Cumulative Impact Assessment
Session Objectives:

- Understand USAID criteria for cumulative impact assessment
- Review role of cumulative impacts assessment (CI) in the project review process
- Develop a understanding of the framework for performing CIA
- Work through a project example on CI assessment
Definition of Cumulative Effects Assessment

The U.S. Council on Environmental Quality (1997) defines cumulative effects assessment (CEA) as:

“the impact on the environment which results from the incremental impact of the action when added to their past, present and reasonably foreseeable future actions......”
Why account for cumulative impacts?

- Reg 216.6(d) states “a Program Assessment may be appropriate in order to assess the environmental effects of a number of individual action and their cumulative environmental impact.”
- ADS 201 and 204
- Multilateral development bank projects (e.g., IFC, World Bank)

It is an essential component of environmental compliance for ESDM
What are cumulative impacts/effects?

- Combined, incremental adverse or beneficial effects of human activity (spatial or temporal)
- Accumulate over time from one or more sources

*Individual minor actions that are insignificant on their own can collectively result in significant impacts over a period of time.*
Types of Cumulative Impacts

**Additive:**
Equal to the sum of individual impacts

**Interactive:**
Greater than the sum of individual impacts
- Magnification
- Synergistic
Examples of Cumulative Impacts

- Increases in pollutant concentrations in a water body, soil or sediments,
- Reduction of water flow in a watershed due to multiple withdrawals.
- Increases in sediment loads on a watershed or increased erosion.
- Interference with migratory routes or wildlife movement.
- Depletion of a forest as a result of multiple logging concessions.

Examples of Cumulative Impacts (cont’d)

- Increased pressure on the carrying capacity or the survival of indicator species in an ecosystem.

- Wildlife population reduction caused by increased hunting, road kills, and forestry operations.

- Secondary or induced social impacts, such as immigration, or more traffic congestion and accidents along community roadways owing to increases in transport activity in a project’s area of influence.
Small Scale ≠ Small Impact!

Myth:
“Environmental impacts of small-scale activities are negligible.”

Reality:
Impacts of single poorly designed/implemented activity may be small overall, BUT
- Local impacts can be significant
- Numerous small-scale activities together can have significant cumulative impacts

An example – a small scale activity

The environmental effects of a small-scale animal husbandry project may be minor...

With project success, more effects occur that cause incremental impacts on the environment.

What might some of these incremental impacts be?
What is cumulative impact assessment?

**Purpose:** To ensure that incremental effects from various actions are accounted for in project design.

**Process:** A systematic way to identify and analyze cumulative environmental and social change as a result of projects, programs, plans, and policies.

Identify valued environmental and social economic components (VECS)

VECs = environmental and social attributes that are considered to be important in assessing risks

- Physical features, habitats, wildlife populations (e.g., biodiversity)
- Ecosystem services
- Natural processes (e.g., water and nutrient cycles, microclimate),
- Social conditions (e.g., health, economics), or
- Cultural aspects (e.g., traditional spiritual ceremonies)
What is the difference between project impact assessment and a cumulative impacts assessment?

Traditional EIA
Policy & Planning

Proposed Project

→

Individual
Environmental Impacts

Cumulative Impacts
Policy & Planning

Past Projects

Proposed Projects

Future Projects

Individual VECs
& Total Impact

Current Projects

What tools do we use in cumulative impact assessment?

**Scoping & Impacts Identification**
- Network & Systems Analysis
- Checklists
- Spatial Analysis
- Consultations & Questionnaires

**Evaluation Techniques**
- Matrices
- Expert Opinions
- Modeling
- Carrying Capacity Analysis

Adapted from European Commission, 1999

General CEA Process in Six Easy Steps!!

1. Identify **incremental effects** of the proposed project and VECs.
2. Identify **other past, present, and reasonably foreseeable future actions** within the space and time boundaries.
3. For the selected VECs, **collect appropriate information** on their indicators, describing baseline & historical indicators.
4. “**Connect**” the proposed project & other actions in the study area to the selected VECs & indicators.
5. **Assess significance** of cumulative impacts on each VEC over the time horizon for the study.
6. **Develop mitigation measures** for VECs or their indicators that may be negatively effected & for which the cumulative impacts are significant.

### Sample Project Matrix

<table>
<thead>
<tr>
<th>Project Activity</th>
<th>Environmental Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landforms/Terrain</td>
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<tr>
<td>Well Servicing</td>
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<tr>
<td>Co-generation</td>
<td>0</td>
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<td>Steam Injection</td>
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<td>Bitumen Production</td>
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<tr>
<td>Makheses Plant</td>
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<td>Deep Well Disposal</td>
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<tr>
<td>Water Use</td>
<td>0</td>
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<tr>
<td>Ancillary Facilities</td>
<td>0</td>
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<tr>
<td>Access/Transportation</td>
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<tr>
<td>Workforce</td>
<td>0</td>
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<tr>
<td>Pipelines</td>
<td>0</td>
</tr>
<tr>
<td>Upset Events</td>
<td>2</td>
</tr>
</tbody>
</table>

**Activity**

**Scores**

Activity – What kinds of cumulative impacts might be identified in designing this project?

Project: a small hydropower facility (<30 MW)

- River in a remote region with low access to electricity
- Communities utilize the river for subsistence fishing and transportation
- Forests cover 40% of surrounding hillsides and is habitat for 2 species of birds and 3 mammal species – all classified as threatened
- Infrastructure proposed: Transmission lines, turbines, generators, and construction camp, roads, and bridges.

Uncertainties in Cumulative Impact Assessment

- Boundaries
- Timeframe
- CIA procedure
- Methods
- Tools
- Data requirements
- Complexity of the analysis
- Temporal and geographic boundaries
- Predictive abilities
Cumulative impacts are the additive AND interactive impacts of various projects and activities on environmental and social systems, temporally and geographically.

Limited information or knowledge is a major challenge in cumulative impact assessment.

CEA should be adapted to the context.

Uncertainty is part of the CEA process.
Additional Resources


• U.S. Council on Environmental Quality
  http://ceq.hss.doe.gov/NEPA/ccenepa/ccenepa.htm

• The World Bank

• IAIA CEA Wiki http://www.iaia.org/iaiawiki/cea.ashx

• Cumulative Effects Assessment Practitioners Guide (Canada)