Assessing cost and equity implications of REDD+ in Brazil and Peru

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Background

- Few “early movers” in REDD+; only one outstanding success story (Brazil)
- **Brazil** pioneered sophisticated command-and-control (C&C) policies (PPCdAM)...
- ...but effective C&C may also require REDD+ incentives to remain politically sustainable (Nepstad et al., 2014)
- **Peru** pioneered incentive-based (PES-like) National Forest Conservation Program
Research questions

1. What *tradeoffs* between cost effectiveness and land-user incomes may integration of REDD+ sticks (C&C) and carrots (PES) trigger?

2. How can incentives be *designed* to make conservation both cost-effective and egalitarian?
Study areas

BRAZILIAN AMAZON
- High historical deforestation
- High concentration of land ownership
- Commercial agriculture and cattle operations at the agricultural frontiers
- Well-developed monitoring and law enforcement
- Large-scale PES planned

PERUVIAN AMAZON
- Low historical deforestation
- More homogeneous distribution of land
- Predominantly subsistence cattle production and small but growing commercial sector
- Weak forest monitoring and law enforcement infrastructure
- Large-scale PES implemented
Methods & modeling assumptions

- Farmers maximize profits from deforestation and policy incentives (Peru & Brazil) and under imperfect enforcement (Brazil)
- Analysis of national policy budgets (Brazil)
- EPA minimizes enforcement costs subject to budget constraint (Brazil)
EPA implementation costs of reducing deforestation in Brazil

US$ 3,046 million
(additional investment)

Fogliano, Börner, Wunder et al. (in prep)
### Land user opportunity costs of reducing deforestation in Brazil

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Total loss (Million R$)</th>
<th>Losses through fines (%)</th>
<th>Opportunity costs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% conservation</td>
<td>2850</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td>20% conservation</td>
<td>1585</td>
<td>77</td>
<td>23</td>
</tr>
</tbody>
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Börner, Wunder et al. (2014) - GEC
Policy mix: trading off C&C vs PES

Börner, Wunder et al. (2015) - PlosONE
The Peruvian Forest Conservation Program

Aims at conserving 54 mio ha of Amazon forest through:

1. **Conditional cash transfers (PES type)**
2. Integrated, decentralized forest mgt. with regional governments
3. Public investments in enforcement infrastructure

300-500,000 USD/yr budget (2011-14)
PES design scenarios

Cost-effectiveness: Peruvian Soles per hectare of conserved forest

Inequality: gini coefficient of HH income change

UNEQUAL & INEFFICIENT

EQUAL & EFFICIENT

- current PNCB scheme
- av. p/ha opp. cost payment
- compensation up to av. opp. cost
- av. department p/ha opp. cost payment
- av. province p/ha opp. cost payment
- 1 min. salary per year + pure compensation
- 1 min. salary per year + average opp. cost payment
Main findings

1. C&C strategies ("sticks") can be cost-effective, but trigger high conservation opportunity costs

2. Mixing "sticks" with PES "carrots" can make REDD+ more equitable – and expensive (Brazil)

3. Enforcement quality is key to cost-effectiveness – not only C&C, but also PES

4. Clever PES design requires knowing spatial patterns of deforestation and opportunity costs

5. Simple ‘win-win’ fixes might boost both cost effectiveness and equity in REDD+ (Peru)
Center for International Forestry Research (CIFOR)

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