# Session 3:

## Environmental Impact Assessment: Concepts, Process and Skills Part I

# Why this session?

*Isn't this workshop about USAID's Environmental Procedures, not EIA?*

- USAID's environmental procedures are a specific implementation of the general Environmental Impact Assessment process
- Understanding this process makes USAID's procedures much easier to understand.
- Core EIA skills are required for effective compliance during USAID project design and implementation.

# Environmental Impact Assessment (EIA)

**Environmental Impact Assessment is**

A formal process for identifying:

- likely effects (impacts) of activities or projects on the environment, and on human health and welfare.
- means and measures to mitigate & monitor these impacts

# Environmental Impact Assessment: a universal requirement


- From its beginnings in the 1970 US National Environmental Policy Act. . .
- Most countries & almost all donors **(including USAID)** now have EIA requirements
- EIA now extends beyond government works to
  - *Infrastructure and economic development projects funded by the private sector & donors*
  - *Analysis of policies, not just projects*
- In many developing countries, EIA is the core of national environmental regulation

# Key EIA concepts

- Defining “impact”
- Characterizing baseline conditions
- Defining “activity”

# Key EIA concept: What is an impact?

The impact of an activity is the change from the

**baseline situation**

caused by the activity.

! **To measure an impact, you must know what the baseline situation is.**

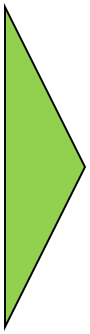
The **baseline situation** is the existing environmental situation or condition in the absence of the activity.

**The baseline situation is a key concept in EIA.**

# Characterizing the baseline situation. . .

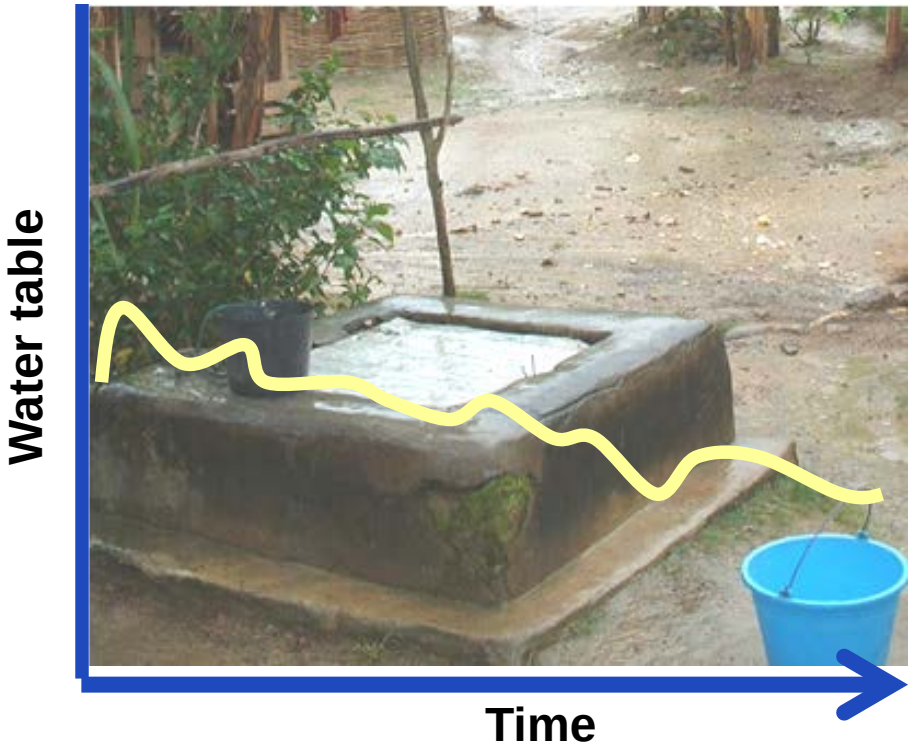
The **environmental components** of interest are those:

- likely to be affected by your activity
- upon which your activity depends for its success



| | |
|---|---|
| **Water?** | *Quantity, quality, reliability, accessibility* |
| **Soils?** | *Erosion, crop productivity, fallow periods, salinity, nutrient concentrations* |
| **Fauna?** | *Populations, habitat* |
| **Env Health?** | *Disease vectors, pathogens* |
| **Flora?** | *Composition and density of natural vegetation, productivity, key species* |
| **Special ecosystems?** | *Key species* |

# Baseline situation: not just a “snapshot in time”




This chart of groundwater levels shows both **variability** and **a trend over time**.

BOTH are part of the groundwater baseline situation.

# Types of impacts & their attributes

The EIA process is concerned with **all types of impacts** and may describe them in a number of ways

- Direct & indirect impacts
- Short-term & long-term impacts
- Adverse & beneficial impacts
- Cumulative impacts

- Intensity
- Direction
- Spatial extent
- Duration
- Frequency
- Reversibility
- Probability

**But all impacts are NOT treated equally.**

# Focus!

**!** **ESSENTIAL to focus on the most significant impacts**

**You definitely do not have time and resources to analyze and discuss in detail less important ones.**

# What is an activity?

The EIA process examines the impacts of **activities**.

✔ An activity is:

A desired accomplishment or output

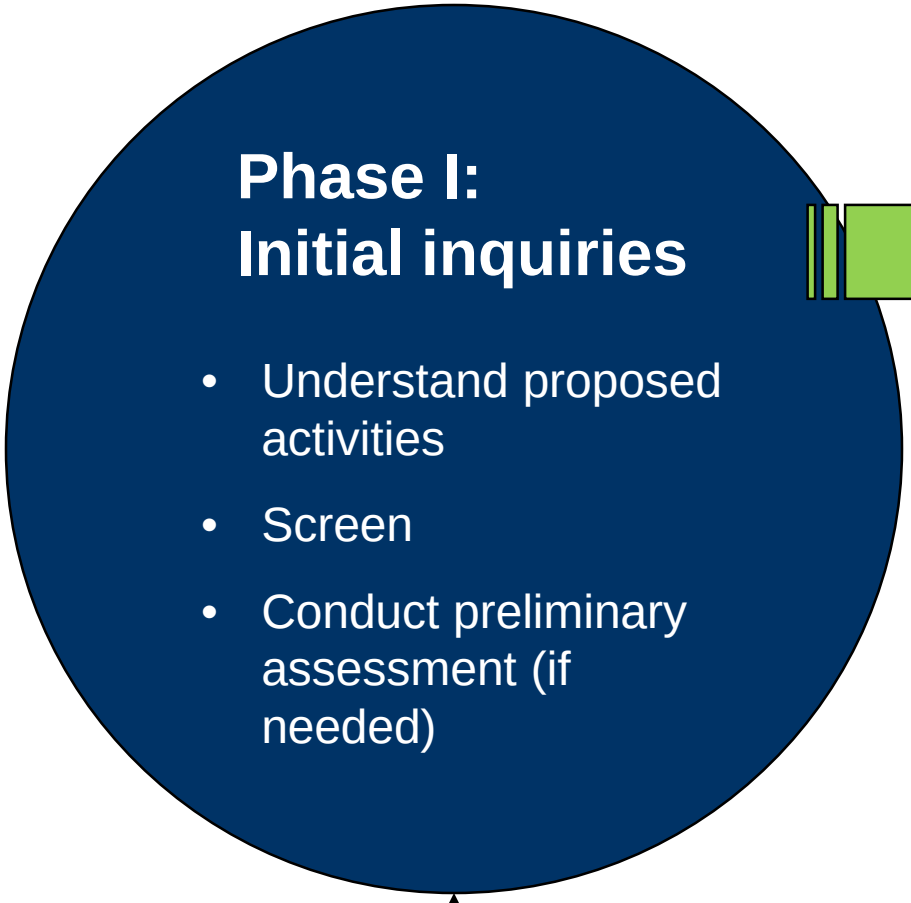
E.g.: a road, seedling production, or river diversion to irrigate land

**A project or program may consist of many activities**

Accomplishing an activity requires a set of **actions**

| **ACTIVITY:** | **ACTIONS:** |
|---|---|
| **market access road rehabilitation** | **Survey, grading, culvert construction, compaction, etc. . .** |

# The EIA process

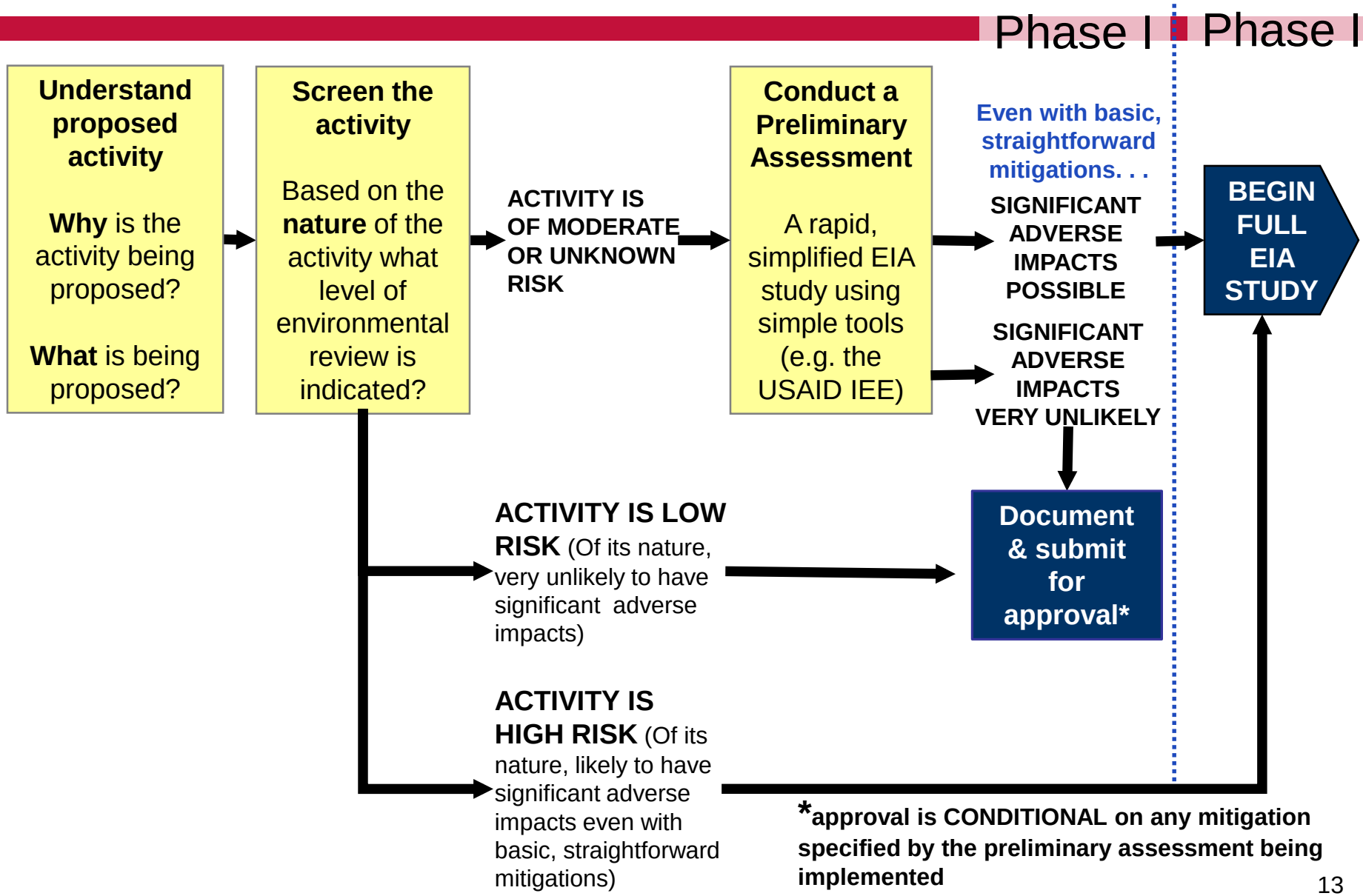



**Phase II: Full EIA study (if needed)**

- Scope
- Evaluate baseline situation
- Identify & choose alternatives
- Identify and characterize potential impacts of proposed activity and each alternative
- Develop mitigation and monitoring
- Communicate and document throughout

*Most USAID activities do NOT proceed to a full EIA study*

# Phase I of the EIA process



# Screen the activity

**Screen each activity**

Based on the **nature** of the activity, what level of environmental analysis is indicated?

**SCREENING asks a very basic set of questions about the activity.**

**These questions/criteria are defined by the specific EIA law, regulation or policy being implemented.**

**Example screening questions:**

**Does the activity involve:**

- **Penetration road building?**
- **Large-scale irrigation?**
- **Introduction of non-native crop or agroforestry species?**

These questions do **NOT**:

- require analysis
- require **detailed** knowledge of the proposed sites, techniques or methods

# The Preliminary Assessment

## (e.g. USAID's Initial Environmental Examination/IEE)

**Conduct a Preliminary Assessment**

A rapid, simplified EIA study using simple tools (USAID Initial Environmental Examination (IEE)

## Purpose is to provide documentation and analysis that:

- **Allow the preparer to determine whether or not significant adverse impacts are likely**
- **Allows the reviewer to agree or disagree these determinations**
- **Sets out mitigation and monitoring for adverse impacts**

**! Screening determines whether the preliminary assessment is necessary**

# The Preliminary Assessment (e.g. the IEE)

**Typical Preliminary Assessment outline**

1. Background (Development objective, list of activities)
2. Description of the baseline situation
3. Evaluation of potential environmental impacts
4. **Mitigation & monitoring**
5. **Recommended Findings**

**For each activity it covers, a preliminary assessment has 3 possible findings:**

**The activity is. . .**

- **very unlikely to have significant adverse impacts.**
- **unlikely to have significant adverse impacts with specified, basic, straightforward mitigation and monitoring,**
- **likely to have significant adverse impacts (full EIA study is required)**

# When to Proceed

!

**We only proceed to Phase II of the EIA process**

**IF**

**Phase I indicates that a FULL EIA STUDY is required**

# Full EIA study

## (e.g. USAID's Environmental Assessment)

The full EIA study has very similar objectives and structure to a preliminary assessment.

**However, the full EIA study differs in important ways:**

!

A formal **scoping process** precedes the study to **identify issues to be addressed**

**Analysis** of environmental impacts is much **more detailed**

**Alternatives*** must be formally defined. The **impacts of each alternative must be identified & evaluated, and the results compared**

**Public participation** is required

A **professional EIA team** is usually required

**includes the project as proposed, the no-action alternative, and at least one other real alternative*

# Core EIA Skills for Environmental Compliance

**Baseline Characterization**

**Identifying Impacts of Concern**

**Mitigation & Monitoring Design**

# 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.

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**Therefore:**

**Impacts of Concern: Salinization Downstream contamination**

**Little Concern: Excess Diversion**

***Why these conclusions?***

# Question:

***Are these concepts relevant to me? I'm not developing IEEs or EAs.***

- 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. . .

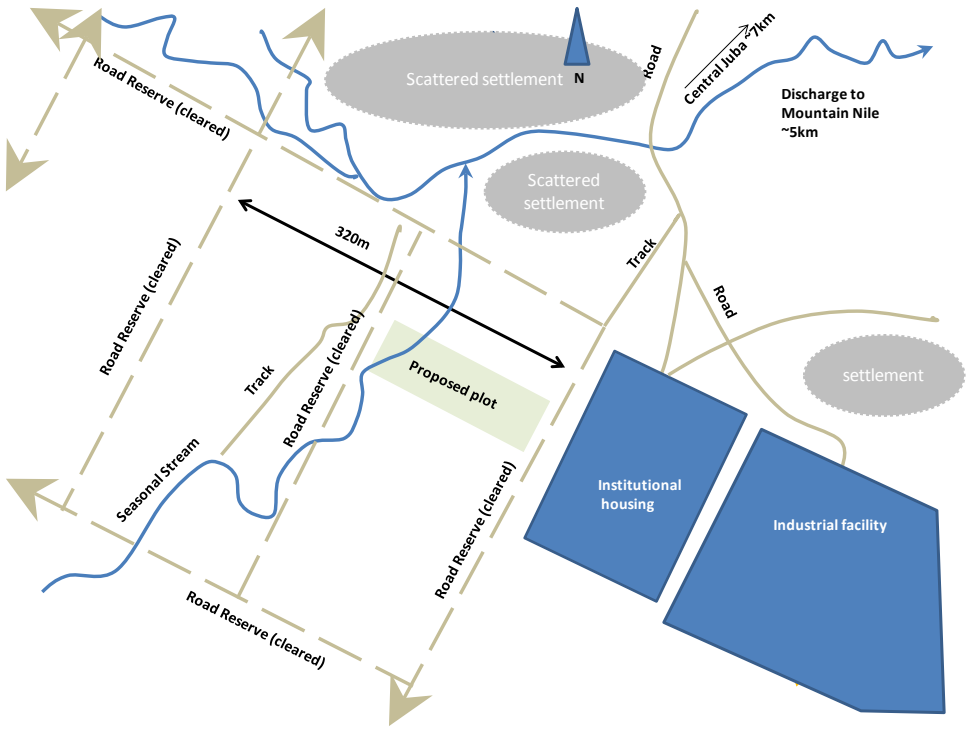
**1: Site is in area already allocated for development---ecosystem integrity already disrupted.**

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

***<u>Implication</u>: 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.**

***<u>Implication</u>: 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**

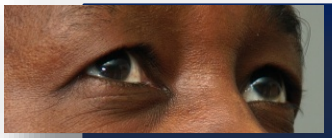
**? Aren't we forgetting something?**

***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?

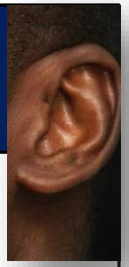


## We need to SEE

- 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.**



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# 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:<br>▪ ***Changing means or technique***<br>▪ ***Changing or adding design elements***<br>▪ ***Changing the site***<br>▪ ***Specifying operating practices*** | PREVENT contamination of wells, by SITING wells a safe distance from pollution sources<br>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 Phase I or II of the EIA process (IEE/EA) must be implemented

**Often env management conditions require judgment in designing specific mitigations. 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

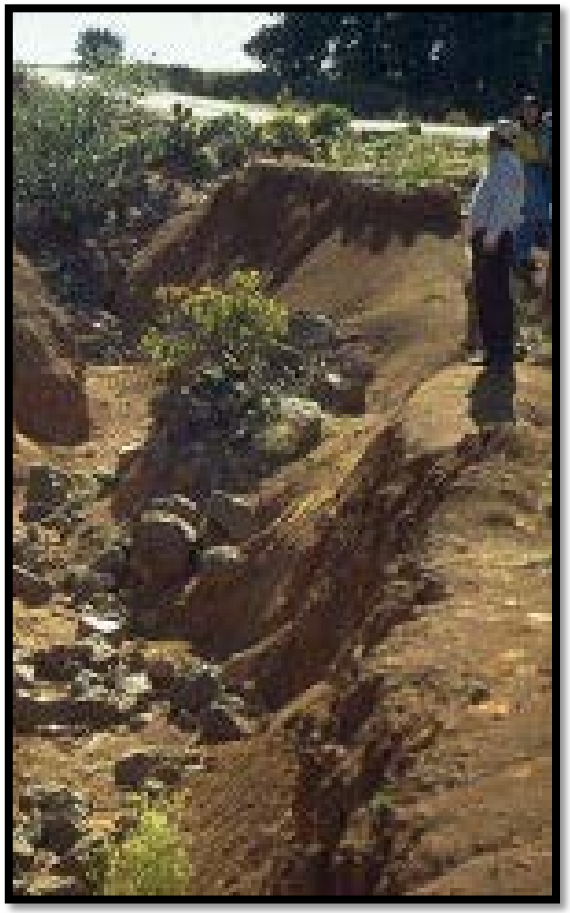
**Avoid steep grades, Follow contours** → **Siting**

**Design elements**

- 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

**Community Maintenance** → **Operating Practice**

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



Gullying can be serious!

# Prevention is best

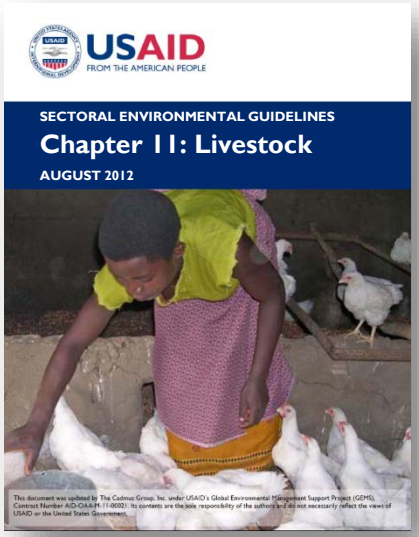
!

**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.**

# 3 rules for Environmentally Sound Design & Management (ESDM)

1. Be prevention-oriented
2. Apply best development practices to environmental aspects of the activity
3. Be systematic

**Properly done, the EIA process makes them a reality.**

# 1 Be prevention-oriented

- Prevention occurs across the project lifecycle. . .

  . . but starts with DESIGN
- DESIGN starts with the **choice of <u>method</u>**
- **Environmental impacts are 1 factor considered**

**Project objective:**

***Improve agricultural productivity***

**How do we choose?**

**Possible *methods***



# EIA assures a “prevention orientation”

1

**Be prevention-oriented**

- Prevention begins with choice of **method.**

  **“Consider alternatives” is a key principle of EIA.**

- EIA forces formal consideration of environmental issues during project design.

  **Early consideration is key to prevention—because that is when design changes can be made**

# 2 Apply general best development practices. .

***Using a technically sound design…***

***That is suited for the local social & policy context***

***Building beneficiary capacity & stakeholder commitment***

***Adjusting what we do as results come in***

**. . .to environmental aspects of the activity**

**AND design for climate change**

# Best Practice #1: Technically sound design

**The design must be appropriate for local environmental conditions ….**

**… Rainfall, temperature, soils, flood, drought and earthquake potential. . .**

**For example. . .**

**?** **Appropriate choice of crops or trees?**

**?** **Appropriate choices of construction materials and methods?**

# Best Practice #2:
# Design for the policy & social context

**Environmental applications:**

**Compliance**

with national and local environmental laws and policies

**Language, literacy**

Environmental management measures must be matched to capabilities

**Natural resource manngagment and land tenure**

Activities utilizing land and other natural resources must be compatible with local NRM and land tenure

**land and resource rights are often gender-specific**

# Best Practice #3:
# Build commitment & capacity. . .

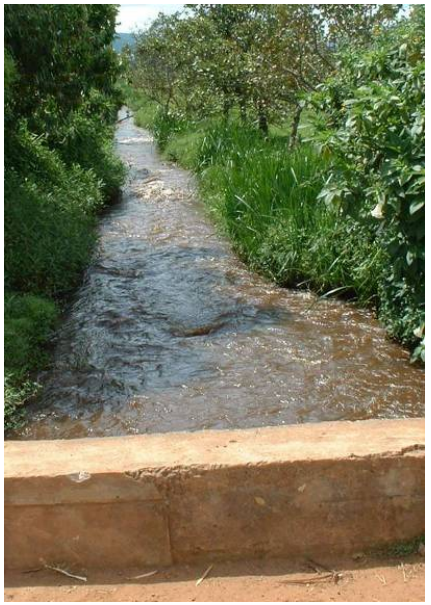
**!**

**Environmental application:**

**Proper maintenance and operation are critical to controlling environmental impacts.**

**Local beneficiaries need to be trained and committed to:**

- environmentally sound operation.
- maintaining the equipment/ structure



Who will maintain it?
Who will operate it?

# . . . and involve the local community

**Ethics require it (environmental justice)**

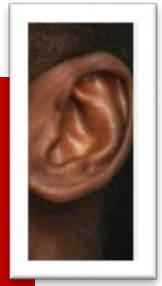
**Local residents must live with the environmental impacts of activities!**

**LOCAL KNOWLEDGE is critical**

- How often does the river flood?
- How often are crops rotated?
- Is there a land tenure problem?
- What do people value and need?

**LISTEN to the community**

**TALK to both men and women**



# Best Practice #4: Practice Adaptive Management

**"Adjust what we do as results come in"**

Environmental dimension: If our activity has unintended adverse environmental consequences, **we need to DO SOMETHING ABOUT IT!**

**Requires:**

- **Funding for environmental monitoring in project budget**
- **flexibility to adapt the project in response to unanticipated adverse impacts**
- **Adjusting implementation based on the experiences of others**

**Communities are often essential to monitoring results from the field**

# Best Practice #5: Design for Climate Change

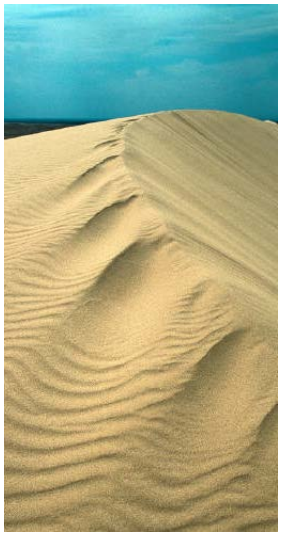
**Already mentioned: future baseline conditions will change—design projects to be ROBUST to meet these changes**

**But in addition**

While individual projects are rarely significant contributors to gobal climate change. . .

. . .climate change is driven by the sum of many small actions.

**So even small-scale projects should seek to reduce greenhouse gas emissions/ increase sequestration/ reduce climate vulnerability in the local area in a manner consistent with their development objectives.**

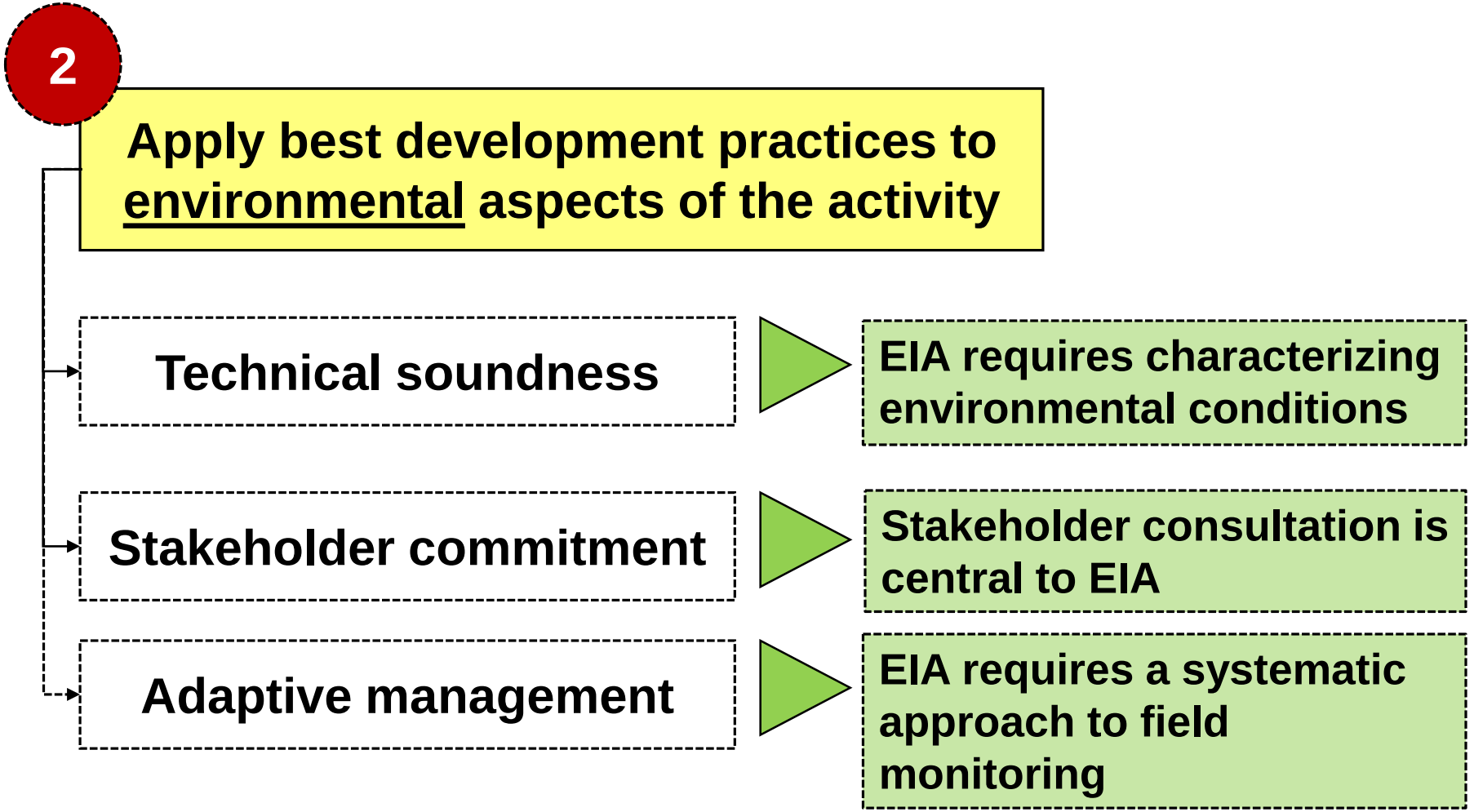


# Best Practice #5: Design for Climate Change

| | Example actions in small-scale projects: |
|---|---|
| Reduce greenhouse gas emissions | Use alternative energy (PV, windmill water pumping, etc) |
| | Improve thermal performance in building design |
| Reduce climate vulnerability in the local area | Prioritize water efficiency to reduce a project's contribution to the area's future water stress |
| Increase sequestration | Tree-planting |
| | Land management sustainable grazing, cropping |

Soil carbon measurement by hand in Senegal

# How does EIA make “Rule 2” a reality?



# Rule 3 for achieving ESDM. . .

3

**Be systematic**

Take a **systematic look at:**

- **the possible adverse environmental impacts of an activity**
- **ways to reduce these impacts**.

The best way to be systematic:

**EIA!**

# EIA: Good practice – and the law!