Ecosystem Services and Impact Assessment

IAIA Washington Branch Meeting
World Bank - 1818 H Street NW
MC C1-200

Charles Hernick ▪ 7 October 2015
• Why ecosystem services in Impact Assessment?
  – Understanding how communities depend on ecosystem services can strengthen an environmental impact assessment and inform decision-makers on trade-offs
  – IFC Performance Standards

• How / how often is it being done? (Rosa & Sanchez 2015)
  – Ecosystem Services Review (WRI)
  – Example: Agricultural development in Tanzania

• Is there a future for ecosystem service review in ESIA?
The benefits people derive from ecosystems

- **Ecosystem:** The biotic community and its abiotic environment
  - Species
  - Physical and chemical characteristics
- **Ecosystem Function:** Processes resulting from species interactions (e.g., primary production)
- **These processes result in goods and services that benefit humans (or any other species)**
• Effects of biodiversity (stock)

• Equilibrium
  – Resistance
  – Resilience

• Result: Continued provisioning of goods and services (flow)

Source: NRC 2005; Kerbs 2001
<table>
<thead>
<tr>
<th>Provisioning Services</th>
<th>Regulating Services</th>
<th>Cultural Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>• Regulation of water timing and flows</td>
<td>• Spiritual and religious values</td>
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<tr>
<td>• Crops</td>
<td>• Erosion control</td>
<td>• Recreation and tourism</td>
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<tr>
<td>• Livestock</td>
<td>• Maintenance of soil quality</td>
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<td>• Capture fisheries</td>
<td>• Water purification and waste treatment</td>
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<tr>
<td>Raw materials</td>
<td>• Climate regulation (global, local and regional)</td>
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<td>• Timber and other wood fibers</td>
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<td>• Biomass Fuels</td>
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<td>• Fresh Water</td>
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<td>Pharmaceuticals and natural medicines</td>
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</tbody>
</table>

Source: MEA 2005
• Payment for Ecosystem Services
  – A voluntary transaction where
  – A well-defined environmental service
  – Is being ‘bought’ by a service buyer
  – From a service provider
  – If and only if provider secures service provision (conditionality)
  – Payment exceeds opportunity cost

• Examples
  – Carbon
  – Water
  – Wetlands / Biodiversity

Source: Engel et al 2008
What about Impact Assessment?
• How have ecosystem services been treated in recent international practice?
  – 5/xx performed some level of review because of PS6
Ecosystem Service Review

ESIA stages | ESR for IA steps
---|---
**Scoping** | 1. Prioritize ecosystem services because of project impact*  
2. Prioritize ecosystem services because of project dependence  
3. Establish the ESIA Terms of Reference for ecosystem services

**Impact analysis** | 4. Assess negative project impact on priority ecosystem services*  
5. Assess project dependence on priority ecosystem services*  
6. Produce summary report

**Mitigation** | 7. Identify options to enhance or at least maintain affected beneficiaries’ well-being and project performance derived from ecosystem services at acceptable levels*
Post-Hoc Evaluation:
• Dependency
• Impacts
• Implications

1. Determined scope: Kilombero Valley--users at local and national scales
2. Identified priority ecosystem services
3. Described trends in priority ecosystem services
4. Discussed development risks and opportunities
5. DID NOT develop strategies for addressing risk and opportunities
Kilombero Valley

- Low-productivity agriculture, pastoralism, and foraging for forest products and bushmeat (provisioning services)
- Bordered by two game reserves, is designated as a Ramsar wetland and Important Bird Area, and is criss-crossed by wildlife corridors
Government’s Proposal

• Construction of surface water-based irrigation schemes at five sites in Kilombero District
  – Magombera Kimbiyoko (MaKi), Kisege, Udagaji, Mgugwe, and Mpanga-Ngalimila
  – Construction is complex and will require large-scale earthworks. Each new system will involve weir diversions, distribution canals, secondary control structures, drainage, and on-farm access roads.

• Beneficiaries are smallholder farmers
  – Construction will be combined with a farmer training program
<table>
<thead>
<tr>
<th>Ecosystem services</th>
<th>Village/Community</th>
<th></th>
<th>Region/Valley (Kilombero District)</th>
<th></th>
<th>National</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Dependence</td>
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<td><strong>Provisioning</strong></td>
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<td><strong>Food</strong></td>
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<td>Crops</td>
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<td>+</td>
<td>○</td>
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<tr>
<td>Livestock</td>
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<td>●</td>
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<tr>
<td>Capture fisheries</td>
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<td>●</td>
<td>+/-</td>
<td>○</td>
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<tr>
<td>Wild foods</td>
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<td>Low</td>
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<td><strong>Raw materials</strong></td>
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<td>Timber and other wood fibers</td>
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<td>Biomass fuel</td>
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<td>Freshwater</td>
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<td>+/-</td>
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<td><strong>Regulating</strong></td>
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<td>Erosion control/soil replenishment</td>
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<td>+/-</td>
<td>●</td>
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<td><strong>Cultural</strong></td>
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<tr>
<td>Recreation and ecotourism</td>
<td>LOW</td>
<td>+/-</td>
<td>LOW</td>
<td>+</td>
<td>●</td>
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<td><strong>Supporting</strong></td>
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<td>Habitat</td>
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<td>●</td>
<td>+/-</td>
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</tbody>
</table>

**Key**

- High
- Positive impact/effect from use
- Medium
- Negative impact/effect from use
- Low
- Don't know
Results

At the national level
- Substitutions exist for many provisioning services
- The game reserves and parks—and associated Ecotourism—depend on maintenance of migratory corridors in the valley

At the village level
- Cost effective substitutes are not available
- Dependency on regulating services is high, and existing practices have a negative impact on these services
- Ecotourism is constrained by limited accessibility and accommodations options

Dependency on the provisioning of fresh water is high at both levels

Raises questions:
- Beneficiaries (Purpose)
- Stakeholders
- Affected Area (Baseline)
Summary

- Ecosystem function depends on species and physical/chemical characteristics
  - Biodiversity
  - Pollution
  - Land use
  - Climate

- Environmental impact assessment ensures that planned social and economic benefits are realized and are not undermined by negative environmental impacts

- Understanding dependencies and impacts on ecosystem services is critical

- An ecosystem service review may draw out important trade-offs worthy of consideration
Questions

• Can an ecosystem service framework improve ESIA?
  – ESIA vs. P- or S-ESIA

• Examples of improved or additional mitigation measures?

• Does the need to factor-in climate change resilience open a door for an ecosystem service framework?