Can Programs of Payments for Environmental Services Help Preserve Wildlife?

Stefano Pugiola
Environment Department
World Bank

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The problem

Deforestation and use for pasture

Benefits to land users

Costs to others

- Loss of water services
- Loss of biodiversity
- Loss of carbon sequestration

Conservation

Stefano Pagiola, World Bank, 2003
The logic of payments for environmental services (PES)

Benefits to land users

Deforestation and use for pasture

Costs to others

Conservation with payment for service

Payment

Important!
This logic is repeated every year
• Need annual payments
• Need sustained income flow
Payments for environmental services: National initiatives

Colombia:  ▪ Cauca Valley water user associations

Costa Rica:  ▪ FONAFIFO/Pagos por servicios ambientales
  ▪ Heredia: Environmentally adjusted water tariff

Ecuador:  ▪ Quito: FONAG
  ▪ Cuenca: ETAPA

El Salvador:  ▪ Mesa permanente de servicios ambientales
  ▪ Tacuba, San Francisco de Menéndez

Mexico:  ▪ Pago por servicios ambientales bosques-agua
  ▪ Coatepec pilot

Venezuela:  ▪ CVG-Edelca payments for conservation of Río Caroní

South Africa:  ▪ Working for Water Program
Payments for environmental services: World Bank support

- Projects under implementation:
  - **Costa Rica**: Ecomarkets Project ($33 million WB + $8 million GEF)
  - **Colombia/Costa Rica/Nicaragua**: Regional Integrated Silvopastoral Ecosystem Management Project ($4.5 million GEF)
  - **Guatemala**: Western Altiplano Natural Resources Management Project (US$32 million, incl. US$2 million pilot PES component)

- Projects under preparation:
  - **Mexico**: Technical support to national PES program
  - **Venezuela**: Canaima National Park Project
  - **South Africa**: Cape Action Plan for the Environment (CAPE)
  - **Dominican Republic, Ecuador, El Salvador**: Pilot PES projects

- Research:
  - Case studies
  - Hydrological aspects
  - Valuation

- Capacity building:
  - Courses in Ecuador, Venezuela, Panama, Perú, Mexico, South Africa, Senegal
How can this help preserve endangered species?

- How PES mechanisms work
  - Characteristics of supply - understanding the science
  - Characteristics of demand - who is going to pay?
  - Contracting with service providers - making sure we get what we want
- Example of water services
- Application to wildlife
Developing payments for environmental services

1. Understanding the science…
   - Land use
   - Hydrological effects
     - Carbon sequestration
       - Biodiversity conservation
         - Ecosystem services
           - Water services
             - Welfare of water users
               - Carbon buyers
                 - Welfare of beneficiaries

… and the economics

2. Capturing benefits
3. Paying service providers

Stefano Pagiola, World Bank, 2003
Supply of services:
Upstream forest cover can affect the **Quantity**, **Quality**, and **Timing** of water flows

Demand for services:
Possible beneficiaries:
- Domestic water use
- Irrigated agriculture
- HEP
- Fisheries
- Recreation
- Downstream ecosystems
Myth: Forests increase precipitation
Reality: Minor effect, except at continental scale

Myth: Forests slow runoff
Reality: True

Myth: Forests increase total annual water flow
Reality: Because of increased evapotranspiration, forests usually reduce total annual water flow. Exception: Cloud forests

Myth: Forests increase water flow in the dry season
Reality: Unclear

Myth: Forests reduce flooding
Reality: True at small scales, not at large scales

Myth: Forests reduce erosion
Reality: Depends on use that is made of deforested areas
Water flows downhill
Water services vary substantially

Río Ocoa
Río Nizao

San José de Ocoa

Hydropower Production

98MW
52MW
64MW

Dominican Republic

Caribbean

6 m³/sec

Potable water

Substantial potential payments

Minimal potential payments

Substantial potential payments

Irrigation

Stefano Pagiola, World Bank, 2003
Identifying environmental services

**Demand:**
- What specific services?
- Who benefits from these services?
- How much benefit do they receive?

**Supply:**
- How are these services generated?
- How much more or less of these services would we receive if land use changed?
- Who generates these services?
Identifying water service beneficiaries
Example: Municipal water supply

What do they need?
- Minimum quantity
  - Depends on size of the population
  - Needs increase over time if the population is growing
- Constant flow year-round
- Minimum quality

What alternatives do they have?
- Reducing consumption, increasing efficiency of distribution
- Obtaining water from other sources
- Treating water to improve its quality

How could part of this value be captured?
- Water tariff rates
Capturing benefits

- Who benefits from environmental services?
- How much do they benefit?
- How can part of these benefits be captured to help finance conservation?
- How should funds be managed?
# Costa Rica: Payments by water users

<table>
<thead>
<tr>
<th>Firm</th>
<th>Type of user</th>
<th>Watershed</th>
<th>Watershed size (ha)</th>
<th>Contract area (ha)</th>
<th>Payment ($/ha/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energía Global</td>
<td>HEP</td>
<td>Río Volcán</td>
<td>3,466</td>
<td>2,493</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Río San Fernando</td>
<td>2,404</td>
<td>1,818</td>
<td>10</td>
</tr>
<tr>
<td>Platanar SA</td>
<td>HEP</td>
<td>Río Platanar</td>
<td>3,129</td>
<td>1,800</td>
<td>10/30</td>
</tr>
<tr>
<td>CNFL</td>
<td>HEP</td>
<td>Río Aranjuez</td>
<td>9,515</td>
<td>5,000</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Río Balsa</td>
<td>18,926</td>
<td>6,000</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lago Cote</td>
<td>1,259</td>
<td>900</td>
<td>42</td>
</tr>
<tr>
<td>La Manguera SA</td>
<td>HEP</td>
<td>La Esperanza</td>
<td>3,000</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Florida Ice &amp; Farm</td>
<td>Bottler</td>
<td>Río Segundo</td>
<td>3,870</td>
<td>1,000</td>
<td>10</td>
</tr>
</tbody>
</table>

Costa Rica: Payments to providers

<table>
<thead>
<tr>
<th>Contract</th>
<th>Amount ($/ha)</th>
<th>Distribution of payments (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reforestation</td>
<td>538</td>
<td>50% 20% 15% 10% 5%</td>
</tr>
<tr>
<td>Forest conservation</td>
<td>210</td>
<td>20% 20% 20% 20% 20%</td>
</tr>
</tbody>
</table>

- Based on opportunity costs
- 200,000ha contracted, more than 800,000ha pending
- 83% of contracts for forest conservation
- Only 7% of contracts for reforestation
- But payments insufficient in Heredia’s watershed
# PES and wildlife conservation

<table>
<thead>
<tr>
<th>Threats to wildlife</th>
<th>Is PES applicable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Loss of habitat</td>
<td>Yes - Pay for land users to adopt specified land use</td>
</tr>
<tr>
<td>▪ Over-harvesting due to insecure tenure</td>
<td>No - first-best is to reform property rights, and PES often not usable if tenure insecure</td>
</tr>
<tr>
<td>▪ Over-harvesting due to high demand</td>
<td>Possibly, if access to land is critical for harvesting and access can be controlled (but can be expensive)</td>
</tr>
<tr>
<td>▪ Elimination to reduce local costs</td>
<td></td>
</tr>
</tbody>
</table>

**PES not universally applicable**
Understanding the science

- Characteristics of threatened species
  - Range?
  - Sensitivity to disturbance?
  - Reproduction rates and patterns?
  - Etc

- Characteristics of access
  - Secure tenure to habitat?
  - Secure rights for wildlife harvesting?

- Economics of species
  - Potential market for harvested species?
  - Does species impose costs on local population?

Potential for land-use based payments to aid in conservation

Feasibility of land-use based payments

Cost of land-use based payments
What might a payment for wildlife conservation services look like?

- PES can pay to conserve habitat
  - Useful when:
    - Destruction of habitat a main cause for loss of species
    - Access to land is critical for harvesting and can be controlled

- PES can pay for specific management regimes (*i.e.* no hunting)
  - Can be very specific about what will pay for
    - Reduces potential for un-intended conservation effects
    - But can have other un-intended problems
    - Monitoring can be costly
    - Still land-use based
Lots of buts…

- But:
  - Problems of minimum size, contiguity
  - Won’t help with migratory species
  - Doesn’t address incentives to over-harvest

- But but:
  - Can make program contingent on size (New York City example)
  - Can help protect critical habitat of migratory species (e.g. wintering sites of Monarch butterfly)
  - Can impose management restrictions in contract

- But but but:
  - Difficult to implement and more expensive
  - ‘Weakest link in the chain’ problem
  - Need to pay more if impose more restrictions = more expensive

- But but but but:
  - Transaction costs
  - Transaction costs
  - Transaction costs

Stefano Pagiola, World Bank, 2003
Who pays?

- In most cases PES need to be made annually, and indefinitely

- Most biodiversity conservation financing mechanisms (GEF, NGOs) not set up to make long-term payments
  - Exception: CTFs, but expensive
Potentially applicable to subset of wildlife conservation cases, but not all

- ‘Accidental’ wildlife conservation as result of paying for other environmental services

Developing effective payments to providers poses lots of implementation problems but probably surmountable

Who pays? likely to be the main problem