Integrating non-fiscal impacts into cost-benefit analyses of extractive industry projects

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Columbia Center on Sustainable Investment
A joint center of Columbia Law School and The Earth Institute, Columbia University
Employment
Spatial linkages
Knowledge linkages
Horizontal linkages
Consumption linkages
(Induced Employment)
Fiscal linkages
Consumption linkages
(Induced Employment)
Downstream linkages
(Indirect Employment)
Upstream linkages
(Indirect Employment)
Dashed line...
Impact on EI’s core operations
VALUE CHAIN
EI project
(Direct Employment)
Downstream linkages
(Indirect Employment)
Fiscal linkages
NEGATIVE IMPACTS

- Environment
- Social dynamics & corruption
- Health
- Economics & livelihoods
- Infra. & services

EI project
Quantifying upstream impacts

Value created in 2014

Employment multipliers vary significantly

<table>
<thead>
<tr>
<th>Industry</th>
<th>Location</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Direct and indirect impact</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>Tanzania</td>
<td>1.0</td>
<td>7.6</td>
<td>8.6</td>
<td>ICMM (2007)(^58)</td>
</tr>
<tr>
<td>Gold mining</td>
<td>Tanzania</td>
<td>1.0</td>
<td>6.87</td>
<td>7.87</td>
<td>Ernst &amp; Young (2013)(^44)</td>
</tr>
<tr>
<td>Cooper mining</td>
<td>Zambia</td>
<td>1.0</td>
<td>2.61</td>
<td>3.61</td>
<td>ICMM (2014)(^45)</td>
</tr>
<tr>
<td>Gold mining</td>
<td>Tanzania</td>
<td>1.0</td>
<td>3.0</td>
<td>4.0</td>
<td>World Gold Council (2009)(^59)</td>
</tr>
<tr>
<td>Gold mining</td>
<td>Mali</td>
<td>1.0</td>
<td>6.0</td>
<td>7.0</td>
<td>United Nations Conference on Trade and Development (2007)(^60)</td>
</tr>
<tr>
<td><strong>Median value</strong></td>
<td></td>
<td></td>
<td>6.0</td>
<td>7.0</td>
<td></td>
</tr>
</tbody>
</table>
Quantifying downstream beneficiation impacts

Creation of about 2,000 employment opportunities
While sharing is generally beneficial, the associated costs vary substantially between projects.

### Costs/benefits of a range of shared infrastructure projects

1 = low, 2 = medium, 3 = high

<table>
<thead>
<tr>
<th>Inf. class</th>
<th>Type of industry</th>
<th>Number of projects assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Bulk</td>
<td>7</td>
</tr>
<tr>
<td>Port</td>
<td>Bulk</td>
<td>4</td>
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<tr>
<td>Pipelines</td>
<td>Gas</td>
<td>1</td>
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<tr>
<td>Water</td>
<td>Bulk</td>
<td>1</td>
</tr>
<tr>
<td>Power</td>
<td>Bulk</td>
<td>2</td>
</tr>
<tr>
<td>Power</td>
<td>Base</td>
<td>2</td>
</tr>
<tr>
<td>Power</td>
<td>Precious</td>
<td>2</td>
</tr>
</tbody>
</table>

**Source:** Vale Columbia Center; McKinsey Global Institute analysis
Quantifying GHG impacts

CamIron Project

- 1,740 sqkm concession
- 580km railway line & port
- 35mtpa of iron ore
- 18 million tons of CO2 over project life

Proposal to protect Forest Management Unit 10034 - 164,000 ha of intact forest from logging by leasing area for $6/Ha per year

If the concession remains unlogged, offset 4.5 million tons of CO2
Quantifying environmental risks

- Around 300 tailing dam failures have been reported between 1915-2016
- Overtopping is failure mechanism in 30-40% of cases
- Calculated hazard rating based on:
  - Dam height
  - Tailings stored
  - Distance traveled
  - Impacted area
Focus on fiscal aspects important particularly in the oil sector

Non-fiscal positive linkages to extractive industry investments often reviewed/negotiated separately, but may be of key importance to both parties

Negative externalities, risks and opportunity costs are not priced into project appraisals. However, these externalities are particularly relevant for impacted regions

There is a need to provide stakeholders with tools to be able to integrate non-fiscal impacts of extractive industry investments in sector & project appraisals.

Probabilistic impact assessments improve with more data from existing case studies.

Such tools could also help improve risk monitoring.