Chapter 4. Writing the Initial Environmental Examination (IEE)

As explained in the previous chapter, your screening outcomes determine if you must undertake an IEE. This Chapter guides you through the process of writing the IEE. Note that the process described here is representative of that applied in environmental impact assessment processes anywhere in the world.

Suggested steps involved in preparing an IEE are:

- Step 1: Decide the type of IEE you will write;
- Step 2: assemble the relevant information resources;
- Step 3: carry out the environmental analysis (i.e., write sections 1–3 of the IEE narrative);
- Step 4: consider recommended determinations (threshold decisions);
- Step 5: settle on recommended threshold decisions and mitigation and monitoring (write section 4 of the IEE narrative);
- Step 6: fill in the Environmental Compliance Facesheet and attach to the IEE Narrative.

The chapter begins with a brief review of the purpose and content of the IEE, and then addresses each of these steps in turn.

NOTE: Steps 2–5 of the IEE are often an **iterative process**. You prepare each section, following the outline to the extent that you have information. You may need additional information and have to go back to various sections and add detail or, in some cases, revise your conclusions. It is best to jump in and do what you can, then fill in and revise later.

Box 4.A
IEE Basic Outline

Program/Activity/Preparer Data::

1 Background and Activity Description
- 1.1 Purpose and Scope of IEE
- 1.2 Background
- 1.3 Description of Activities

2 Country and Environmental Information (Baseline Information)
- 2.1 Locations Affected
- 2.2 National Environmental Policies and Procedures *(of host country, both with respect to environmental assessment generally, and any requirements particular to the sector/activity.)*

3 Evaluation of Environmental Impact Potential

4 Recommended Determinations and Mitigation Actions *(Includes Monitoring and Evaluation)*
- 4.1 Recommended Threshold Determinations & Conditions *(includes justification of categorical exclusions identified during screening)*
- 4.2 Mitigation, Monitoring and Evaluation

4.1. IEE Review

The IEE is a review of the reasonably foreseeable effects on the environment of a proposed development intervention/activity. The purpose of the IEE is to provide information and analysis sufficient to reach one of four conclusions (or *threshold decisions)* regarding the overall environmental effects of the project. For each activitiy addressed by the IEE, IEE preparers *recommend* one of these threshold decisions to USAID. USAID can accept or reject this determination.

Table 4.1: IEE outcomes

IEE determination (Reg. 216 terminology)	Explanation	Implication
Positive determination	Activity is likely to have significant adverse environmental impacts	Do full Environmental Assessment (EA), or redesign project
Negative determination	Activity has no significant adverse environmental impact	Project has passed environmental review
Negative determination with conditions	With adequate mitigation and monitoring, activity has no significant adverse environmental impact	By adding additional mitigation to project design, project passes environmental review
Deferral	Not enough information to evaluate impacts	Project must be defined and IEE finalized and approved before any "irreversible commitment of resources" can be made.

Note that the text of the IEE will also document any Categorical Exclusions identified during the screening process.

4.2. Step 1: Decide the type of IEE you will write

Regulation 216 does not specify the IEE format or outline. Over time, USAID practice has standardized around a set of basic approaches. All start from the same outline (Box 4.A, above). These basic approaches are described in Table 4.2. Examine the first column of the table to see what situation best characterizes your proposal. Remember that the IEE must cover all the activities/components for which a screening outcome required an IEE.

Note that subsequent guidance centers on writing the IEE to the basic outline—i.e., to the "basic" or "classic" IEE described in the table. IEE examples in the Annex illustrate how this basic outline is adapted to various other IEE types.

Table 4.2: Guidelines for choosing the type of IEE you write

Situation	Type of IEE	Comment and Explanation
Well-defined, closely related activities at one site.	Basic or "classic" IEE	This is the most straightforward IEE. It requires specific information about the activities over their full lifecycle (i.e., over all phases of the activity), including site selection, design, construction, operation and decommissioning/abandonment. For example, a classic IEE describing agricultural interventions would detail these interventions, how they work, and where they will be implemented. If, on the other hand, dams or river diversions are planned to irrigate an area, required information would include the design of the dam or diversion (e.g., height, volume of water impounded or diverted; location of the water source), upstream and downstream characteristics; etc. In both cases, information about the site, environmental setting, farmers and their families would be required. Examples of "classic" IEEs and amendments are found in Annex D.
Well-defined, closely related activities at multiple sites	Multi-site IEE	Many USAID-supported programs carry out specific, well-defined activities in numerous sites across a region or country. A multi-site IEE can be prepared if the following conditions apply: ▪ The multiple activities are well-defined, repetitive and/or predictable; ▪ impacts can be mitigated by measures readily identifiable in advance ▪ sites are known well enough to affirm that no unexpected impacts would occur in sensitive areas (e.g., wetlands, protected areas, etc.). In these cases, the multi-site IEE avoids the unnecessary effort of preparing an IEE for each site. Instead, the IEE analyses the activities in a general way, and identifies mitigation and monitoring measures sufficient to prevent significant adverse impacts. Common situations in which multi-site IEEs might apply include programs of latrine or well construction or terracing. At the beginning of the program or project, not every specific site may have been identified, but overall characteristics are known. In these cases, the multi-site IEE would analyze all construction activities in the general environmental context. The analysis would identify mitigation measures sufficient to prevent significant adverse environmental effects. Mitigating measures might include training for local staff, and adoption of siting and construction guidelines to ensure the actions taken have no adverse environmental implications (e.g., water sources will not be diverted, soil will not be eroded, and protected species will not be endangered, etc.). An example of a multi-site IEE is included in Annex D.
Some activities not yet fully defined	IEE with deferral	A *deferral* may be appropriate for an activity or major component when it is not yet fully defined, sufficient information is unavailable, or a decision to pursue an activity is not yet definite. This applies especially when you expect that at least some of the activities are not likely to be considered small-scale. The request for a deferral is made within the IEE (see §216.3(a)(7)).The IEE must be amended as soon as information about that activity becomes available. The deferred activity **cannot proceed** until the deferral in the IEE has been resolved. However, other activities addressed in the approved IEE and receiving negative determinations CAN proceed. An example of an IEE with deferral is included in Annex D.

Situation	Type of IEE	Comment and Explanation
Multiple sets of dissimilar activities at one or more sites.	IEE with separate write-ups of sectoral activity	If the project or program includes several sets of dissimilar activities (e.g., natural resources management, road construction, and water resources works), it may be most efficient to address each sector in a separate analysis. Each analysis would follow the format and content of IEE sections 1-5, but would address *only* the sector in question. Elements common to multiple sectors (e.g., aspects of country and environmental information) can be cross-referenced rather than repeated.
Multiple activities not yet fully defined, but mostly small scale	Umbrella IEE	The "umbrella" IEE may be applicable under the following conditions: ▪ The proposal consists of multiple activities (i.e., one or more sets). ▪ The activities are generally expected to be small in scale. ▪ Some of the activities are not fully defined at the time of proposal. ▪ A post-IEE review process can be defined that will prevent any as yet undefined activities from having significant adverse environmental impacts. Umbrella IEEs are commonly used for subgrant programs and proposals that contain activities to be identified by communities. An "umbrella" IEE assumes a negative determination with conditions. The conditions are the environmental review process that will be followed as the activities become more completely defined. This environmental review process varies with the nature of the activities. E.g., environmental review and screening for construction of many small dams differs from that for construction of wells. The "umbrella" IEE may also require application of "Best Practice" guidelines, and training of subgrant recipients in environmental review. The umbrella IEE process can be applied to all the sponsor's program activities or to a portion of the program. [Note that a "classic" IEE may also incorporate an umbrella process for part of the program.] In principle, the advantages of the "umbrella" IEE are that (a) it provides for a post-IEE screening and review process for each activity as the information about the activities is developed; and (b) all or most activities can be approved in the field on the basis of local screening and review once the IEE, including a process of environmental screening and review, has been approved by the BEO. *An alternative to the "umbrella" IEE is to* ***prepare an IEE with a deferral of those activities for which insufficient information is available.*** *This requires amendment of the IEE before funds are obligated or the deferred activities are implemented.* Examples included: More information about the "umbrella" IEE is contained in Annex G A useful example of an environmental review process and screening form, specifically prepared for rural roads is provided in Annex E.

4.3. Step 2: Assemble information resources

To understand the potential environmental impacts of a project or activity, certain information about the community and physical environment at the site(s) will be needed. Some of this information will already have been collected to develop the activity objectives, but additional data will be necessary to identify alternative means of accomplishing the objectives and to assess their impacts on the environment.

Note: You will not be able to acquire all possible sources of information for the IEE. Be selective and judge what you think is most useful.

Box 4.B
Assembling an IEE team

If you are not especially familiar with the implementation of activities and actual on-the-ground detail, you should consider assembling a multi-disciplinary team with the requisite knowledge and expertise.

Locate key environment and natural resources data.

Potential sources of existing information about the environment and natural resources relating to the project sites include:

- Host country counterpart agencies, such as the Ministry of Agriculture or Forestry, or local agricultural extension workers, universities, or training centers;
- Direct observation during a site visit and contact with counterparts, villagers, farmers, and residents;
- NGOs, universities, consultants, and technical experts;
- National-level documents, such as the country's National Environmental Action Plan (NEAP), Conservation Strategy for Sustainable Development (IUCN sponsored), National Report on Environment and Development prepared for the United Nations Conference on Environment and Development (UNCED) held in Rio in 1992, or Tropical Forestry Action Plan;
- The USAID Mission's Environmental Sector Assessment (sometimes referred to as an Environmental Threats Assessment) or Biodiversity Assessment (in place or likely in process);
- Geographic Information System (GIS)[9] databases (consult Ministry of Environment or Natural Resources or equivalent); and
- FAO reports (The FAO has supported international soils and water resource inventories in many areas).

[9] Geographic Information Systems provide digitized computerized map data, often on subjects such as land use, drainage, climate, vegetation, or soils. Overlays and comparisons of these factors are possible.

Box 4.C
Basic elements of a participatory process

- Work with organizations established in the local community.
- Participation must be facilitated. It won't just happen by calling a meeting.
- Be attentive to meeting times and suitability of places for women to attend.
- Provide gender training to the PVOs and NGOS who will be working at the local level.
- Work with entire families.
- Ensure that communication skills, discussion and methods of inclusion are appropriate for the community in which you are working

Do not neglect socio-economic and cultural information

To understand the context of your interventions, you need information on local culture, socio-economic conditions, and gender relations in the geographic area of your proposed activities. Without this understanding and the participation of the local population, your activities' sustainability will be questionable. Sources of such information include direct observation, local counterparts, farmers and villagers, and local NGOs. The information gathering process should include a local participation component. The participation of affected groups needs to be encouraged so that potential adverse impacts can be identified and mitigation strategies developed by those most knowledgeable about the local setting and existing environmental conditions.

By **incorporating gender and other social variables in design and environmental analysis**, development programs will be more effective and sustainable. Gender-disaggregated data should routinely be collected where appropriate. This information can be useful as baseline for monitoring and evaluation purposes.

For example:

- In the case of agricultural productivity projects, be sensitive to the fact that women and men have different relationships to specific resources, and these relationships affect resource access and use. Which farmers are responsible for what? Is it appropriate to ensure that all farmers receive training in the new technology? How will you choose the farmers? What risk minimization strategies do farmers employ? What impact might these strategies have on the environment, the introduction of new technologies, and mitigation strategies?

- For agricultural extension projects and demonstration of improved practices, determine through a participatory process whether those involved agree that the technology can be expected to work. What would be the anticipated drawbacks? Will they use the new techniques, if not, why not? Again, who selects the farmers and how?

- In providing agricultural credit, will all farmers benefit, or mainly those who own (or farm) the land? If it is in a region where credit is tied to ownership and women farmers cannot own land, can provisions be made to benefit them?

One should also aim to promote enforcement of environmental and health statutes or application of such statutes in areas with disadvantaged populations. **Environmental justice** concerns to be addressed include:

- inequities or disproportional adverse environmental impacts affecting low income populations or various disadvantaged groups (depending on the context: ethnic groups, indigenous populations, minorities and women);

- adverse effects on populations that depend on subsistence consumption of natural resources or those who have traditional

livelihoods, e.g., pastoralists who depend upon rangeland proposed for irrigation;

- population groups that face higher health risks because of exposure to environmental hazards created by nearby project activities; and
- segments of the population whose health is differentially affected by exposure to environmental hazards or changes in environmental baseline conditions, such as the very young or very old, pregnant women, etc..[10]

The importance of maps

Maps can be especially valuable in activity design and implementation, as well as in preparing the IEE. They also make it much easier for reviewers to understand the proposed activities and their environmental implications. They should be of sufficient scale to show roads and villages, targeted rivers and streams, and topographic features (e.g., 1:50,000 or 1:25,000 or better). Compare information about the setting with maps or plans of your activity to assess how the geographic area may be affected by your proposed action. Be careful when comparing maps of different scales.

Maps will help you visualize whether or how various resources or areas overlap with your area of intervention. Often you will not have a precise indication of overlap areas, but you will be able to see potential areas of conflict that need to be investigated further. Environmental information in map form can be developed and presented manually with transparent overlays. Computer-generated maps or Geographic Information Systems (GISs) can be used to present multiple features from a variety of sources. You may even wish to consider providing maps as attachments to your environmental documentation.

Box 4.D
Preferred writing style for IEEs

Keep writing simple and clear. Use short sentences. Avoid the passive tense.

Be brief. If supporting documents are needed, attach them or refer to them. Do not reproduce large passages in the IEE.

Use bullets, tables and other formatting techniques to (1) make organization clear and (2) reduce length.

4.4. Step 3: Conduct the Environmental Analysis (write sections 1–3 of the IEE narrative)

The first 3 sections of the IEE (1) describe the program or activity; (2) characterize the physical and social environments potentially affected by the program or activity, and (3) evaluate the potential impact of the proposed activities on these environments. Together, these sections constitute the basic environmental analysis portion of the IEE. The text below provides guidance for completing each of these sections.

[10] Adapted from: US Executive Order 12898, February 1994.

IEE Section 1 contains:

- *background and rationale for the proposed activity*
- *description of proposed activities*
- *purpose and scope of the IEE*

IEE Section 1: Background and Activity/Program Description

In Section 1 of the IEE, you should provide the **background**, **rationale for** and **description** of current and/or proposed activities and the **purpose and scope of the IEE**.

- Use the subsection on "purpose and scope of the IEE" (1.1) to answer the following questions: Is this the first IEE being prepared for the proposed activity(ies) or an amendment? Are certain activities in the program not being covered? Why? (e.g., they are expected to end in the near future, or are deferred.)What other IEEs cover the sector, or SO, if any?
- Use the background subsection (1.2) t describe why the activities are desired and appropriate. (For example, what development need do they address? How does they fit into the Mission and/or the host country strategy/program? Also note any other contextual information that should be brought to the attention of an IEE reviewer.)
- Under the activities subsection (1.3) describe the activity and its component actions. The organizational framework is up to you. Determine how you wish to organize and group activities in a logical or coherent fashion. If your project or program is organized as a Results Framework, you may find that method of organization most convenient. You may prefer some other logical grouping of activities, geographically or by sector.

In this manual:

"Activities" mean desired accomplishment or output *(e.g., a road, placing land under irrigation, etc.)*

Activities consist of a number of components or actions, occurring over various phases of the activity (e.g., planning, construction, etc.)

What is the definition of an activity?
The definition of an activity was discussed in Section 2.1

Briefly, in this manual, "activity" refers to the desired accomplishment or output such as a road, seedling production, forestry planting, or river diversion to irrigate land. Accomplishing an activity requires a set of *actions,* which take place over the lifecycle of the activity.

Analysis of impacts requires that you know what all these actions are. These discrete actions, the inputs to accomplish the activity, do not, however, require separate Reg. 216 determinations. The activity as a whole is typically the subject of the Reg. 216 determination.

What information do I provide about the proposed activities?
For each grouping (e.g., by type of intervention or Intermediate Result), try to provide information about the activities, including background and description of major components or discrete actions. You do not need to justify activities (this is covered in other parts of the project or program proposal). You do, however, need to provide some physical detail and be as quantitative as possible. For example, "about 500 farmers will be trained in irrigated agriculture for one week each, four farm-to-market roads will be built in such-and-such locations with respective lengths of a, b, c, and d kilometers with a construction period of approximately four months during the dry season, and estimated vehicular traffic of about 20 small trucks or vans and 10 autos per day. . ."

Consider actions over the entire activity lifecycle
All activities have a lifecycle, from (i) planning/design, to (ii) construction,

through (iii) operation, and (iv) potential phase out or abandonment (decommissioning) of these components. The activity description in the IEE should cover all of these components and phase, and address the various locations involved. (For example, if you are building or rehabilitating a road, material from a distant quarry may be needed during the construction phase. Consider constructing a table that organizes the components of your activities by the four phases along the vertical axis, and by location (village, ward, district, nation, etc.) along the horizontal axis. Review the additional questions listed below to help you understand the activity and its components from the IEE point of view.) Table 4.3, below, sets out specific concerns and questions related to each phase of the lifecycle.

Table 4.3: Issues for consideration in the IEE across the project lifecycle

Activity phase	Questions and notes
Planning and design	Planning and design work usually does not directly affect the environment or human behavior. However, sometimes it does, for example, site drilling or survey work can disturb threatened or endangered species. Associated land speculation can also lead to future adverse impacts. The proposed activity can prompt people to move to or away from the site in anticipation of the activity happening. Further, decisions made in the planning and design phase define in large measure the environmental impacts associated with future phases. It is thus important to ask whether there are siting alternatives, and the impacts that might be associated with each. What choices of materials and equipment will need to be made?
Construction/Site preparation	Is a construction camp needed? Where will the labor come from? Does an access or haul road need to be constructed? Is quarrying needed to obtain construction materials or is a borrow pit for earth fill needed? What other construction materials are needed (wood, bricks, etc.) and where will they come from? If earth or vegetation is removed, what will be done with it? What will happen to excess construction material or rubble? How will erosion be controlled? If new plantings are proposed will these be indigenous? Do utility pipes need to be laid? What social impacts may result during this phase?
Operation	What inputs are needed, including raw materials, water, or energy sources? Where will they come from? What products are created and where do they go (export, autoconsumption)? Are waste products created and how are they disposed of? Is traffic generated? What routine maintenance and repair activities are needed, and what inputs, (e.g., material, labor, transport) will this require? What social impacts may result during this phase?
End-of-life	If the activity were to cease (no longer needed or no longer funded) or its useful life were over (reservoirs silt up; mines become exhausted; roads, wells or latrines are abandoned; etc.), does it just disappear? What is left behind and what characteristics do the “leftovers” have?

Key Questions to Consider in describing expected results, background and rationale.

You are not expected to answer the following questions *per se* in the IEE. Instead, they are provided to (1) help you identify all activities and actions which should be covered by the IEE, and (2) adequately describe background and rationale. These questions should also stimulate your thinking on potential impacts. (You will assess potential impacts in Section 3 of the IEE). Again, keep in mind the full activity lifecycle, as discussed above.

- **Why is the (proposed or current) activity needed, and are there alternatives?** Have the alternatives been evaluated? If so, the IEE

should indicate why the particular activity was chosen. If no alternatives have been considered, are there any, what are they, and should they be considered?

Consider these key questions *when you articulate the rationale for the activity and describe its components and intended results*

- **Why is the activity the best or most feasible***?* Why is activity "x" the best or the most feasible way to accomplish the goal? For example, if increased income is the ultimate goal, why is small-scale irrigation (or aquaculture or micro-enterprise) the chosen activity? What other planned or potentially necessary activities are linked to the activity under consideration? The planned intervention may be necessary to accomplish the goal, but is it sufficient? For example, if vegetable production were to increase, is the road adequate to transport it to market?
- **Does the activity have a history**? Is there some important history to the activity? For example, fish farming may have been tried before, but failed. Perhaps the community being assisted was relocated because of another project, etc. What was its previous experience? Does the activity involve rehabilitation of a previous investment (e.g., terraces)? It may be important to know why rehabilitation is proposed. Was rehabilitation expected and planned for in the original design? Was the prior design incorrect or inappropriate? Was maintenance neglected or improperly carried out? If faulty design or lack of maintenance is provoking the rehabilitation, how will these problems be avoided in the proposed new activity?
- **What are the results?** Distinguish between the physical reality (a school or a well constructed) and the ultimate result (potable water or education).
- **What would happen if the no action alternative were chosen?** The answer is **not** that things would remain the same. For example, without the proposed activity, environmental deterioration might worsen over time. This scenario should be compared against the effects of the proposed activity. For example, a rehabilitated road with proper drainage may pose fewer long-run environmental impacts than a deteriorating road that is eroding away.

IEE Section 2 *contains:*

- *information regarding the environmental, social and economic conditions of locations affected by the activity*
- *any applicable host country environmental regulation or procedures with which the activity must comply*

IEE Section 2: Country and Environmental Information

In this section, you describe the environment (physical, biological, socio-economic and cultural) in which the proposed activities and interventions are expected to occur.

It is standard practice in most countries and in most documents that assess environmental impacts to consider people and the socio-economic and cultural characteristics of the affected environment.

Although USAID regulations define environment as the natural and physical environment, experience demonstrates that an IEE needs to consider the human factor. Some impacts may be beneficial for one segment of the population but adverse for others (e.g., women versus men or rich versus poor). Indigenous populations, different ethnic groups, and the economically

inactive portion of the population (the elderly and those not yet of working age) may either benefit from an activity or be adversely affected in different ways from other groups.

You will need to determine first how you want to organize this section. It may be appropriate to adopt the same organizational framework you used in IEE Section 1, presumably by sector, type of activity or Intermediate Result, and to describe the environmental situation appropriate to each. For example, suppose rural health activities occur in the same general area as road rehabilitation activities. In this case, you may want to describe the baseline situations for rural health and then refer back to this description for roads. In some cases, it may be easiest to use geography as the organizing framework.

Environmental baseline information.
In some cases, this may be similar or identical to information required for performance monitoring and evaluation. Similarities or differences between the environmental baseline and the baseline for measuring activity results will depend on the nature of the results expected and being tracked. Such baseline information, whatever the source or reason for collecting it, can be useful in determining long-term sustainability, in developing environmental mitigation and monitoring strategies, and for measuring whether mitigation is working. As noted earlier, people are part of the environment, and their interactions are often the key issue under consideration, especially for most Title II development activities.

Locations Affected and Trends.
Try to gain a picture of overall development issues and prospects for the area of concern. In so doing, you are trying to determine the future no-action alternative. This is not a static condition, but rather, the baseline situation projected into in the future, and shaped by trends, growth, further degradation, improvement in water or air quality as regulations are developed and enforced, normal environmental change, etc.)

The impacts of your actions are measured not against the existing situation but by using the yardstick of the future—the future context in which the actions will occur. If no clear trends exist, you may have to consider the existing situation to be the best approximation you have of the future. For example, if you are building a road through a forested area that has already been targeted for cutting and for development in the next four years, how much does it matter that the road will result in loss of vegetation? Can you estimate the population of the area 25 years from now? Fifty years? What would be the potential impact of the projected changes on the natural resource base? Box 4.D poses a number of questions which focus attention on this wider context — i.e, *what else is happening (or is likely to happen) in the activity locations* that will shape the future baseline*?*

Look at Box 4.E, which describes Major Categories in a Baseline Study, to determine what features you should describe or about which you should acquire data. Determine key characteristics and key data needs. You construct the description of the environment pertinent to your activities as you see fit.

Environmental Policies and Procedures
Describe briefly the host country's environmental impact assessment policy,

Box 4.D
Factors and actions outside your activity which may impact the future environmental baseline.

Are roads being built or rehabilitated by others?

Are there other projects operating or about to start-up?

Has this area been identified as a growth area?

Are there plans for power development or extension of electricity?

Are there resources (e.g., mineral or biological) that will likely be exploited (mined, extracted) in the foreseeable future?

legislation, or procedures and whether the host country will require environmental documentation. Note any applicable policies or regulations for protected areas, wetlands, historic or archaeological sites, siting or construction of facilities, wells, dams, or water diversions.

Remember to **reference** your sources of information. For example, Kenya has procedures and standards for siting wells. Thus, for a program for well development in Kenya, the USAID Partner may need to elaborate in Section 2.2 of the IEE on the nature of the procedures specific to the siting of wells. Policies and procedures are likely to vary by sector, i.e., irrigation, roads, wells, or the like, and each is affected by the sector-specific policies, procedures or regulations from lead government units, e.g., a Ministry of Agriculture or Ministry of Water Resources, etc.

Box 4.E
Major elements of the environment characterized in baseline studies

(select and focus as appropriate to your activities)

Geology—geological provinces, bedrock formations, history of geological stability or instability.

Topography—general topography of region, specific topography of project area.

Soils—soils mapping, soil series properties, constraints to development.

Groundwater Resources—nature of water-bearing formations, recharge rates, sustainable safe yields, locations and depths of existing wells, quality.

Surface Water Resources—drainage basins and sub-basins, named and unnamed water bodies and watercourses, regulatory classification of water bodies, flow regimes, water quality data and evaluation, identification of existing permitted discharges to surface waters, long-term historical precipitation data or characteristics.

Terrestrial Communities—spatial arrangement of vegetative community types, vegetative species-abundance listings, wildlife species-abundance listings, records of threatened and endangered plant and animal species.

Aquatic Communities—nature of aquatic habitats, species-abundance listings for aquatic macro-invertebrate and fish communities, ecological indexing of community data.

Environmentally Sensitive Areas—identification of wetlands, floodplains, sensitive coastal, riparian or desert ecosystems, steep slopes, stands of mature vegetation, aquifer recharge areas, areas of high water table, areas of rock outcrop, prime agricultural lands, and mines. Identification of existing protected areas (e.g., national parks and forests).

Air Quality—regional quality and trends, data from local monitoring stations, reported exceedances of standards.

Sound Levels—existing sound levels, sources of sound.

Land Use—existing patterns of land use in region, regional planning for future use, zoning.

Demography—censused or estimated population, recent trends and projections for future population.

Socioeconomics—economic and social structure of communities, tax rates, characteristic types of development.

Infrastructure Services—nature and status of human services such as police and fire protection, hospitals, schools, utilities, sewage, water supply, solid waste disposal.

Transportation—layout and function of existing roadways, railways, airports; existing and projected capacities and demands.

Cultural Resources—location and characterization of identified cultural resources (archaeological, paleontological, historical, cultural, landmark), potential for unidentified resources to be present in project area.

General Guidelines:

- You are not writing an environmental encyclopedia! Provide only baseline information needed to assess the potential environmental effects of your proposed activities.
- Be guided by national environmental policy or Environmental Action Plan(s) and by the special or unusual characteristics of the locations affected. For example, in one country, genetic diversity and maintenance of indigenous crop varieties may be important; in another, preventing land degradation or soil erosion may have special value.
- Consider what is ecologically or culturally unique, unusual, or sensitive. Consider what regulations or laws might apply. For example, are there special prohibitions on building in or filling wetlands?
- Obtain some information about all the locations associated with each activity and its related actions, as noted in IEE Section 1 above. For example, if a project or activity requires an access road or a utility line to a site or a borrow pit, relocation of families to another place, off-site disposal of waste, etc., it may be appropriate to describe all locations that will be affected by the proposed activities.

"You are not writing an environmental encyclopedia"

Provide only useful and relevant information.

IEE Section 3: Evaluation of Activity/Program Issues with Respect to Environmental Impact Potential

Identifying potential impacts requires application of **science** and **experienced judgment.** Although scientific methods should be used whenever possible, there are often limitations due to inadequate data, complex relationships, and limited time and resources. Therefore, seeking the input of knowledgeable local experts and applying informed judgment are essential; where these are lacking, simple analysis and logical reasoning are useful.

You are advised to adopt the same organizational framework for IEE Section 3 you used for IEE Section 1, so that reviewers can easily refer back to the activity descriptions.

IEE Section 3 *describes the impacts for each activity, using the same organizational framework you adopted for IEE Section 1*

If an activity has no potential impact, or a component may be a categorical exclusion, briefly note this.

Construct List of Potential Impacts

You may wish to use one or more simple *checklists* to help you identify potential environmental impacts. Sample checklists are found in Annex E. No checklist is perfect. Each is meant to help stimulate good thinking and planning about your activities. You are encouraged to create your own for the specific activity or program under review. Checklists offer the advantage of simplicity in gathering and classifying information necessary for assessing environmental impacts. The technique is a structured way of help you begin to organize information, identify potential environmental impacts, think about possible mitigation options, and make tentative conclusions on the extent of environmental impacts.

Table 4.4: Example of a project impact (or Leopold) matrix for a roads project

Environmental Components:	Physical environment										Biological environment									Social environment							
	Agricultural lands	Soil erosion	Slope stability	Energy/mineral resources	Surface water quantity	Surface water quality	Ground water quantity	Ground water quality	Air quality	Noise	Aquatic eco-systems	Wetland eco-systems	Terrestrial eco-systems	Endangered species	Migratory species	Beneficial plants	Beneficial animals	pest plants	pest animals	disease vectors	public health	resources/land-use	distribution systems	employment	at-risk population	migrant populations	community stability	cultural/religious values
Project Components																												
I. Project Planning & design																												
Obtain geo-mechanical investigations																												
Obtain groundwater investigations																												
Design basic road route																												
Determine excavated road materials locations (where?)																												
Determine borrow pits quarries – where?																												
Planning of disposal site locations																												
Planning of drainage systems																												
Land surveying																												
II. Construction																												
Clearing of top soil																												
Disposal of removed vegetation																												
Excavation of embankments																												
Rock blasting																												
Road camp management																												
Putting down base material																												
Mining, crushing, and transport																												
Construction of concrete drainage systems																												
Construction of erosion control structures																												
Asphalt works: production, transport, filling																												
Land survey																												
Bridge construction																												
III. Operation & Maintenance																												
Preventive soil erosion measures: planting grass and shrubs																												
Winter maintenance activity: salt and snow application																												
Maintenance of drainage systems																												
Fence maintenance																												
Road patching																												
Maintenance of road signage																												
Pay toll facilities&management																												
Commercial facilities impact																												
IV. Decommissioning																												
Old road sections																												
Reclamation of quarries and excess material landfills																												
Abandonment of excavated road material																												
Abandonment of old asphalt and concrete materials																												

The matrix should be filled in with symbols which indicate (1) the size or extent of any impact, AND (2) whether it is adverse or beneficial. Example:

Adverse impacts		Beneficial impacts
×	Negligible or non-existent	•
×	Moderate	●
×	Large	●

A "**Project Impact Matrix**" (also called a Leopold Matrix, Table 4.4) is *highly recommended* as a means of organizing your thoughts. Typically such a matrix has the various environmental components affected by the activity listed across the top. For each of these environmental components (physical, biological, socio-cultural, economic), you indicate if some input action during planning and design, construction, operation, and cessation of useful life could affect one of the environmental components. (see Annex E for an example of a completed matrix)

Impact matrices are *highly recommended.*

Once you have organized your activities by phase (planning, construction, operation, end of useful life) and bearing in mind the characteristics of the environment you noted in IEE Section 2, determine how each activity might affect some environmental component, e.g., aquatic ecology, soils, topography, water quality, flora and fauna, etc. You will need to focus on issues of importance. It is not always easy, even given the right data, to appreciate the various and often subtle ways in which certain project activities can affect the environment.

Identify and Consider the Implications of Classes of Impacts
Using the information you developed and the description of the affected environment, determine what types or classes of impacts may apply, as defined below.

- Determine direct impacts first, e.g., clearing land means loss of vegetation. A new or improved road means new or additional traffic.
- Consider the *implications of each direct impact to arrive at indirect or induced development impacts*. Indirect impacts are caused by the action, but two, three or four steps down the line from direct impacts, occurring later, or in different locations. (See box 4.F.)

  Use the literature available to see how you might link direct impacts to secondary, tertiary impacts, etc. For example, does development of a site mean that more people are attracted to an area, resulting in population growth, or will the clearing be so extensive or in such a sensitive zone that an important habitat will be destroyed.
- Distinguish between short-term or temporary, and long-term impacts. Although construction-related impacts are often short-lived, some impacts may occur during construction that are long-term with permanent implications, e.g., construction activities that alter the hydrology of a wetland.
- Distinguish beneficial impacts from adverse impacts, recognizing that where human groupings are concerned, impacts beneficial to one group may be adverse to another.
- Consider the ***potential for cumulative impacts.*** These are impacts that result when the impacts of your actions are added to the existing situation or to the effects of other reasonably foreseeable activities likely to take place ***regionally or over time***. For example, cumulative impacts can result from individually minor but collectively significant actions, e.g., continuing forest clearing for agriculture, or the addition of another access road. This is

Box 4.F
Indirect impacts: the example of a dam

Consider the following example of a chain of impacts associated with a dam:

The dam could result in reduced water flow downstream

Decreased water flow results in increased aquatic vegetation growth,

Denser aquatic vegetation tends to support denser populations of aquatic snails (some of which are vectors of schistosomiasis)

Higher population of disease vectors results in the potential for increased incidence of this disease by water users.

Thus, in this example, the indirect health impacts of the dam clearly need to be taken into account.

The vegetation growth can be called a secondary impact, the growth of snails a tertiary impact, etc.

particularly the case in countries with severe population pressures on land, water and energy resources. The activities you are proposing may be only one of many being carried out, or likely to be undertaken in the area by a variety of organizations or agents with varying objectives and sources of support. Promoting area-wide environmental management plans and environmental analyses can be very important in mitigating adverse cumulative effects. You probably will not be able to mitigate the effects of activities for which you are not responsible. Nevertheless, where feasible, you should try to **coordinate your activities** with others, help others to recognize potential impacts of their activities, or play a role in fostering an environmentally sound overall development plan.

- Consider what you said about the future context of the activities, i.e., the future no action alternative. **Compare** the expected impacts to that, not just the current baseline situation.

To write Section 3:

1. List potential impacts

2. Systematically consider the list by class/type of impact

3. Predict the impacts

4. Judge their significance

Predict and Characterize Potential Impacts
Identify the nature of the changes in environmental conditions that are caused by the proposed action. Doing so requires an understanding of *cause-and-effect relationships*. Environmental impacts will have a number of distinct, but linked, characteristics, which should be considered to give an overall picture of the anticipated changes due to the project. Use the list in Box 4.G to help predict the nature of the identified impacts. In using the list of impact descriptors, consider especially effects on human groups. Also consider gender equity. Who is affected by the magnitude, direction, extent, duration, or frequency of impacts? Try to make your impact indicators as quantitative as possible. Define your terms for the reviewer and try to avoid words like minor, moderate, major, etc.

It is a good idea at this point to again compare the impacts of the proposed action with the no-action alternative[11] and any other alternatives to the proposed action. If the proposed action seems to have the biggest set of adverse impacts, *consider these additional alternatives*. Consider reducing the size of the activity, changing its site or substituting another type of activity that could achieve a similar objective. Note: Consider again whether there are alternatives that have less impact, including possible sets of mitigation measures for each alternative. (See IEE Section 4 for more ideas.)

Judge the Significance of Impacts
Significance of a predicted impact depends on its *context* and *intensity*.

- **Context** varies with the setting. For example, the loss of one hectare of park in an urban setting may be more significant than the same quantitative loss in a more rural setting, unless that hectare is habitat for an endangered species (or belongs to you!). A new or rehabilitated road in an urban area could be far less significant than the same road in a remote or wilderness setting.

[16] It is important to stress the role of the no-action alternative because it serves as a baseline against which other alternatives can be measured. When the environmental consequences of the action alternatives are weighed against their projected benefits, the no-action alternative can sometimes be the best one.

- **Intensity** depends on the degree to which an action:

  - affects public health or safety
  - affects unique characteristics of an area (culturally, archeologically or historically important resources, parklands, prime farmlands, wetlands, wild and scenic rivers, ecologically critical areas, etc.
  - is likely to be highly controversial
  - is highly uncertain or involves unique or unknown risks
  - establishes a precedent
  - adversely affects nationally defined historic places
  - adversely affects endangered or threatened species or habitat and the like; or
  - is irreversible

Thus, determining "significance" involves a judgment, tempered not only by applicable national or international laws protecting the environment, but also by societal perceptions of importance. One way to judge significance is by considering the specific USAID or host country regulations, international conventions, or policies that say "x" is significant, or where standards exist that are not to be contravened. (For more detail, see 5.4.4 How do I determine whether the scale or magnitude of my activities may result in significant effects?")

Box 4.G:
Characteristics of environmental impacts

Typical *descriptors* used in identifying environmental impacts include:

Magnitude: the absolute or relative change in the size or value of an environmental feature. Uncertainty is likely in forecasting the magnitude of change, and some upper and lower estimates may need to be given.

Direction: the impact will represent a beneficial or adverse change. It is therefore important to know the direction of the impact as the beneficial impacts are welcome. It is the adverse impacts which are cause for most concern.

Extent: the area affected by the impact — e.g., in hectares of productive agricultural land or kilometers of river. A distinction here between on-site and off-site impacts is often useful.

Duration: the time period over which the impact will be felt. Some impacts may be very short term (i.e., during construction), some may occur over a number of years, and some may be permanent. It is often desirable to specify duration in terms of short-term (i.e., 1 year or less), medium-term (i.e., 1 to 10 years), and long-term (i.e., more than 10 years).

Frequency: refers to the *return period* for impacts which will recur over and over again—e.g., seasonal water quality problems. Return period can often be specified by interval—e.g., annually or less, 1 to 10 years, 10 to 100 years.

Reversibility: refers to the permanence of the impact. Several distinctions are possible here. Impacts may be reversible by natural means at natural rates, or be reversible by various forms of human intervention at reasonable costs, or be, for all practical purposes, irreversible. Irreversible impacts are likely to be more severe as this assumes permanent damage to the environment.

Likelihood of Occurrence: refers to the possibility of a particular impact occurring as forecast. Here, an estimate is made about how certain the impact prediction is, given the limitations of environmental science. Again, establishing categories of analysis such as "definite," "probable" and "possible" may come in useful if they are well-defined.

(adapted from Takawira, 1995)

4.5. Step 4: Consider recommended threshold decisions

After writing the basic environmental analysis, you must consider the threshold decision(s) the IEE will recommend to USAID. Again, the IEE recommends a threshold decision for EACH activity it covers. Each recommendation MUST be supported by the analysis presented in the IEE, as detailed below:

- A **negative determination without conditions** indicates that the activity is routine and is expected to have no significant effect on the environment. (As discussed above, significance is a matter of judgment, based on context and the intensity of an action) If a negative determination without conditions is recommended, section 3 (evaluation of potential environmental impacts) must clearly reflect the low-impact nature of the activity.

- A **negative determination with conditions** indicates that, with appropriate mitigation and monitoring, the proposed activity will produce no significant harm to the environment. Mitigation and monitoring might produce this result in one of two ways:

  1. any adverse impacts that occur will be mitigated
  2. monitoring will identify adverse impacts before they become significant, and project implementation will be adjusted to prevent significant harm from occurring.

  Absent those mitigation and monitoring conditions, the implication is that a positive determination would result. If there is any confusion or doubt about whether to include conditions, the prudent decision is to select a "negative determination with conditions," then specify good environmental practices and mitigation or monitoring of impacts (see Box 4.I).

- A **positive determination** indicates that the activity has the potential for creating significant, adverse effects on the environment. A positive determination means that an IEE alone is not sufficient to assess and address the environmental concerns raised by the proposed activity, and an EA or PEA is required. The affected activity cannot proceed until the EA is completed and approved, although normally the other activities in the project or program may proceed once the IEE is approved.

Box 4.H
EA versus PEA

If the activity is one of a kind, then a project-specific EA is suitable. If there are many similar activities either within a particular program, or where several USAID Partners have similar activities, a PEA might be more applicable. Additional information on PEA preparation is provided in Annex C. If the activity directly affects the U.S., the global environment, or areas outside the jurisdiction of a country, an EIS (Environmental Impact Statement) will be required.

Box 4.l
Examples of Environmental Determinations

Example 1: Health post construction.
If as part of a health activity, you were building a small health post or some other facility where health care and information were provided, your analysis would need to show that building and operating this facility posed no special environmental problems (e.g., no wetlands filled, no habitat for endangered species affected, no unusual erosion or flooding conditions, etc.), and that the health post could be built using standard engineering and construction practices. Assuming this were the case, the health post would qualify for a **negative determination without conditions.**

If, however, the health post's construction had some unusual siting conditions and the site could not be changed to avoid these conditions (e.g., unusual need for slope or soil stabilization, specialized erosion control, or need to divert a drainage course), then a **negative determination with conditions** would apply. If this health post were to be testing blood, using syringes, creating biohazardous waste, etc., then a **negative determination with conditions** would also apply. The conditions would specify how the adverse effects would be minimized or otherwise mitigated (e.g., how biohazardous wastes would be safely disposed of), so as to avoid environmental harm or risks to human health.

Example 2: Well construction.
If wells were to be developed, and they were shallow wells in an area with a sufficient aquifer and standard "good practices" for digging wells were to be followed, a simple **negative determination** would suffice. The IEE would affirm that cumulative impacts on the environment should not be a concern, that "best practices" are expected to suffice as mitigation measures, and would identify any other appropriate measures that have been incorporated in the design.

If there were unusual conditions, such as the need to use major construction equipment to bore hundreds of feet into the ground, questions about the sufficiency of the aquifer or a potential for saline intrusion, then a **negative determination with conditions** related to construction methods, water extraction rates or monitoring would likely apply.

Example 3: **Potentially high-risk activity**
Consider an activity on the list that might trigger an EA (e.g., application of general-use pesticides, or construction of dams of 50,000 cubic meters capacity).

- If the scale and magnitude of potentially adverse impacts could be avoided or sufficiently minimized through design, or mitigation and monitoring measures, then the IEE would likely request a negative determination with conditions.
- However, if the IEE indicates that significant impacts are still likely even with best practice design, mitigation and monitoring, then a positive determination is necessary.

Example 4: **"Umbrella IEE"**
If an "umbrella" IEE is used (Annex G), the determination is by definition a **negative determination with conditions,** the conditions being the subsequent environmental screening and review appropriate to the development programs involved. Also normally included in the "umbrella" IEE language would be a requirement for demonstrated capacity in sound design, environmental review, mitigation and monitoring and "best practices." This requirement may be addressed in part through required training for USAID partners, and incorporation of specific language in Partner Subgrant or contract agreements.

See Chapter 2 for examples of applicable **categorical exclusions** and high-risk activities likely to result in **positive determinations.**

Positive determinations *should be made in consultation with the relevant USAID environmental officers.*

A positive determination automatically requires preparation of an EA. This implies a substantial commitment of resources and time (often ranging from six month to more than a person-year). Thus, a positive determination should be made in consultation *with the relevant USAID Environmental Officers*, who need sufficient information from the USAID Partner in making this decision. In the case of a positive determination, the IEE should clearly support this conclusion.

- A **deferral** indicates that no threshold decision can yet be reached, because of insufficient information.

Box 4.I provides short examples of types of decisions reached. In Annex D, you will find examples of approved IEEs. These illustrate how determinations are made in practice.

4.6. Step 5: Settle on recommended threshold decisions and mitigation and monitoring (write section 4 of the IEE narrative);

At this point, you have reviewed the first three sections of the IEE narrative, and carefully considered the threshold decision(s) you will recommend to USAID. Now you must write these recommended threshold decisions into the IEE, document any applicable categorical exclusions you identified during screening, and document the mitigation and monitoring measures you are committing to.

Complete the summary table

Your first step should be to complete the summary table you started in Chapter 2 (Table 2.1). In the final columns of the table (**Recommended IEE Threshold Decision)**, indicate the threshold decision you are recommending for each activity covered by the IEE.

Organize "recommended determinations" *in the same way as sections 1 and 3.*

IEE Section 4.1: Recommended Determinations (Threshold Decisions & Categorical Exclusions)

Organize this section to correspond with the organizational format chosen for IEE Sections 1 and 3.

In this Section, you should set out your recommended threshold decision for *each* activity whose screening result was "IEE required." (Again, the only possibilities are a positive determination, negative determination, negative determination with conditions, and deferral.) Review the specific language in Reg. 216 for negative determination(s) §216.3(a)(2)(iii) and for deferrals §216.3(a)(1)(iii)

- IF your screening identified some categorical exclusions, you must document them in this section. You should **provide the specific Reg. 216 language and citation** to justify these exclusions.
- IF you one or more of your recommended threshold decisions is a "negative determination with conditions," you should note briefly what mitigation and monitoring measures are considered "conditions." You will be able to expand on these in IEE Section 4.2
- Include your summary table in Section 4.1

If screening identified some activities as CATEGORICAL EXCLUSIONS, *these are also documented in IEE Section 4.1*

IEE Section 4.2
Mitigation, Monitoring, and Evaluation.

The generic outline for the IEE indicates Mitigation, Monitoring, and Evaluation as one section. You can discuss the three topics together by activity under Section 4.2 or you can organize separate sections for each. In this discussion, only Mitigation and Monitoring (related to the IEE specifically) are treated. This assumes that the evaluation of overall effectiveness of mitigation and monitoring will be dealt with as part of your overall project performance monitoring and evaluation (M&E) framework.

The process of environmentally sound project development does not stop when project or program environmental effects have been identified or decisions have been reached. An environmental mitigation and monitoring plan (often referred to as an *Environmental Management Plan*) is part of the environmental documentation process and should be included in or annexed to the Reg. 216 documentation.

Identify Mitigation Options.
Mitigation is the purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment. Mitigation is a general concept that may include the following list of categories:

- *Avoiding* impacts altogether by not taking a particular action.
- *Minimizing* impacts by limiting the degree or magnitude of the action and its implementation.
- *Rectifying* impacts by repairing, rehabilitating, or restoring particular features of the affected environment.
- *Reducing* or *eliminating* impacts over time by performing maintenance and preservation activities over the life of the action.
- *Compensating* for impacts by replacing or providing substitute resources or environments that are, or might be, affected by the action. (Compensation might include, for example, enhancing the ecological value of another wetland or protected area, if you have destroyed one. Or it might be the provision of replacement housing and land for relocated people. Generally, it is easier to provide compensation to people than it is to provide replacements or

compensation for the biophysical environment.) Note that providing compensation requires some estimate of the level of compensation provided. This is turn requires a methodology for *valuing* the environmental damage caused by the proposed activity.

- *Monitoring impacts* of an activity can be considered a form of mitigation when decisions contain uncertainty and monitoring becomes a form of agreement among affected stakeholders, to be used to help define a shared strategy for addressing future problems as they are identified.

Note that the mitigation categories above are arranged according to desirability. In other words, avoiding impacts is preferable to rectifying impacts or providing compensation for them.

Elements of an environmental mitigation plan or management plan are summarized in Box 4.J.

When designing mitigation measures:

Plan for the cost and build into the budget. If too expensive, consider redesign

Identify who *is responsible for each aspect of mitigation.*

Key issues to consider in developing your mitigation strategies
The most important issues to consider in developing a mitigation strategy center around cost and accountability:

- How costly are the mitigation measures relative to project cost? If they are more than ten percent of the cost, perhaps you should recommend redesign.
- What co-benefits, if any, are likely to result from the mitigation measures?
- Who will be responsible for design, implementation, and monitoring of the effectiveness of your proposed mitigation measures?

It is very important to incorporate any mitigation and monitoring measures in bids or tenders, if contracts for construction are needed as part of an activity. These could be construction-related mitigation measures (such as reducing soil erosion, protecting vegetation during construction, restoring a landscape, or ensuring sound environmental practices in a construction camp). They may include mitigation measures needed during operation (e.g., the methods employed to prevent contamination of water supplies in water and sanitation projects, or the disposal of medical wastes in health facilities.) They may also extend to measures that will need to be taken at the end of a project's useful life, or when infrastructure is finally abandoned or replaced, e.g., closure of old roads, quarries, wells, latrines, mines, etc.

In preparing your environmental documentation, you may not have the time or resources to assess or develop mitigation and monitoring measures for all potentially adverse impacts. Your Project Impact (Leopold) Matrix (Table 4.4) can be used to help identify those impacts most in need of mitigation and others which may be considered only as time and additional resources allow. (See Annex E for examples.) For instance, in a rural road project, impacts from water related erosion may require far more mitigation attention than the potential adverse impact from road traffic hydrocarbon emissions.

Box 4.J
Environmental Mitigation or Environmental Management Plan

A mitigation or environmental management plan consists of the set of measures to be taken during implementation and operation to eliminate, offset, or reduce adverse environmental impacts to acceptable levels. Also included in the plan are the actions needed to implement them, including monitoring. During the preparation of a mitigation plan, one should (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.

A mitigation or management plan should include the following items:

(a) identification and summary of all the significant adverse environmental impacts that are anticipated;

(b) description and technical details for each mitigation measure, including the type of impact to which it relates and the conditions under which mitigation may be required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;

(c) institutional arrangements—the assignment of specifics responsibilities for carrying out the mitigatory measures (e.g., responsibilities which involve operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training);

(d) implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans;

(e) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) provide information on the progress and results of mitigation; and

(f) integration into the activities' cost estimates and sources of funds for both the initial investment and the recurring expenses for implementing the mitigation plan.

To strengthen environmental management capability for implementation, most mitigation plans cover one or more of the additional topics identified below:

(a) technical assistance programs;

(b) staff development;

(c) procurement of equipment and supplies, and;

(d) organizational changes.

Specific links should exist for (a) funding, (b) management and training (strengthening local capabilities), and (c) monitoring. The purpose of the first link is to ensure that the proposed actions are adequately financed. The second link helps embed in the overall management plan the training, technical assistance, staffing, and other institutional strengthening needed to implement the mitigation measures. The third link is necessary to provide a critical path for implementation, to enable evaluation of the success of mitigation, and to serve as a means for improving future projects.

(Adapted from World Bank Environmental Assessment Sourcebook Electronic Copy (1991), by using keyword 'mitigation'.)

Identify Monitoring Needs
In addition to monitoring of key mitigation measures to determine whether they are achieving the intended result, there may be potential environmental impacts you are unsure of, or for which mitigation may or may not be necessary. These potential impacts are also candidates for monitoring. Certain mitigative measures may require periodic maintenance. These too are candidates for monitoring. Box 4.K describes basic elements of a monitoring plan.

Because monitoring can be a costly undertaking, consider:

- Is the monitoring needed?
- Will comparisons be made to the baseline situation, a control site/situation, or both?
- How often will the indicators be monitored?
- Who specifically will be responsible for the monitoring? What kind of expertise may they need?
- What will be the approximate cost (including person-days per month or year, if you can estimate that) for measuring each indicator? Can the mitigation and monitoring budget be sustained long enough to provide useful data?
- Can the indicators of mitigation effectiveness be derived from data already being collected? Could the data collected contribute to regional, national, or other monitoring efforts?
- Can the stakeholders benefiting from the activity be involved in or trained to perform any of the monitoring?
- How will the results be used and with whom will results be shared, either for information purposes or because action needs to be taken?
- How will this monitoring be incorporated into your overall monitoring plan or program?

Note:
for BDCHR activities, updates on mitigation and monitoring are to be included in the annual Environmental Status Report (see Chapter 3.2.)

What environmental factors and indicators are to be monitored?
Indicators used for monitoring need to be clearly identified and described during activity and monitoring plan design. The monitoring plan identifies and describes the environmental and natural resources parameters to monitor, such as pH, salinity, productivity, etc. It also identifies indicators or "proxies" to use to measure or estimate changes (presence of plants in a specific environment, plants with different tolerances to changes in soil fertility, exotic species, etc.). The selection of parameters to be monitored, as well as associated indicators, depend on the type of activities, and the impact of those activities on the environment, and the mitigation measures employed. If environmental monitoring specialists are not on staff, consider obtaining short-term technical assistance and use an interdisciplinary team approach.

Note that sample mitigation and monitoring tables *are presented in Annex E.*

The environmental mitigation and monitoring plan (or Environmental Management Plan) may be applied most effectively where it is directly linked to the Annual Workplan for a project or program and to annual budget planning processes.

Box 4.K
Designing an Environmental Monitoring Plan

Environmental monitoring plans differ depending on the severity of impacts on the environment, and on the kinds of environmental factors that need to be monitored. Plans should state clearly *how, by whom, and at what cost in human and financial resources* monitoring will be accomplished.

Monitoring components should describe how:

(i) monitoring will be accomplished to determine if mitigation is meeting expectations; and

(ii) other monitoring will be provided to serve as "caution lights" to inform activity implementers and communities of changes that may require additional mitigation (ideally an effort should be made to select indicators that measure both beneficial and adverse effects).

Effective monitoring plan development and implementation requires a participatory approach, especially in development settings where constraints on financial and technical resources may require innovative approaches to monitoring involving local communities, farmers, pastoralists, etc. Local involvement in monitoring can reduce overall mitigation and monitoring costs and create greater ownership and responsibility for Environmental Management Plans. The results of the monitoring should be provided to the USAID MEO and in some cases might warrant reporting to the host country institution in charge of the environment, e.g., if the monitoring were to detect overall patterns of degradation that warranted area-wide action or policy solution.

For more information on environmental mitigation and monitoring see USAID's *Topic Briefing: An Introduction to EIA* (available for download at www.encapafrica.org). Also of particular interest are the mitigation and monitoring tables contained in the *World Bank's Environmental Assessment Source Book - Volume II Sectoral Guidelines* (1991). Also explore the IAIA website home page at www.iaia.org.

The special case of water quality monitoring

Testing and monitoring for water quality has become an issue of increasing importance to USAID and USAID Partners. USAID and other donors, including the World Health Organization, are concerned about the frequent occurrence of health-threatening contaminants in rural and urban public water supplies. These contaminants include heavy metals like arsenic, as well as coliform bacteria, nitrates and nitrites. (See Box 4.L.)

***Potential water supplies** should be tested BEFORE water development programs are initiated*

Testing should include arsenic

Prior to initiating water development programs, USAID Partners should assess water quality, and take results into account in the design of water development activities. Monitoring also should be done to ensure future quality is maintained. A 1998 USAID official cable (98 STATE 108651) on testing potable water provides "supplemental guidance for conducting USAID's 22 CFR 216 Initial Environmental Examinations (IEE) and Environmental Assessments (EA) when funding activities involving drinking water." Reference to this cable is made in Box 4.L).

This guidance is under development as research continues on arsenic field evaluation and mitigation. You should consider the following questions:

- What should be tested? Where? The answers depend on factors that include, but are not limited to, the hydrogeological conditions of the area, nature of surface and groundwater flow patterns and quantities, or proximity to potential sources of contamination (sometimes many miles from the proposed water development activity).
- How frequently will testing need to be done? Is seasonal testing important?
- Will sample surveys suffice? Does every well need to be tested for everything? For example, if wells are all part of one uniform aquifer, in uniform geological formations, would one-shot sampling be sufficient? If the hydrogeology is known to vary, or if it is largely unknown, what should the approach be?
- How will testing be done? Who will do it? How much will it cost? Again these answers are shaped by hydrogeological conditions and proximity to known or potential contamination sources, but they are also determined by the context of geography and available human and financial resources. For example, what are the cost and labor advantages of conducting tests and analyzing samples in the field versus sending samples to laboratories? What are the advantages/disadvantages of kits versus lab work, taking into account factors such as reliability, ease and cost of transport, length of time required to receive and apply analysis results, etc.
- Whose water quality standards should be used? The World Health Organization's? The host country's? The U.S. Environmental Protection Agency's? Other?
- If testing reveals water quality is lower than agreed upon standards, what mitigative measures are available?

The preceding questions may be relatively easy to answer, or quite difficult. Answers must typically be developed on a case-by-case basis. There is no

one "requirement" for water quality testing—it's a matter of appropriateness. Do what makes sense based on local expertise and realism. Sampling about a half-dozen key parameters at the outset, and twice a year, or more often if called for, may in fact be a significant improvement over past practice and a major step in helping to improve the health and well-being of rural and urban populations. Remember to consult members of the community on their perceived problems with water quality and how the think they might best be solved.

More information and resources on water supply issues are contained in USAID's *Environmental Guidelines for Small-Scale Activities in Asia and the Near East* (available for download at www.ane-environment.net). Seek advice, when appropriate, from your MEO, REO (if one exists in your region), or your geographic or BDCHA BEO.

Box 4.L
Arsenic Testing in Potable Water

Recent concern over arsenic was sparked by a situation in Southern Bangladesh and West Bengal, India, where very large rural populations have been exposed to elevated levels of arsenic from wells drilled over the last forty years, leading to increased incidences of poisoning. Naturally occurring high levels of arsenic in groundwater have also been identified in Mexico, Romania and several other countries. These occurrences are not associated with mining or industrial sources or with any particular geologic formation, so they were difficult to predict. Initial thinking is that these situations may be more likely to occur in areas with thick sediments such as deltas or deserts, or areas with current or former geothermal activity, but there is no reliable prediction model yet.

In general, USAID no longer undertakes large-scale well-drilling programs. Nevertheless, in those cases where USAID does fund potable water supply (either via construction of a new system or via restoring old infrastructure), prudent practice would dictate that environmental reviews carried out in accordance with 22 CFR 216 should include testing for arsenic in addition to the usual testing for coliform bacteria and nitrite/nitrate. Tests for additional contaminants should also be performed, as appropriate, when a nearby pollution source (e.g., industry, mining, heavy pesticide or fertilizer use) suggests that additional contaminants may be present.

There is no cause for undue alarm at this time because elevated arsenic concentrations are not anticipated at most locations. The USAID guidance has been issued to avoid potential problems and to resolve actual problems more effectively should they arise.

Should concentrations of arsenic exceeding the current drinking water recommendations be found in a location, a dilemma may arise as to whether to allow people to continue to use polluted traditional water supplies or to use USAID funds to provide water tainted with arsenic. Options will depend upon how the water is used (drinking and cooking, irrigation, livestock watering, or industry), the actual concentration of arsenic in the water, and the duration of use. Should such a dilemma arise, the Mission should consult the Public Health and Nutrition (PHN) Center in the Global Bureau and other partners as well as the potentially affected populations to find a workable resolution.

USAID is working with the U.S. Geological Survey to address this problem. Close coordination is recommended among the field, the responsible Bureau Environmental and Health Officers and USAID Partners (including PL-480 Title II Cooperating Sponsors) that provide wells, as G/HPN's additional guidance on appropriate sampling and testing for arsenic is being developed. This coordination is also recommended to ensure appropriate analysis of this important issue in an activity's 22 CFR 216 documentation.

The Global Bureau's Centers for Environment and PHN will continue to monitor current research and field evaluations aimed at mitigation of arsenic in water supplies. Your input and ideas on developing guidance that is on the one hand, sensible, and on the other, protective of public health, are welcome. Please send input and ideas to Jim Hester, PPC/ENV, at (202) 712-5176.

(USAID's cable communication Agency-wide, State 108651 16 June 1998)

4.7. Step 6: The Environmental Compliance Facesheet

Completing the Environmental Compliance Facesheet is the last step in the IEE process. The Facesheet is self-explanatory, and simply summarizes the following information:

- Basic activity or project information
- Whether the Facesheet supports a new activity, or whether it is submitted in support of a modified activity (and thus amends preexisting environmental documentation)
- Types of screening/IEE outcomes being recommended (Categorical Exclusions, Negative Determinations, Negative Determinations with Conditions, Deferrals)

The Facesheet also:

- requests a one or two paragraph summary of the activities covered by the IEE.
- Requests an summary of the IEE's findings. This can be provided in table form.