Introduction to Payments for Ecosystem Services

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The economic problem

Land use practices result in external impacts which affect the provision of environmental services.

The opportunity

Beneficiaries of ecosystems services can pay the land/resource managers to change to sustainable practices.
What are Payments for environmental services?

Mechanisms through which beneficiaries of the ecosystem service reward the providers (eg forest managers), financially or in-kind.

Ecosystem services paid for include:

– biodiversity conservation
– carbon sequestration
– watershed protection
– maintenance of landscape beauty
Watershed service

Tourism,
fisheries

Urban and
industrial
users

Agriculture

Upstream land
management

Watershed service
PES Examples

- **Pimampiro, Ecuador**: 20% increase in urban water price to pay landowners to retain forest ⇒ watershed protection

- **Colombia**: cattle farmers paid to rehabilitate degraded pastures up to US$6000 over 4 years ⇒ biodiversity, carbon, watershed protection,

- **Cambodia**: bird watchers pay US$30 to community fund if they see an Ibis – community agrees to protect feeding grounds ⇒ landscape beauty, biodiversity

- **Nhambita Community, Mozambique**: sells carbon credits to voluntary carbon offset market
National PES Scheme Costa Rica

Government   Energy companies   International donors
Hydrological services   Carbon   Biodiversity   Landscape beauty

Pooled DEMAND

FONAFIFO/ Ministry of Environment

FONAFIFO/ Ministry of Environment

Forest owners: public and private
• Conservation: US$320/ha over 5 years
• Reforestation US$820/ha over 10 years
• Agroforestry US$1.3 per tree

SUPPLY

Independent Monitoring
# Financing of Costa Rica PES Scheme

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount (US$mn/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel tax</td>
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</tr>
<tr>
<td>Agreements with private companies</td>
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</tr>
<tr>
<td>Loans, grants and market instruments</td>
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</tr>
</tbody>
</table>
Economic issues

- Economic criteria for PES
- What is being paid for?
- Types of payment
- Payment mechanisms
- Determining payment levels
- Costs
- Targeting payments
Economic Criteria for PES

• Voluntary transaction especially for sellers
  – Otherwise no different from regulation
• Between a minimum of one seller and one buyer that are distinguishable
  – Otherwise no externality
• Conditional on “delivery of the service”
  – a land use or management practice that is expected to enhance or secure delivery of the environmental service
Other economic criteria

• New source of money vs relabelling of subsidies
  – Private sector, consumers, tourists
  – Water and energy charges
• Level of competition
  – Many sellers and many buyers – often only one buyer
• Continuous payment vs fixed period
Measuring service delivery

• Depends on
  – The service
  – Risk allocation

• Carbon
  – Measurement based on biomass changes
  – Discount for risk sometimes built into payment

• Watershed services/biodiversity
  – Proxies: land uses (eg forest conservation) and management practices
  – Buyer takes the risk that the proxies will deliver the service
What is being paid for?

• Not the ecosystem service itself

• But a change in its quantity and quality of delivery

• Additionality
Watershed services

• Three main services that can be influenced by land use
  – Quantity – water yield
  – Water quality
    • Sedimentation
    • Salinisation
    • Agrotoxics
  – Evenness of flow
    • Reduced flood risks
    • Reduced drought
Proxies for delivery of watershed services

• Best management practices
• Reforestation for commercial plantations
• Protection of existing ecosystems (land use restriction)
• Rehabilitation of degraded ecosystems
Examples of proxy payments - Mexico

- **Proxy:**
  - maintenance of forest cover
  - Measured from comparing satellite images

- **Differentiation by service delivery**
  - US$36 /ha for cloud forest
  - US$27/ha for all other forest types

- **Risk allocation**
  - Buyer (Government) takes risk that forest conservation delivers water services
  - Community takes risk of forest loss due to fires or timber theft
Payment Types

• Nature of reward
  – Financial payments eg Costa Rica
  – In-kind eg: beehives in Los Negros, Bolivia

• Duration
  – Continuous payments dependent on service provision eg Costa Rica, Mexico
  – Fixed period payments to support a transition to improved practices eg Colombia silvopastoral scheme
Continuous vs Fixed period

• Continuous
  – Ensures conditionality
  – Recognises a continuing externality
  – Dependent on continued provision of finance

• Fixed period
  – Limited conditionality – recipients may revert to previous activities once payments stop
  – If successful in tackling short-term barriers to on-site benefits will be self-sustaining
Payment mechanisms

- Direct contracts between buyers and sellers
- Intermediary-based transactions
- Area-based schemes with payment levels and rules set out in regulations
- Product-based mechanisms
- Trading mechanisms: credits, licences and use rights
Determining payment levels

• Not less than opportunity cost
  – Otherwise nobody will sell

• Not more than value of service delivered
  – Otherwise there will be over-payment
What is the value of an ecosystem service?

• Challenge is to link the land management change with the delivery of the ecosystem service

• Willingness to pay depends on perception of this link

• In practice PES payments are determined by opportunity cost of service supply
Level of payments - sellers

• Theory
  – payments should cover cost

• Practice
  – Payments often considerably less than average returns to conventional land use

• Why do sellers participate?
  – Non-financial benefits
  – Hidden pressures – eviction
  – Average return to land not always a good indicator of opportunity cost – locational variation, amenity value, legal restrictions
Opportunity costs in Costa Rica

• Virilla watershed critical for water supply to capital
• Returns to export crops and cattle exceed the payment
• Landowners are well-off and using land for recreation not farming
Transaction costs - Sellers

• Types of transaction costs
  – Application, demonstrating ownership, measurement, verification, payment transfer

• High fixed cost element
  – disadvantage for small farmers/sellers

• Solutions:
  – subsidise some parts of the process,
  – group applications,
  – Streamlining and coordination between agencies
Transaction costs in Costa Rica

• 11 separate application requirements eg:
  – Proof of legal title or possession rights
  – Proof of payment of local taxes
  – Official cadastral and cartographic maps
  – Professional verification of size of the area

• 12-18% of payments if intermediary used

• Cost of leaving land idle during application process (up to 1 year)
Targeting payments

• Efficiency criteria
  – area/seller most important for service provision eg: critical watersheds or habitats
  – Areas at highest risk of forest conversion/unsustainable management
  – Areas with lowest but positive opportunity cost of delivering the service

• Equity criteria
  – Poorest farmers (but may not coincide with efficient areas)
Targeting in Costa Rica
Payments for conservation

- Biological corridors
- Influence area of the Huetar Norte Forestry project
- Strategic areas for protection of water resources
- Privately owned areas within protected areas
- Areas where social development index is under 40% (after 2002)
Pimampiro Municipality

- Population of 17,000
- Motivations for the Payment Scheme:
  - Problems of water shortages for town supply
  - Estimated 13,000ha of forests lost since 1985
  - Decentralisation
- Pilot scheme with farmer’s association
  - 27 families with an average of 2-3 ha of agricultural land and 20 ha of forest or paramo
- Aim: protect forest in the headwaters of the municipality’s water system
Payment Mechanism

20% increase in water price

Seed capital US$15,000 USD

PES FUND

Payment to Nueva America Association

UMAT CEDERENA
## Payment Categories

<table>
<thead>
<tr>
<th>Payment Categories</th>
<th>Payment ($/month/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Paramo and Forest</td>
<td>1.00</td>
</tr>
<tr>
<td>Intervened Paramo</td>
<td>0.50</td>
</tr>
<tr>
<td>Primary Forest</td>
<td>1.00</td>
</tr>
<tr>
<td>Intervened Primary Forest</td>
<td>0.50</td>
</tr>
<tr>
<td>Old Secondary Forest</td>
<td>0.75</td>
</tr>
<tr>
<td>New Secondary Forest</td>
<td>0.50</td>
</tr>
<tr>
<td>Agriculture and Livestock</td>
<td>0</td>
</tr>
<tr>
<td>Degraded Land</td>
<td>0</td>
</tr>
</tbody>
</table>
Benefits to buyers
Challenges for PES

- Finding buyers and sources of funds
- Providing evidence of links between land management and the service
- Securing participation on supply side
- Keeping transaction costs down
- Monitoring
Targeting in Mexico