Session 6:

Core Environmental Impact Assessment Skills

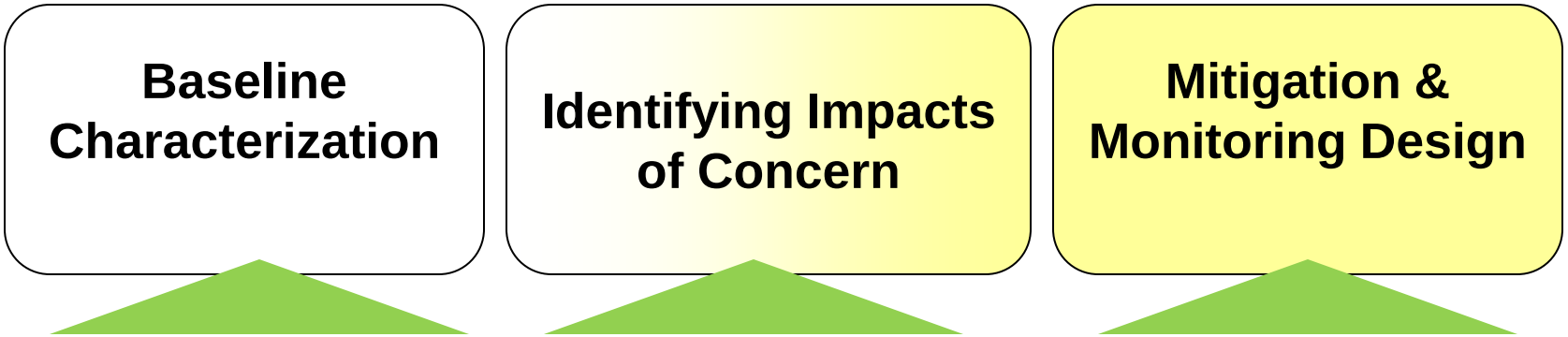
Part I:

Characterizing the baseline situation
Identifying environmental impacts
Principles of environmental mitigation

Session Objectives

- Recognize that effective mitigation design requires skills in baseline characterization and identifying issues of concern
- Become familiar with the basic principles of baseline characterization, identifying issues of concern, and mitigation design.

Core EIA Skills for Environmental Compliance



Employed in developing the IEE--- but also critical to making mitigation responsive to local environmental conditions

Key skills for implementing IEE conditions

Impact evaluation process: THEORY

1. **Understand** the activities being proposed
2. **Research** the potential adverse impacts typical of these activities & know **how** they arise
3. Based on the potential impacts, **identify** which elements of the baseline situation are important
4. **Characterize** these elements of the baseline

5. **Given:**
   1. **the baseline conditions,**
   2. **the project concept/design, and**
   3. **How the adverse impacts arise,**

   <u>decide which impacts are of concern</u>

Impact evaluation process: EXAMPLE

1

Proposed intervention: irrigation scheme

(wing dam diversion type ▪ water-intensive crops ▪ high fertilizer use, unlined canals & open-channel irrigation)

2

Key potential impacts:

- Excessive diversion of water
- Salinization of soils
- Contamination of groundwater & downstream surface water

3

Key elements of baseline:

- River flow volume, variability
- Soil & water characteristics & groundwater depth
- Downstream uses

Assessing impact: EXAMPLE

4

Baseline characterization

- *River flow volume, variability*
  - Will divert 3% of normal flow
  - low-year flows are 50% of normal
  - Downstream abstraction is <10% of total flow volume.
- *Soil characteristics & groundwater depth*
  - Soils are well-drained but relatively high in salts; groundwater 2m depth
- *Downstream uses*
  - Key water source for community domestic use & livestock, immediately downstream.

5

Therefore:

Impacts of Concern: Salinization Downstream contamination

Little Concern: Excess Diversion

Why these conclusions?

Question:

Why are these concepts relevant to me? I'm not developing Initial Environmental Examinations.

- IEE conditions often require Implementing Partners to identify issues of concern particular to a site & respond with appropriate, specific mitigation measures.
- C/AORs & M&E specialists must be able to evaluate if IP actions are appropriate

For example. . .

Medium scale construction. . .

ACTIVITY:
Development of institutional compound/ training facility
(perimeter wall, offices & classrooms, canteen, genset & fuel storage, latrine block, etc.)

IEE Conditions:

1. No construction permitted in protected areas or relatively undisturbed ecosystem areas.
2. Construction & facilities operation may not (a) result in significant adverse impacts on ecosystem services or (b) adversely affect the quality of surface or groundwater tapped for domestic use.

The baseline situation determines the relevance of these conditions & specific issues of concern mitigation must address

Inspection of baseline conditions at the site identifies issues of concern for mitigation. . .

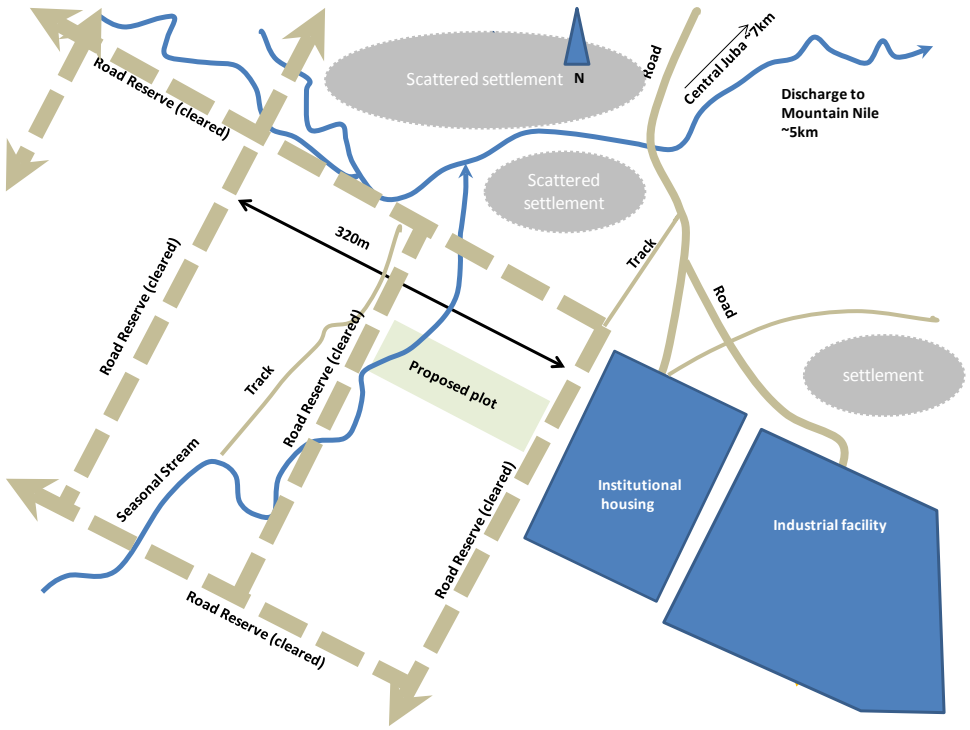
1: Site is in area already allocated for development---ecosystem integrity already disrupted.

2a: Key ecosystem service provided by the land is area drainage

Implication: design must assure no reduction in stream capacity & no alteration to local drainage patterns.

2b. likely domestic use of surface water just downstream of the facility; potentially shallow groundwater also.

Implication: must prevent additional siltation of stream, gray and brown water discharge, fuel leaks.



Where do I obtain information about the the baseline situation?

1. **YOUR ORGANIZATION**
   <u>TALK</u> to staff who know the project, and know the sites.

   <u>OBTAIN</u> project documents and information

2. **DIRECT OBSERVATION**
   <u>Go to the site(s)!</u> Look up publicly available satellite imagery before you go.

3. **UTILIZE OTHER LOCAL TALENT & KNOWLEDGE**
   communities, government, counterparts

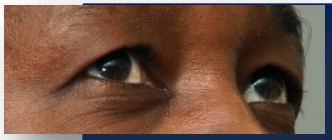
? Aren't we forgetting something?

What about reports by donor organizations and international agencies? What about government statistics? GIS databases?

All these sources can be useful (and sometimes necessary)

But good local information is the most important input

Why direct observation?

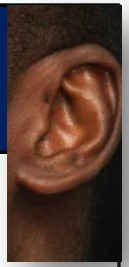


We need to **SEE**

- **Are latrines close to water supplies?**
- **Is there a drainage problem?**

Visual inspection is the quickest and best way to check issues of location, scale and proximity that determine many impacts.

We need to **LISTEN**



- **Is there a land tenure problem?**
- **How often does the river flood?**

Stakeholders and local communities have *local knowledge that you need.*

And, impacts depend on what those affected value and need!

!

Talk to men AND **women.** Women's perceptions on environmental matters are critical and distinct.

What if I can’t travel to the sites?

If at all possible, DON’T make the site characterization a desk exercise.

But if you can’t visit the sites/area, you need:

- **MAPS** and **PHOTOS** to help you visualize the environment.
- to **TALK** to people who have been there

Mitigation and Monitoring

A critical part of the EIA process—and of environmentally sound design and management

Mitigation is. . .

The implementation of measures designed to eliminate, reduce or offset the undesirable effects of a proposed action on the environment.

Monitoring . . .

Environmental and activities measurements to tell you if your mitigation measures are:

1.Being implemented
2. Sufficient and effective

How does mitigation reduce adverse impacts?

Type of mitig measure	How it works	Examples
Prevention and control measures	Fully or partially prevent an impact/reduce a risk by: ▪ ***Changing means or technique*** ▪ ***Changing or adding design elements*** ▪ ***Changing the site*** ▪ ***Specifying operating practices***	PREVENT contamination of wells, by SITING wells a safe distance from pollution sources Add wastewater treatment system to the DESIGN of a coffee-washing station and train in proper OPERATIONS
Compensatory measures	Offset adverse impacts impacts in one area with improvements elsewhere	Plant trees in a new location to COMPENSATE for clearing a construction site
Remediation measures	Repair or restore the environment after damage is done	Re-grade and replant a borrow pit after construction is finished

… and sometimes you may need to redesign the project to modify or eliminate problem components

Siting & design features to PREVENT impacts

Water Supply (Well provision)

- **Potential impacts:** Contamination of water supplies; spread of disease
- **Mitigations needed:** Fence to keep out livestock

  Site away from contamination sources

  Provide separate water point for livestock

What is wrong with this intervention?

Proper treatment system OPERATIONS

Agricultural Processing
(Coffee Washing)

- **Potential impacts:** Contamination of water supplies; excessive water draw
- **Mitigations:**

  Wash water recycling

  Basic wastewater treatment (pictured)

! **Proper treatment system *operation* is essential**

Stream (community water supply)

Must EVERY impact be mitigated?

Mitigation specified by the IEE/EA must be implemented

Often IEE conditions require judgment in designing specific mitigations. In this case, apply the following principle:

Prioritize!

Potentially serious impacts/issues	Easily mitigated impacts
These must **ALWAYS** be mitigated to the point that the impact is non-significant	Then, there may be other impacts for which mitigation is easy and low-cost

Effective mitigation usually requires a MIX of mitigation techniques

Example: ROAD REHABILITATION

Some typical adverse impacts:

- Alteration of natural watershed drainage
- Erosion of road surface materials into habitats, productive agricultural land
- Roadside gully formation→ damage to adjoining land
- Dust→ respiratory problems, crop damage
- Inappropriate extraction of materials for road surfacing
- Increase in disease transmission (HIV)
- Increased non-sustainable logging, charcoal extraction

Combining mitigation techniques: Road rehabilitation

Some typical good-practice mitigations

Avoid steep grades, Follow contours → **Siting**

Culverts or Rolling dips for water drainage and diversion

Side drainage to prevent flooding washout

Slope stabilization via plantings, grading/terracing & riprap

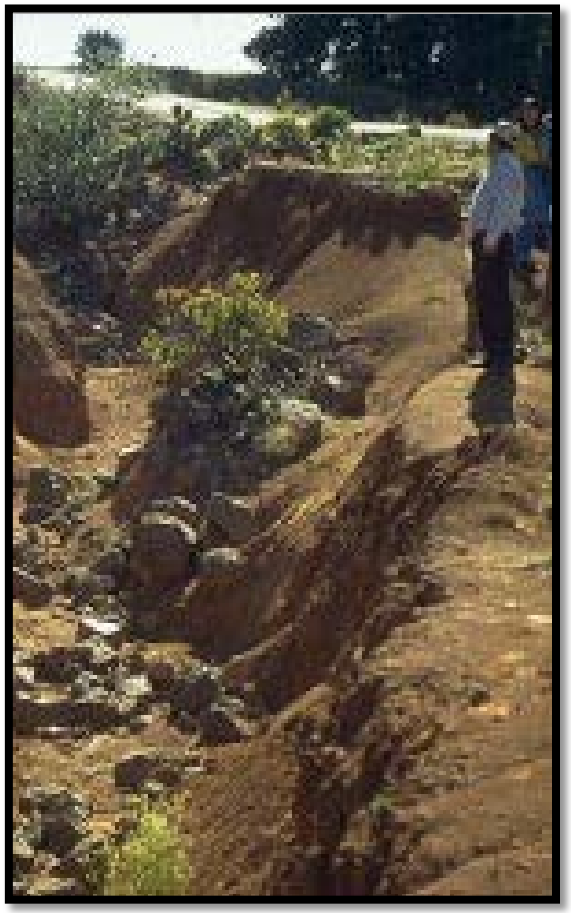
Dust reduction barriers

Paving of vulnerable stretches

→ **Design elements**

Community Maintenance → **Operating Practice**

Grading/planting/draining borrow pits → **Remediation**



Gullying can be serious!

Prevention is best

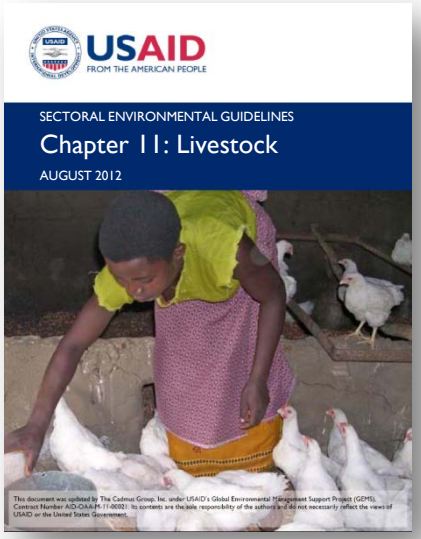
!

Where possible, PREVENT impacts by changes to site or technique.

CONTROL of impacts with Operation & Maintenance (O&M) practices is more difficult to monitor, sustain.

How do I learn about potential impacts and mitigation measures?

KEY RESOURCE: **USAID's Sectoral Environmental Guidelines**



- Covers more than **20 typical development sectors**
- Each sectoral write-up identifies **potential impacts & discusses how they arise.**
- Impacts are matched **to mitigation actions**.
- The **annotated bibliographies** provide URL links to **additional key resources**
- Over 2012-13, AFR, LAC, Asia Guidelines being consolidated into a "global version."
- See www.usaidgems.org.

Summary

- **Environmental compliance (and achieving ESDM) requires “core EIA skills”**
  - Baseline characterization
  - Identifying impacts of concern
  - Mitigation design
  - Monitoring (coming up)
- **Effective mitigation design is site-specific. It requires a knowledge of the baseline situation.**
- **Mitigate by prevention where you can.**