Payment for Ecosystem Services: Concepts and Applications

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Ecosystem Services

- “The benefits people obtain from ecosystems”
  - provisioning, regulating, and cultural services
    - directly affect people
  - supporting services
    - needed to maintain other services

(Millennium Ecosystem Assessment, 2005)
Examples of Ecosystem Services

- **Products**
  - Wood and other fibers
  - Food (plant and animals)
  - Natural medicines

- **Carbon**
  - Ecosystems absorb CO₂ from the atmosphere and store C (climate change mitigation)

- **Water**
  - Ecosystems regulate water quality and quantity

- **Spiritual and religious value, landscape beauty, inspiration, cultural heritage…**

Why are Ecosystem Services Important?

- Humans are fully dependent on ecosystem services
  - food, clean water, disease regulation, climate regulation, spiritual fulfillment, and aesthetic enjoyment…
- Different human groups receiving the services
  - ex: carbon = global society, water = downstream users
The Value of Ecosystem Services

• A famous valuation exercise (Costanza et al., 1997):
  – Estimated of the current economic value of 17 ecosystem services for 16 biomes
  – It is not a market value
    • Most of the value is outside the market
  – Entire biosphere = US$16–54 trillion (10^{12}) per year
    • Compared to global GNP (US$18 trillion per year)

The value of the world’s ecosystem services and natural capital


Threats to Ecosystem Services

Examples of threats on 3 types of ecosystems over the past 50 years

Habitat change and overexploitation are main drivers

Driver's impact on biodiversity over the last century

Low
Moderate
High
Very High

Source: Millennium Ecosystem Assessment
Land-Use Change Decisions do not Consider Ecosystem Services

Upstream Stakeholders
- Private benefits of environment-friendly land use
- Social costs due to water problems

Downstream Stakeholders
- Private benefits of land use with less ecosystem services
- Social costs due to water problems

Ecosystem Services

Principal of Payment for Ecosystem Services (PES)

Upstream Stakeholders
- Private benefits
- Private benefits + PES benefits

Downstream Stakeholders
- Social costs
- Social costs + PES payment

All are better-off
Examples of PES

• For carbon
  – Global mechanisms
    • CDM (Clean Development Mechanism)
    • Reductions of Emissions from Deforestation and Degradation (REDD)
    • Voluntary markets
• For water
  – Many local experiences
    • Colombia, Costa Rica, Ecuador, Honduras, Venezuela…

287 cases reported in Landell-Mills & Porras (2002)

PES in Costa Rica

• PSA (“Pagos por Servicios Ambientales”) in Costa Rica
  – A national PES scheme
  – Since 1997
  – Payments to landowners for:
    • Forest plantation
    • Forest conservation
    • Forest management (until 2002)
    • Agroforestry (since 2002)

• Recognized ecosystem service
  – Watershed
  – Scenic beauty
  – Biodiversity
  – Carbon
Buyers of Ecosystem Services: Who Pays?

- Carbon
  - Costa Ricans (tax on fossil fuels)
  - Norway
  - World Bank Carbon Fund (through a project)
- Biodiversity
  - GEF (Global Environment Facility)
- Water
  - Hydropower producers
  - Bottlers
  - Tourism
  - Irrigated areas
  - Municipal water supply
- Scenic beauty
  - Negotiations with hotels & rafting companies

Sellers: Who Receives the PES?

- PES is mostly paid to forest conservation
- Active contracts = 250,000 ha
  - almost 5% of the country
  - 9% in priority areas
- How much is paid?
  - Around 40 US$/ha/yr for forest conservation
  - Around 820 US$/ha for plantation
    - 370 US$/ha during the first year,
    - 50 US$/ha/yr during the 9 next years

(Pagiola, 2007)
Who Participates?

Buyers of Ecosystem Services

National and Local Buyers  Biodiversity Funds  Carbon Market

FONAFIFO (National Forestry Fund)

Regional offices

Landowners

NGOs  Licensed foresters

Impacts of PES in Costa Rica

• On forests
  – 10% of the forests are under PES (and many new applicants)
  – As forest law prohibits clearing, is there additional impact?
    • Controversies:
      – Forest cover in 2005 = 10% greater than it would have been without PSA (Tutenbacher et al., 2006)
      – PSA = minimal impact on deforestation 1997–1999 (Paff et al., 2006)

• On people
  – Impact rather positive on landowners
  – Criticism: benefits tend to go to larger and relatively better-off landowners (Zbinden and Lee, 2005, Pagliola, 2007)
Conclusion

- A lot of interest for PES around the world
- Debates on:
  - Where or when PES are adequate instruments?
    - Land tenure, governance…
  - Can PES alleviate poverty?
    - Efficiency vs. equity…
  - How to implement PES?
    - Institutions, buyers/sellers, payment (cash, kind…)
- A lot of case studies and good reviews are available

Thank you!