Environmentally Sound Design & Management: a Foundation for Environmental Compliance

GEMS Environmental Compliance-ESDM Training Series
Rwanda ▪ March, 2015

Environment – the Big Picture

What is Environment?

- *Webster's defines it as "The totality of circumstances surrounding an organism or group of organisms, especially:*
  - The complex of **physical, chemical, and biotic factors** (e.g. climate, soil, and living things) that affect and influence the growth, development, and survival of an organism or an ecological community
  - The complex of **social and cultural conditions** affecting the nature of an individual or community.

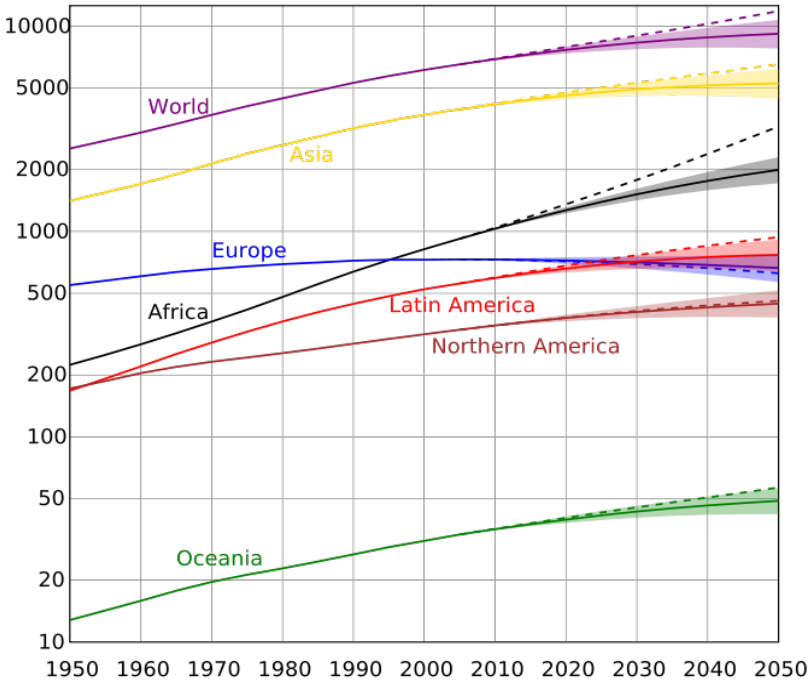
❖ USAID's environmental procedures are concerned with the "natural and physical environment," but in practice social and cultural issues are often not separable

What are some "big-picture" environmental trends affecting human health and livelihoods in Eastern Africa? Are they important in Rwanda?

1. Population growth

UN Population estimates:*

	2015	2050	% change
World**	7.28 bn	9.31 bn	+28%
Africa**	1.15 bn	2.19 bn	+90%
E. Africa**	395mn	869mn	+120%
Rwanda	12 mn	25 mn	+108%
Less-Developed Regions**	6.03 bn	7.99 bn	+32.5%
LDCs	931 mn	1.73 bn	+86%



* All data: “medium variant” projection.
UN Population Division (http://esa.un.org/wpp/unpp/panel_population.htm)

**Includes Rwanda

Increasing Population in Rwanda → **LEADS TO** → **Increased demands for water, land, timber, energy, infrastructure & social services. Increased waste production.**

2. Urbanization

UN Population estimates:*

	Urban pop as % of total		Average annual rate of change (2010- 2015)
	2014	2050	
World**	54%	66%	0.9%
Africa**	40%	56%	1.1%
Eastern Africa**	25%	44%	1.7%
Rwanda	28%	53%	3.7%
Less-Developed Regions**	48%	63%	1.2%
LDCs**	31%	49%	1.7%

* UN Population Division (http://esa.un.org/unpd/wup/highlights/wup2014-highlights/wup2014/pdf

**includes Rwanda

Urban population will grow more than 2X as fast as rural population for the foreseeable future

Most urban growth in the next 35 years in developing countries

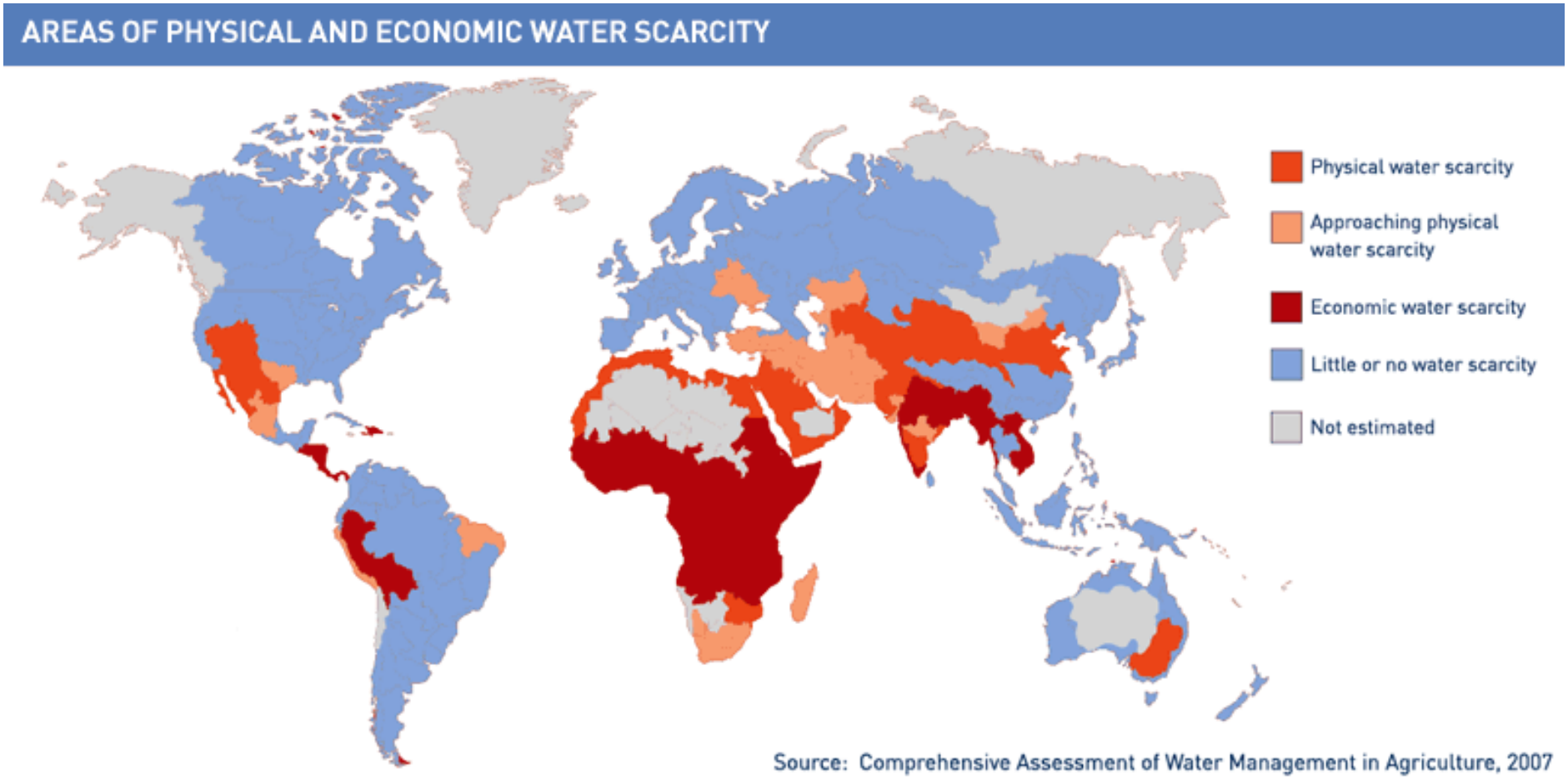
LEADS TO

Increased urban environmental health hazards (given poor or no municipal sanitation & waste management capacity).

Global change + population growth =

INCREASED WATER STRESS

Greatest impacts on poor, subsistence agriculture.



Environment and development are not separable

- Much of USAID's portfolio in the region is already a direct response to or directly affected by these environmental trends
- But good development does not simply respond to external environmental challenges. Good development …
  - is **AWARE** of its **potential adverse impacts on ecosystems, environmental resources and environmental quality and**
  - **PROACTIVELY seeks to limit** these adverse impacts, particularly **where they affect health and livelihoods**

Why? To avoid MISTAKES. . .

Why are “environmental mistakes” made?

Sometimes obvious (previous examples).

But often difficult to foresee, predict

Often rooted in a few common design problems

!

- **Failure to plan for the effects of increased scale**
- **Designing for average conditions**
- **Ignoring economic-environmental linkages**
- **Failure to understand system complexity**

Common root causes #1

! **Failure to plan for the effects of increased scale**

Or, failure to plan for success!

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

BUT if the project is successful, and many more individuals begin to hold larger numbers of animals, serious problems may arise. . .

Health hazards from animal waste. . .

Fodder shortages (may lead to overgrazing and erosion and/or land conflicts)

Common root causes #2

Global change will affect both average conditions & expected variability

! Designing for average conditions, not expected variability

This schoolhouse is being rebuilt in makeshift fashion with plank walls and a split-bamboo roof.

Why? Strong winds ripped the aluminum sheet roofing off the "permanent" structure and toppled the landcrete walls.

In this area, one or two storms every 5 years typically have winds of this strength.

Other "average conditions" to be careful of:
Rainfall, tides, water tables. . . What else?

Common root causes #3

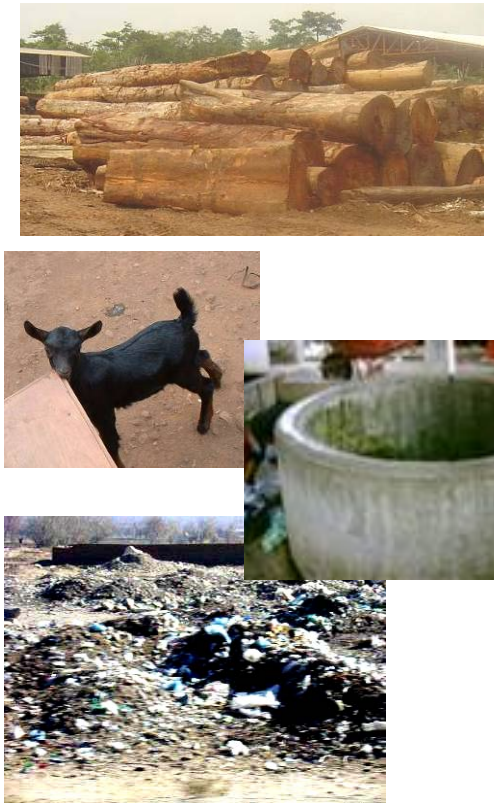
! **Ignoring economic-environmental linkages**

Another failure to plan for success!

Household consumption depends on income.

Success in raising income in a community may increase

- **demand for building materials (brick & timber)**
- **the number of livestock,**
- **demand for water**
- **generation of waste, including disposable packaging**



All can have significant adverse environmental impacts!

Common Root Cause #4: Failure to understand system complexity

Today ~3000 Bangladeshis die each year of As-induced cancer; 2 mn live with chronic As poisoning

Photo: UNESCO-IHE

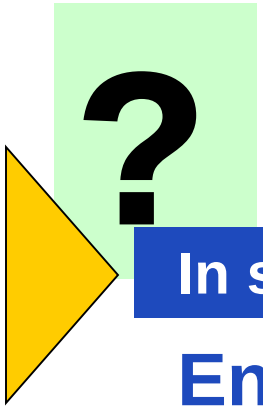
Ponds excavated for fill to build-up ground level in villages for flood protection

Ponds provided a source of organic carbon which settles to bottom of pond, seeps underground and is metabolized by microbes

creates chemical conditions that cause naturally occurring arsenic to dissolve out of the sediments and soils and move into groundwater

Created conditions for mass arsenic poisoning when villages switched from surface water to "cleaner" tube wells.

How can we avoid these environmental mistakes (and maximize environmental benefits)?



In short, how can we achieve . . .

Environmentally Sound Design & Management (ESDM)?

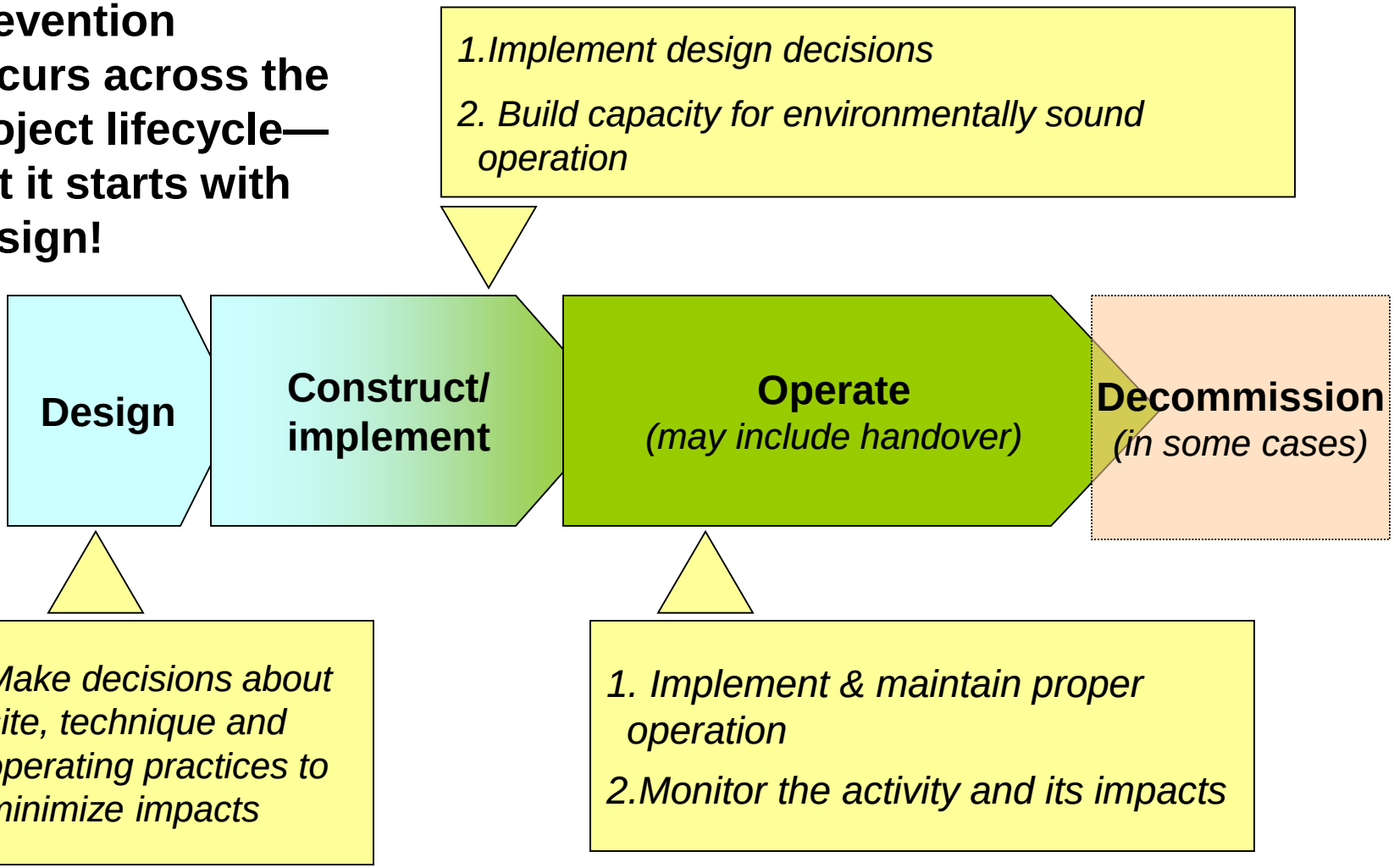
How do we achieve ESDM?

3 basic rules:

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

1 Be prevention-oriented

Prevention occurs across the project lifecycle—but it starts with design!



ESDM is prevention-oriented

- Prevention starts with DESIGN
- DESIGN starts with the choice of means.
- Environmental impacts are 1 factor considered

Objective

Improve agricultural productivity

Possible *means*

How do we choose?

2 Apply best practices

Apply general best development practices. . .

- A technically sound design
- To build beneficiary capacity & stakeholder commitment
- To design for the local social & policy context
- To adjust what we do as results come in

. . .to <u>environmental</u> aspects of the activity

AND design for climate change

BP #1: Technically sound design

Environmental application:

The design must be appropriate for local environmental conditions ….taking into account likely climate change.

… Rainfall, temperature, soils, flood, drought and earthquake potential, the built environment. . .

For example. . .

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

? **Appropriate choice of siting?**

BP #2: Design for the policy and social context

Environmental applications:

Compliance

with national and local environmental laws and policies

Language, literacy

Environmental management measures must be matched to capabilities

NRM 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

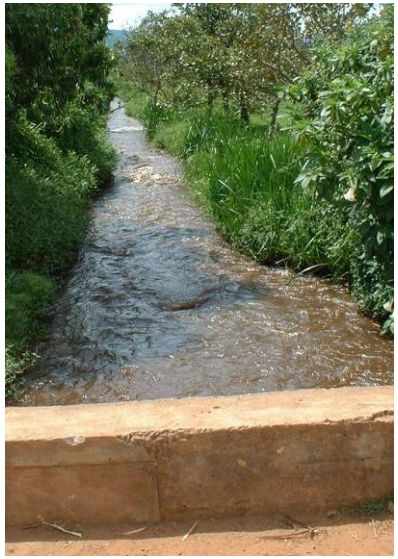
BP #3: Build stakeholder commitment & capacity

Environmental application:

Proper maintenance and operation are critical to controlling environmental impacts.

Local beneficiaries need to be trained and committed to:

- **environmentally sound operation.**
- **maintain the equipment/ structure**



Who will maintain it?
Who will operate it?

. . . and involve the local community

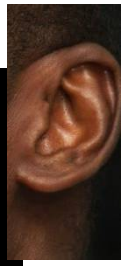
Ethics require it
(environmental justice)

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

BP #4: Adjust what we do as results come in

Practice Adaptive management –

adjusting implementation of our activity based on results from the field

If our activity has unintended environmental consequences, we need to DO SOMETHING ABOUT IT!

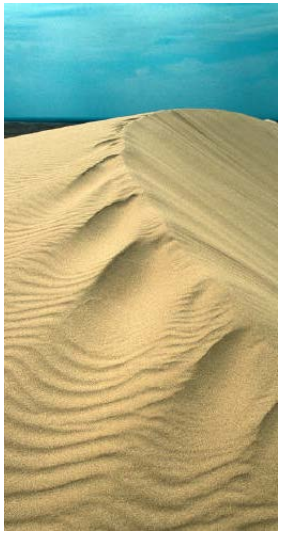
Communities are often essential to monitoring results from the field

Adaptive <u>environmental</u> management requires:

- **A project budget that funds environmental monitoring**
- **The flexibility to adapt the project in response to unanticipated adverse impacts**
- **Adjusting implementation of our project based on the experiences of others**

BP #5: Design for Climate Change

Already mentioned:
Climate change will affect future baseline conditions—projects must be designed to be ROBUST to these conditions



BUT IN ADDITION

While individual projects are rarely significant contributors to GCC…

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

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

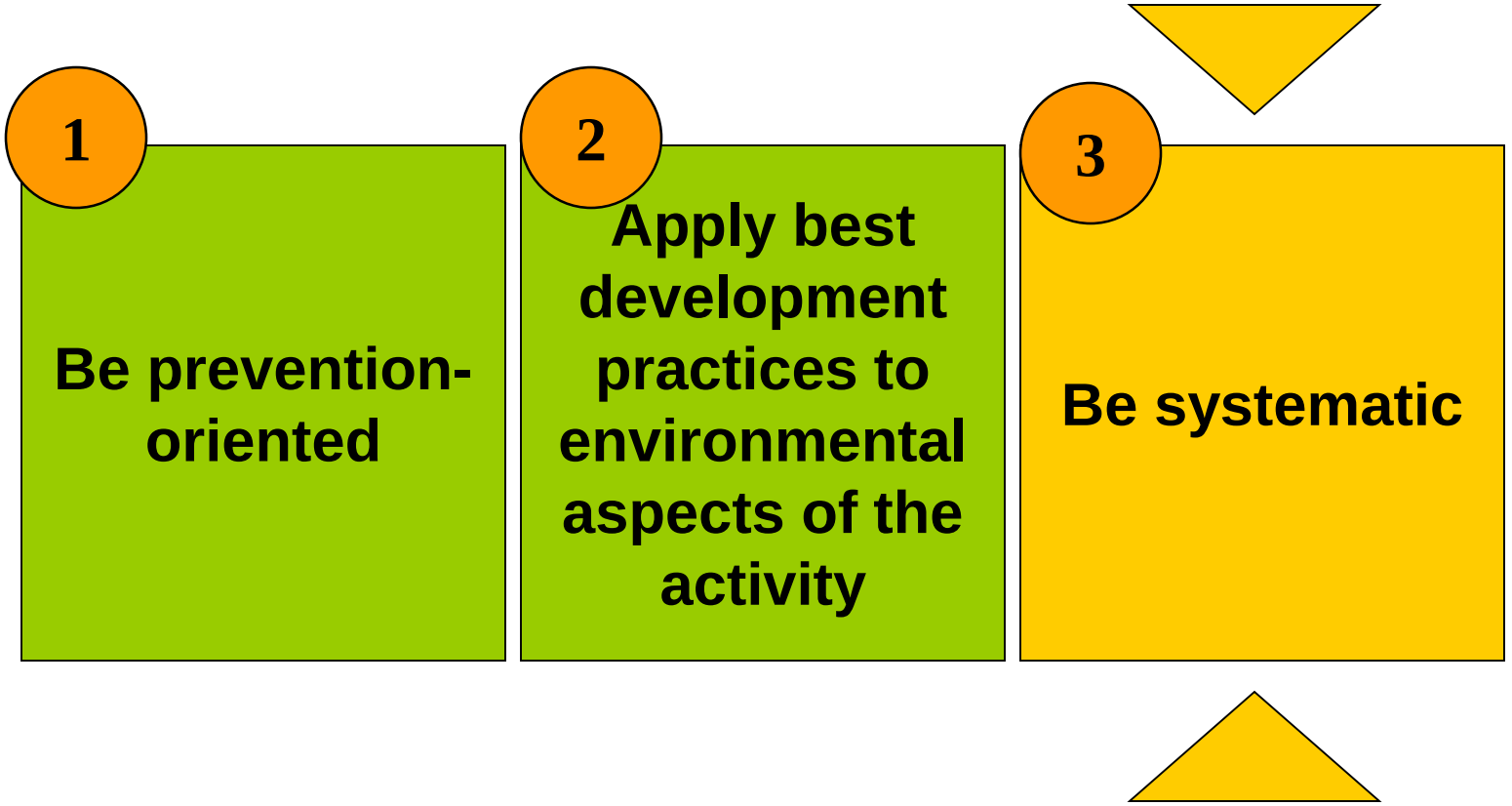
USAID Policy!

Best Practice: Design for Climate Change

	Example actions in small-scale projects:
reduce GHG emissions	Use alternative energy (PV, windmill water pumping, etc)
	Improve thermal performance in building design
	Buy carbon offsets for int'l travel.
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

Now, 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:

Environmental Impact Assessment (EIA)!