Bosque Viejo</td>
<td>107,600</td>
<td>4,793,099</td>
</tr>
<tr>
<td>B</td>
<td>Bosques Privados</td>
<td>Area adicional de PSA para Deforestación Evitada en Regeneración Media</td>
<td>19,191</td>
<td>833,503</td>
</tr>
<tr>
<td>C</td>
<td>Bosques Privados</td>
<td>Area adicional de PSA para Captura de Carbono mediante Inducción de Regeneración Temprana</td>
<td>123,120</td>
<td>6,517,412</td>
</tr>
<tr>
<td>D</td>
<td>Bosques Privados</td>
<td>Area adicional de PSA para Captura de carbono mediante establecimiento de Plantaciones Forestales</td>
<td>72,132</td>
<td>7,623,406</td>
</tr>
<tr>
<td>E</td>
<td>Reservas Indígenas</td>
<td>Area adicional de PSA para Captura de Carbono mediante Inducción de Regeneración Temprana</td>
<td>18,742</td>
<td>1,147,726</td>
</tr>
<tr>
<td>F</td>
<td>No aplica</td>
<td>Captura de carbono en productos de madera mediante el Incremento Uso de Madera</td>
<td>-10,000,000</td>
<td></td>
</tr>
</tbody>
</table>

Total: 340,784 30,915,145
Costa Rica policy goal of carbon neutrality by 2121:
79% of emissions reductions from forestry & agriculture!
Planned and ongoing activities under Costa Rica REDD+ strategy (conceptual)

**Early Actions: Difficult to Seek Credit for:**
- Acciones Tempranas Pre 2005 (37,000 Gg)
- Acciones Tempranas Post 2005 (54,000 Gg)

**Proposed REDD Actions A to F:**
- Nuevas Actividades (31,000 Gg)
- Mantenimiento Nivel PPSA (34,000 Gg)

**Questions:**
- **Q1:** Assume PES payments continue as BAU, or end?
- **Q2:** What if CR needs $500 per year REDD $... & gets less?
Monitoring REDD Actions: Technology Changing, Accuracy Requirements Increasing

RL essentially being set with 3 different technologies over time

Acciones Tempranas

ER-Program

Bosque/No Bosque 2005-2015

SPOT 2005

SPOT 2010

SPOT 2015

Bosque/No Bosque 2000-2005

LandSat 2000

LandSat 2005

Opciones

a. Estratificación y Parcelas (RPP)
b. Modelos de biomasa+Lidar
c. CLASLite+Lidar

Escenario de Referencia

Año

Stock de Carbono (Gg CO₂)

650,000

700,000

750,000

800,000

850,000

900,000

2000

2005

2010

2015

2020

2025

Con PPSA

Sin PPSA

REDD+
• Some countries appear to be using national RL.

• Most countries plan to use some kind of nested approach, starting subnationally and eventually upscaling to national.

• 64% countries (16 out of 24) propose developing RL by analyzing historic trends, and projecting into the future somehow.

• Data & capacity for even simple historic approach is challenging for most countries!
1. How can we reconcile baselines set using different data, scales, and time periods? (Costa Rica example)

2. Countries very interested, but not yet explored setting the compensation level, and allocating the RL to provinces (very political).

3. What criteria should be used to determine what programs etc. are in BAU vs. new creditable actions . . .

4. How to link RL to MRV system, nested at different scales, & account for leakage?

5. Q: When can a RL be adjusted?
   Eg., When major defor. drivers change? ... every 5 or 10 years?