Supporting Public Prosecutors to Value Impacts of Illegal Small-Scale Gold Mining

The Mining Impacts Calculator Tool

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- Design and Evaluation of Environmental Projects and Policies
- Impact assessment of infrastructure projects
- Economic Incentives for Conservation
- Ecosystem Services Valuation

www.conservation-strategy.org
Presentación

• Context
• Objective
• Online Calculator
• Results
• Methodology
Background

- Increase in illegal gold mining in Brazil
- Impacts on the environment and health (mercury)
- Public Prosecutors Office (MPF)
  - Public institution engaged in guaranteeing people’s rights
  - Setting fine amounts
- MPF wanted a valuation tool (robust and quick)
  - Challenges:
    - Difficulty to sustain claims in courts
    - Lack of valuation methodology
    - Time consuming
Purpose

- Create a “mining impact calculator tool”
  - Standardized formula with generalized parameters
  - Context → Value
  - Training prosecutors to use it

- Increase Public Prosecutors’ capacity to use economic tools to sustain cases and monetary values claims in courts
  - Reduce arbitrariness in valuation
  - Increase probability of holding offenders accountable for their actions
  - Reduce environmental and health negative effects of gold mining on communities and miners.
Introduction

The impacts calculator is the result of a partnership between CSF and MPF, an analytical and pedagogical tool that describes the impacts of illegal gold mining, their monetary values and the steps for measuring them.

http://calculadora.conservation-strategy.org/
Methodology

- Productivity
- Deforestation
- Soil degradation
- Mercury Contamination
Methodology

- Productivity: Establishes equivalence between:

  - Mining area
  - Pit depth (volume)
  - Deforestation, Soil loss
  - Gold production
  - Mercury Use
  - Mercury Contamination
Methodology: Deforestation

• Restoration Cost
  • Official data
  • Adapted by transportation costs

• Opportunity Costs
  • Meta-analysis (ecosystem services)
    • Provision services: Timber forest products & NTFP
    • Climate regulation: Carbon
    • Other: Recreation, habitat and species protection, and water services
Methodology: Deforestation

- Value transfer function (meta-analysis)

\[
ES = \exp (0.562 \times \ln (Dd) + 0.566 \times \ln (GDPpc) + 0.0178 \times T + 1.133 \times \ln (Sr) - 8.375)
\]

(Siikamaki et al. 2015)
Methodology: Mercury

- Mercury is naturally present in the environment
  - Deforestation also spreads mercury

- How to differentiate sources?
  - How to attribute responsibility from ASGM?
Methodology: Mercury

- “Metal mercury” becomes “organic mercury”
- Fishes get contaminated and spread it
- People eat fish and get contaminated
Methodology: Mercury

- Link (additional) mercury use and expected average health outcomes
Methodology: Mercury

• Health effects
  • Neuropsychological problems
  • Mental retardation
  • Heart disease (IQ loss)
Methodology: Mercury

- Health indicator: Disability-adjusted life Years (DALY) (0-1)

- Economic indicator: Value of Statistical Life (VSL) ($)

- Using VSL to value DALY

“Weight” of a premature death (1 year) ↔ Value of Statistical Life (1 year)
Economic Results

ASGM Social Cost is at least 2x greater than Private Benefits
Project Results

• Public Prosecutors
  • Incorporated it as official methodology

• Federal Police
  • Will use the tool to sustain a case in the Brazilian Supreme Court

• Other countries
  • Planning processes and investment in law enforcement
Next Steps

• Adapting calculator to other countries and contexts

• Potential: Other types of damages
  • Oil spills, pesticides impacts, etc
• Thank you!

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