Ecosystem services in SEA of land use plans

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Integrating ecosystem services in land use planning
Comparing the effects of three alternative zoning policies:

On:
- Timber production
- Soil retention
- Water purification
Policies

Future land use scenarios

Ecosystem service modeling

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Q1: What are the effects of the policies on the provision of services through time?
Metrics

- Land area where services are **highly degraded** (i.e., <50% of original service remaining by 2050)

- Land area where services are **preserved** (i.e., 90% of original service remaining by 2050)
Q2: How changes in ecosystem services affect the actual benefits that people receive?

Ecosystems
Modeling biophysical processes and functions

Input data: land cover/land use, climate, soil, vegetation, topography, ...

Services
• soil retention
• water filtration
• timber production

Benefits
Basic material
Health
Social relations
Security

Input data: poverty survey, census and livelihoods data

Human wellbeing

The framework “ecosystems-services-benefits” is after TEEB, 2010

Integrating ecosystem services in land use planning
## Ecosystem service: soil retention

<table>
<thead>
<tr>
<th>% of people relying on farming</th>
<th>maintained</th>
<th>slightly reduced</th>
<th>badly reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
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</tbody>
</table>
Metrics

- Households with no piped water affected by reduction in the water purification service

- Households that rely on subsistence farming affected by reduction in the soil retention service
Q3: What are the tradeoffs (among services)?

Soil retention vs. Timber production

- SP 1
- SP 2
- SP 3
Q3: What are the tradeoffs (among groups of beneficiaries)?

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Conclusions

- Understanding how land use choices affect the distribution of services among different groups in society

- Multiple metrics, to answer case-specific questions

- Spatially explicit