Integrated assessment of the effects of the Payment for Ecosystem Services (PES) Program on Conservation Land, Mexico City

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Introduction
Payment for Ecosystem Services (PES) promotes conservation by paying forest owners to maintain ecosystems that produce Ecosystem Services (ES). Since 2003, in Mexico PES has been used for conservation, water supply and poverty reduction. But despite claims, is it a successful policy.

The main objective is to develop a proposal for indicators to evaluate the socio-ecological effects of this policy (PES).

Case study community, Ajusco (South-West of Mexico City)
- Ajusco means “where the water emerges”
- Natural water = ±75% of the city’s water
- 604 persons collectively own this land
- Strong participation in Hydrological PES
- High poverty, most people > 2 jobs
- Unequal access to housing, education, health (elderly & women) and water (all)

» PES = US$24.26 ha/year for 5 management activities:
1. Dams (with natural materials)
2. Improved Reforestation
3. Cut fire barriers
4. Prune low branches
5. Soil conservation

Integrated indicators of PES are needed to...
- i. Evaluate success of PES
- ii. Evaluate feasibility
- iii. Inform the public, since –
  a. Positive government evaluations not available to the public
  b. Academic assessments disciplinary
- iv. Justify the permanence or enhancement of PES

Indicators proposal

<table>
<thead>
<tr>
<th>SOCIAL</th>
<th>ECONOMIC</th>
<th>WATER</th>
<th>SOIL</th>
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</thead>
<tbody>
<tr>
<td>Access to water (% households with clean water)</td>
<td>Marginality (education, payment, etc.)</td>
<td>Water quality (pH, temperature, DOC, conductivity, DBO &amp; DBQ)</td>
<td>Soil productivity (biomass production and/or net N immobilization net kg/ha)</td>
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<tr>
<td>Environmental education and forest perception (time invested, # participants in activities, workshops, forest values, etc.)</td>
<td>ES’ real monetary value ($ price of the service produced)</td>
<td>Water quantity (annual % water production m3/year)</td>
<td>Compaction &amp; soil characteristics (bulk density, physical &amp; chemical proprieties)</td>
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<td>Governance (inclusion, participation &amp; capacity)</td>
<td>Value for users ($ to replace ES)</td>
<td>Water buffer capacity (functionality of the soil &amp; vegetation)</td>
<td>Erosion (USLE factors)</td>
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<td>Community benefits (involvement in forest management, multiple resource use)</td>
<td>Value for providers ($ and job quality)</td>
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<td>Nutrient decomposition rate (kg/m2)</td>
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<td>Equity (gender &amp; youth)</td>
<td>Welfare (housing, education, etc.)</td>
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ECOSYSTEM Integrity & Functionality
- Biodiversity (functional groups & floristic richness)
- Forest health (damage- physical & pathological, retention of dead trees)
- Structure and forest dynamics (demographic and spatial)
- Quality of species habitat (bird inventory)