



## Regional Environmental Assessment

*Regional environmental assessment (REA) is a tool to help development planners design investment strategies, programs and projects that are environmentally sustainable for a region as a whole. REAs take into account the opportunities and limitations represented by the environment of a region and assesses on-going and planned activities from a regional perspective.*

*This EA Sourcebook Update describes REA in terms of its nature and purpose, advantages, operational context, selection criteria, and key components. It also discusses challenges associated with REA preparation and offers examples from Bank experience. The Update expands upon existing information in Chapter 1, pp. 12–14 in the EA Sourcebook.*

### Background

Generic guidance on regional EAs was introduced in the World Bank in 1989 with the adoption of an Operational Directive on environmental assessment (amended in 1996 as OP/BP/GP 4.01). The *Environmental Assessment Sourcebook* (1991) provided additional advice on the nature and purpose of REAs and possible operational contexts. REAs have had limited use to date, but emerging experience in the Bank and other development institutions has revealed that this tool can improve regional development planning by helping to formulate more sustainable investment strategies and to build environmental management capacity at the regional level. This *Update* draws on this experience. The term 'region' is discussed in box 1.

### Nature and purpose of REA

The main purpose of REA is to improve investment decisions by bringing environmental opportunities and constraints into development planning at the regional level. REA is similar to sectoral EA (see *Update* no. 4: *Sectoral Environmental Assessment*) in that it is used during the early stages of development planning, before decisions about specific projects have been made and with the purpose of influencing such decisions. Both EA types allow for comprehensive assessment of environmental issues (one within a sector and the other a region), and can be used to establish environmentally sound development policy.

Regional EA differs from other forms of EA because it assesses environmental issues and impacts in a dis-

tinctly *spatial* setting. Ongoing activities, plans and potential projects are assessed by how they may cumulatively affect the ecology and human living conditions within a larger area. The spatial area to be investigated can be delimited based on ecological, socio-economic, administrative or other boundaries (see Box 1). In the first case, the geographic area may be a river basin, a coastal zone, a highland area or other areas that can be viewed as naturally bounded. In the second case, a regional EA may, for example, focus on a province, a group of counties or a municipality. The spatial area can also be delineated by demographic factors; this applies most commonly to urban areas. Sometimes a defined region extends to more than one administrative area, e.g., more than one municipality, county, province or even nation state. In such cases, cross-jurisdictional issues often create a need for innovative institutional arrangements.

REAs are more comprehensive undertakings than project-specific EAs being broader in terms of the physical area to be assessed, the time frame to be considered, and the analytical content. REAs are also more open-ended in terms of impact predictions and recommendations. They do not substitute for project-specific EAs of individual investments, but can limit the need and scope of project-specific EAs downstream.

Some regional EAs are used in a proactive manner as a development planning tool for a region. They examine a given region in terms of its natural resources, ecological and socioeconomic characteristics and identify investment projects that are environmentally sustainable for the region as a whole. The end result may be a comprehensive regional development plan. However, most

### Box 1. Definition of “region”

One definition of a region is “any subnational area that a country calls a region for purposes of planning or development (Organization of American States—OAS, 1984).” Such an area is usually demarcated along administrative boundaries and may be composed of one or more municipalities, provinces or states. Other times, a region is defined as the locus of a specific problem (e.g., poverty, social tension, population pressure) or according to ethnic makeup. Socio-economic characteristics may also define regions, such as a generally poor rural area, or a major industrial area.

For purposes of integrated regional planning and REA, the ideal approach is normally to define the region in natural-spatial terms. Common geographically defined units are river basins, mountain plateaus, forested areas, coastal zones, airsheds and island configurations. An urban area can also be a very useful unit of analysis, often providing a degree of consistency across natural-spatial, socio-economic and administrative boundaries.

Given this wide variety of definitions and characteristics, regions have no general distinguishing characteristics as study areas. However, methodology for regional development planning in general is relatively well defined and advanced.

regional EAs are more in the nature of a cumulative impact assessment of multiple projects and activities that may be on-going, planned, or simply expected. Such an REA may be carried out in conjunction with a regional development plan, and may also help shape investment priorities and activities downstream. However, the emphasis is on *influencing* an evolving strategy or plan (including projects) and assessing cumulative impacts rather than *designing* a full-fledged development plan. Boxes 2 and 3 discuss two REAs of the second type.

### Advantages of REA

REAs can influence investment planning in a large area where project-specific EAs can only address the design and management of individual projects. REAs can assess the cumulative and interactive environmental impacts of several projects where the project-specific variant looks at site-specific impacts. Like sectoral EAs, REAs move environmental analysis upstream in the planning process into the policy arena, at a stage where major strategic decisions have yet to be made. Thus, REAs offer opportunities for more comprehensive and realistic assessment of investment alternatives and can help eliminate at an early stage those investments that might generate particularly adverse environmental impacts.

A range of countries have experience with REAs and other environmental planning tools with a regional application. This experience suggests that, effectively used, REA can provide a number of additional benefits:

- Provide a baseline overview of environmental conditions within the study area (a regional “state of the environment”), which is key to making reliable impact assessments and monitoring environmental changes over time;
- Assist governments in forming a long-term view of regional planning and increase the transparency of the planning process (that is, show the reasoning behind development plans), thereby modifying or eliminating decisions that might be environmentally harmful;
- Analyze the institutional and legal framework relevant to the particular region, identify institutional and jurisdictional gaps, and make recommendations regarding, for example, environmental standards and law enforcement appropriate for the region (thus reducing the need for similar analysis in downstream EA work);
- Suitably collect and organize regional environmental data and, in the process, identify data gaps and needs at an early stage, and outline methods, schedules and responsibilities for data collection and management during program or project implementation;
- Allow for comprehensive planning of region-wide environmental management and monitoring, and identify broad institutional, resource and technological needs at an early stage, including potential funding problems;
- Provide a basis for collaboration and coordination across administrative boundaries and between sector-specific authorities and help avoid contradictions in policy and planning while enhancing efficiencies;
- Strengthen preparation and implementation of individual projects within the region, by recommending criteria for environmental screening, analysis and review of such projects and setting standards and guidelines for project implementation; and
- Provide a vehicle for public participation in shaping the future development of a region, thereby building public support for the process.

### The operational context

The World Bank may support REAs in the context of: (1) a region-specific investment program involving multiple subprojects, such as the Argentina Flood Protection Project featured in box 3; (2) a series of independent investments within a region where the Bank may be involved in one or several of them; (3) a large, single project with complex implications for other activities in the region, such as the Lebanon Solid Waste and Envi-

## Box 2. Biodiversity Conservation Project in Indonesia: The regional impacts of conservation

This project, financed in part by the Global Environment Facility (GEF), aims to conserve biological diversity and improve natural resource management and economic opportunities for local communities in and around the Kerinci-Seblat National Park on the island of Sumatra.

A REA was prepared to assess the environmental, land use and socioeconomic development implications of this project and help design appropriate policy, administrative and fiscal responses from national and local governments. The REA was an integral part of project development from the earliest stages and evaluated the following:

- the extent to which the design of the project met GEF criteria and objectives for natural resource and biodiversity conservation;
- the potential impacts of adjacent development activities on biodiversity conservation and integrity of the national park; and
- the impacts (positive and negative) of the project on adjacent human communities and on opportunities for future economic development.

The REA included detailed baseline surveys of the natural environment and of socioeconomic conditions in the project area, enabling the REA consultants to evaluate the evolving project design and give concrete

recommendations in a number of areas. For example, the REA found that the park boundaries were inadequate for biodiversity conservation, and that a clear commitment from the Government of Indonesia to rationalize the boundaries progressively over a five-year period would be needed.

Perhaps the most important finding of the REA was that current rates of deforestation and land degradation are so high in the area that for the project to be viable, immediate and strong environmental management measures were required. Logging, agricultural encroachment, mining and road development are activities where immediate control and enforcement measures are needed. The REA outlined a number of such measures and also discussed how the proposed project might influence regional development opportunities. It concluded that the project has a low opportunity cost because remaining land areas with biodiversity value have major use limitations. Suitable land for agriculture has already been converted. Further logging and conversion to agriculture and other uses are already causing major erosion problems as remaining forested areas are typically in steep hillside areas. While the project is not likely to make a significant regional economic contribution in the short-term, it might lead to a significant slowing in the degradation of land, water and biological resources. Over the medium to long term, park-based tourism could become an important source of income.

ronmental Management Project discussed in box 4 ; and (4) regional planning that may go ahead independently of any Bank-supported project preparation in the region.

In the first three instances, the REA would normally be tied to one or several projects. These may have potential environmental impacts that are either significant or moderate (classified by the Bank in categories A or B—see *Update no. 2: Environmental Screening*). Thus, the REA should be carried out in accordance with the Bank's EA policy and procedure (OD 4.01: *Environmental Assessment*). However, in the fourth context the REA is employed without any direct link to lending activities that normally require EA work. In this case, the REA can be tied to Bank economic and sector analysis for any given country, or to technical assistance or adjustment operations. The Bank's EA policy does not apply although it, as well as this *Update*, may provide valuable information.

### Criteria for undertaking REA

The following criteria help indicate if a REA is appropriate to a given investment project or program (where OD 4.01 applies):

- Is the Bank considering supporting an investment program or project(s) in a region with existing, significant and inter-related environmental problems or major uncertainties about ecological functions and relationships?
- Could the proposed program or project(s) have significant region-wide environmental impacts (including environment-related social impacts and impacts on cultural heritage) that need a comprehensive treatment to be understood and addressed?

If the answer is “yes” to one or both of these questions, a REA should be considered. In addition, there are conditions that, when met, increase the value and feasibility of a REA:

- Is the borrower at an early planning stage or at a new major investment phase, where important strategic decisions have not yet been made concerning development of the region?
- Are the economic and social conditions in the region relatively stable and predictable (as opposed to rapid and unpredictable change), to allow for a medium to long-term planning horizon and enhance the long-term value of the REA?

### Box 3. A proactive regional EA: A flood protection project in Argentina

The central objective of the Argentina Flood Protection Project is to improve flood protection for the human communities inhabiting the flood plains of the Parana, Paraguay and Uruguay rivers in northern Argentina. It would finance implementation of a comprehensive program of investments within the flood plains lying within the boundaries of seven provinces. This region has suffered enormous economic and human loss from floods, the last occurring in 1983 and 1992. At the same time, the periodic flooding sustains ecological systems and many forms of productive activities. The project has therefore adopted a “living with floods” strategy. The investments include both structural and non-structural measures to protect important economic and social infrastructure and enhance the provincial capacity to deal with periodic flooding.

At the Bank’s suggestion, a REA was initiated during the earliest stages of project preparation, to serve as an input to its design. The REA studied the interaction of natural and manmade systems within the flood plains, including the ecological functions of the periodic floods and the current state of critical ecosystems such as wetlands and gallery forests.

The study, undertaken by an Argentine team led by a Colombian specialist, found that to a surprising extent many ecosystems and human activities depended on the floods. This had a direct impact on the way the project was designed. Criteria for the selection of investments were modified to ensure that flooding would continue but not threaten human well-being and economic infrastructure.

The study also documented the extent to which wetlands, gallery forests and aquatic ecosystems of the tributaries to the three rivers are threatened by ongoing human activities. The REA found that the most disruptive activities

were road construction, followed by poorly planned urban expansion, and effluent from the meat packing industry. Another significant finding was that poor urban sanitation services were directly undermining existing flood protection works. For example, many communities disposed garbage along protective dikes, attracting rodents which weakened the dikes by digging tunnels making them ineffective against floods.

The REA helped design four key project components to help improve the environmental and economic benefits of the project. These included (a) a component to strengthen EA procedures in key institutions within the seven provinces; (b) technical assistance for urban environmental management; (c) environmental education and awareness programs in communities benefiting from protection works; and (d) support to protection and management initiatives for wetlands and other ecosystems.

However, perhaps the most important contribution of the REA was its direct contribution to screening potential investments under the project and assessing the cumulative impacts of selected sub-projects. From a total of some 150 possible investments, 51 subprojects with clear economic, social and environmental benefits were short-listed. Project-specific EAs were prepared for all sub-projects, on the basis of which the REA team examined the likely cumulative impacts of all the 51 subprojects, ensuring that such impacts would be minimized. Public consultation was an important part of the entire process and, in one case, a subproject was significantly redesigned following community input.

A highly experienced team was used and the total cost of the REA did not exceed US\$300,000—a small amount compared to the cost of the project and the expected economic, social and environmental benefits.

- Is the borrower likely to give due consideration to the findings and recommendations of the REA?

### Undertaking a REA: The process

Like any other form of EA, the process of undertaking a REA can be divided into designing the study and executing the study. The design stage essentially consists of determining the scope of the REA (“scoping”), preparation of TOR and selection of the REA team. The execution stage involves the preparation of the REA. What makes the REA process different from other EA processes is that the regional/spatial perspective needs to be present throughout, and that the scope poses some particular challenges in design and execution.

#### Designing the study

Since a REA by its very nature is a complex undertaking and can have significant impacts on the develop-

ment of a region, it is strongly recommended that a comprehensive scoping exercise be undertaken to help lay a solid foundation for the study. The scoping should encompass the following activities:

*Understanding the regional planning framework.* There must be a compelling connection between the REA process and the existing development planning framework for the region. In some cases the situation is clear-cut: the boundaries of an existing regional institution, such as a river basin authority, provides both an organizational home and the geographical boundaries for the REA. At other times, a region is characterized by overlapping responsibilities across institutions and even overlapping jurisdictions, making it more complicated to institutionally position the REA and determine the appropriate boundaries. The key is to understand the existing institutional setting and link the REA in a functional way.



#### Box 4. A solid waste and environmental management project on Lebanon's coastal zone

This project has two main objectives: Rehabilitation of Lebanon's solid waste management system, and reversing the current trend of environmental degradation in coastal areas of the country. The second objective is addressed through a coastal zone management (CZM) component aimed at strengthening development planning and environmental management in coastal areas. A regional EA for Lebanon's coastal zone is the first step in the process of designing this component. It is intended to identify the cumulative pressures and impacts of coastal developments under different investment scenarios, identify the "hot spots" in terms of environmental sensitivity and potential hazard, and propose potential mitigation actions. It will also provide key information that will feed into (a) the establishment of a Geographic Information System (GIS) for physical planning and monitoring; (b) preparation of a CZM plan to be approved and legally binding for all future developments on the coast; and (c) implementation of emergency actions to protect and rehabilitate coastal resources. Below are excerpts from the Terms of Reference (TOR), in the form of questions that the REA needs to address:

##### *Task 1: Description of the development scenarios*

- What are the expected developments/trends at the micro and macro levels that will affect the coast?
- What are the assumptions behind the scenario(s) identified and which are the main uncertainties?
- What is the most likely scenario?
- What are the main concerns related to expected coastal impacts, 1995–2010?
- What are the expected resource use conflicts, 1995–2010?
- What are the institutional responsibilities and functions in control and management of the coast?

##### *Task 2: Description of the environment*

- What are the main features and natural resource uses of the coast?
- What and where are the main, current environmental impacts and resource use conflicts?
- What are current trends in coastal environmental "quality"?
- What and where are the relative contributions of the various economic sectors to these trends?
- What and where will the net effect be of current infrastructure rehabilitation?

##### *Task 3: Prediction and evaluation of the cumulative impacts of the scenarios*

- What are the significant adverse and beneficial impacts/resource use conflicts by the year 2010?
- What are the relative probabilities of the impacts occurring?
- Which of these expected adverse impacts are irreversible?
- Which adverse impacts are reversible and how might this be achieved?
- How might expected beneficial impacts be enhanced?
- What is the temporal and spatial distribution of the impacts and resource use conflicts?
- Which protected areas, non-designated but important sites or resources might be affected?
- Which protected, rare or endangered species might be threatened?
- Which international or national standards, criteria or guidelines, and policies for pollutant levels, human health/activities, protected areas/species will be contravened?

##### *Task 4: Comparative analysis of the development alternatives*

- What are the main differences between the scenarios in terms of environmental impacts and resource use conflicts?
- Are these differences of type or scale?
- What are the major differences in type?
- What are the major differences in scale?
- What are the implications of these differences for institutional arrangements and the nature/type of Coastal Zone Management Plan needed?

##### *Task 5: Recommendations/input to Coastal Zone Management Plans*

- What are the priority "hot spots" which need remedial action?
- What sectors are contributing most to these "hot spots"?
- What types/mix of measures are needed to improve the "hot spots" in the short and long term?
- What beneficial impacts could be enhanced?
- What measures could achieve this objective?
- What might be the costs and institutional implications of the recommended measures?
- What capacity building measures might be needed?

*Defining the spatial context.* Defining the geographic and environmental context for a REA is essential. Some steps that will help define context include the following: (a) identify the major ecosystems of the region to understand the broader ecological context and the rational boundaries for natural resources management (e.g., a river basin or a coastal zone); (b) determine the boundaries of economic and market systems; (c) define the pri-

mary, secondary and tertiary urban centers of the region; and (d) assess demographic patterns and migration trends to understand the population dynamics likely to influence the region's development.

*Determining the optimal multi-sectoral focus.* Development problems are frequently defined in a sectoral context that often obscures casual relationships. Because

sectoral problems frequently require multi-sectoral solutions, the challenge is to design studies with a sufficiently broad technical focus. Consequently, before embarking on a REA, the following steps are needed: (a) determine which sectors have the potential to cause environmental problems in the region so that the study can be designed to include all relevant aspects; (b) analyze sectoral cause-and-effect relationships so that the REA is directed toward addressing main causes rather than symptoms; and (c) encourage sectoral institutions to supply information, feedback and political support. Involving sectoral interests early may defuse potential conflicts and reveal false assumptions that can misdirect the study.

*Limiting the study goals while retaining an integral focus.* One common problem in designing regional studies involves stretching limited financial resources to cover too many study objectives. The challenge is often to cut the problem down to fit the resources available, without losing the integral focus of the study or producing plans and proposals too general to be implemented. Ways to balance these concerns may include: (a) limiting the overall size of the geographical area; (b) studying the region at different levels of detail, phasing the investigation from the general to the specific; (c) limiting the time horizon of the proposed development plan and projects; (d) limiting the sectoral focus of the study after a rapid integrated overview of the various sectors; or (e) focusing the study on a particular target population within a designated geographical area.

*Setting up appropriate institutional arrangements.* This point is particularly important for REAs where the main objective is to shape regional development planning. The most common management structure is a technical unit composed of national and international professionals and support personnel who jointly execute the study. It is important for the effectiveness of the study that the degree of interaction and teamwork be very high. In terms of institutional arrangements at the national and subnational levels, several options are available, including (a) setting up a task force of agencies to execute the study; (b) working with a sectoral executing agency under the aegis of a national or provincial planning agency; (c) working with a natural resource or environmental agency; (d) working with a regional development corporation or similar agency; and (e) helping establish an independently funded study team that can evolve into a regional development institution. All these options have their strengths and weaknesses and specific country circumstances should guide the final selection.

*Developing a detailed TOR.* The TOR needs to address the following: (a) define the objectives of the study and tasks to be performed to achieve the objectives, including clear allocation of responsibilities among those involved; (b) identify the specific technical products to be

delivered (reports, maps, training, development project proposals, etc.); (c) define available information resources; (d) allocate the available human and financial resources to the various tasks; (e) establish a time frame for the delivery of different products; (f) design a system for continually integrating information and forcing the interaction of specialists throughout the study; and (g) provide for appropriate levels of public consultation.

*Planning appropriate public consultation.* Public consultation is an integral part of the EA process (see *Update no. 5: Public Involvement in Environmental Assessment: Requirements, Opportunities and Issues*). Since a REA is invariably initiated *before* concrete investment decisions are made, it may not always be possible to systematically consult representatives of potentially affected people during REA preparation. The exception is if activities with potential impacts on specific locations are already being planned. Consequently, an appropriate approach may be to target consultations with those NGOs that are active in the region, scientific experts, relevant agencies from all levels of government and perhaps industrial, commercial and labor interests. The scope of the consultations would normally be at the level of strategic choices for regional development.

The REA can also be an effective vehicle for designing a public consultation plan to be carried out within the context of the implementation of a regional development program. In the case of a proposed urban infrastructure program for the Indonesian island of Bali, the regional EA will design detailed provisions for consulting with stakeholders at local ('banjar'), county ('kabupaten') and provincial levels. At the local level, the need to consult women has been particularly emphasized, as they are the principal end users of water, solid waste and other services. A well-planned and successfully implemented consultation process will help ensure public support for the final regional plan or program, and increase overall public awareness of major environmental issues and their interrelatedness in the region.

*Defining a review process.* It is important to agree on a review process in advance, including scope and process for report distribution, allocation of review responsibilities and definition of review stages. In establishing the review process public consultation needs and requirements should be fully taken into account.

### ***Executing the study***

REAs vary in scope and content according to the region of concern, types and significance of environmental issues and the operational context. Primary areas requiring attention in a full (Category A) REA are presented below. It is important to keep in mind that flexibility is needed to adjust the REA process and methodology according to the particular context (geographical, administrative and operational). Being a relatively new ap-

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proach, REAs require innovative thinking, careful judgment and a structured “learning-by-doing” process.

**Policy, legal and administrative framework.** This section should be considered a fundamental part of a REA report. It is important to take into account those aspects of the national policy, legal and institutional framework likely to influence environmental management in the region, in addition to the regional framework itself. This should include looking at existing political priorities and how they might constrain or facilitate implementation of environmental policy and activities in the region. If other, recent studies have analyzed these dimensions adequately, the REA should use this work rather than duplicate it.

- *The national framework.* The relevant national environmental policies, laws and regulations should be assessed for completeness and appropriateness in light of the particular conditions and problems of the region, and gaps and weaknesses noted. Non-environmental laws and policies of significance to the region’s utilization of resources, production processes, or pollution should also be identified. Similarly, the national regulatory framework for EA preparation and review should be assessed. The REA should look closely at the institutional capacity of the main environmental or natural resources ministry or agency, in terms of effectiveness and capacity for providing guidelines, setting and enforcing standards, and reviewing EAs. The capacity and performance of agencies responsible for specific environmental services such as nature conservation and cultural heritage should also be reviewed when relevant.
- *The regional framework.* The REA should analyze regionally-based policies and regulations that have environmental implications. It should also identify how responsibilities are distributed and assess institutional capacity for environmental management (including enforcement). The regional investment planning process should be carefully reviewed in terms of objectives, methodology and procedures for review and approval of plans and projects. The relationship between timing of project review, issuance of licenses and permits, and the regional planning process more generally should be clearly indicated.

**Baseline conditions.** A central component of the REA study is the assessment of the existing environmental conditions in the region, including the development constraints and opportunities that the environment and natural resource base pose. The baseline survey should be clearly focused on those aspects of direct relevance to the key environmental issues the REA is intended to address, rather than attempting to cover all possible environmental aspects. The survey would normally cover the following main themes, reviewing the sub-themes on a selective basis:

- *The physical environment:* Geology; topography; soils and land capabilities; meteorology; surface and groundwater hydrology; water quality and quantity; air quality; potential natural hazards.
- *The biological environment:* Flora and fauna (particularly rare or endangered species); critical habitats and ecosystems; parks and reserves; significant natural sites; and species of commercial importance.
- *The socioeconomic and -cultural environment:* Population; land use and patterns of land ownership and tenure; planned development activities; community structure; employment; distribution of income, goods and services; public health; cultural heritage; indigenous peoples; and customs, aspirations and attitudes.

The emphasis given to each of the issues listed above would depend on the given regional setting, particularly on whether the setting is urban or rural but also whether it is coastal or inland, densely or scarcely populated, largely pristine or highly developed, and so on. Thus, those who prepare REA TORs should provide clear direction on these matters on a case-by-case basis. Box 5 describes criteria for baseline data collection and summarizes some lessons of experience. Where a project-specific EA describes conditions around a proposed project site, the REA should concentrate on the issues and problems that are characteristic of the region as a whole. For example, deforestation may be a dominant problem in one region, leading to associated problems such as loss of biodiversity, soil erosion and sedimentation of river systems. Or, if rapid industrialization and urbanization is taking place, the main concerns may be management of water supply, air and water pollution, or congestion.

Important regional resources and activities should be given particular emphasis. For example, if the region of concern is a rural coastal flood plain, major sectors are likely to be agriculture/irrigation and fisheries. The interrelationship of these sectors and the impacts on the natural resources of the flood plain and coastal zone could be major issues. Water quality and floods could be other areas of concern.

Geographic Information Systems (GIS) may be an effective instrument for gathering, organizing and analyzing baseline environmental data (see *Updates* nos. 3 and 9), particularly at the regional and national levels. If GIS capability is not in place, a regional EA may provide opportunity and rationale for introducing it immediately or in the future.

It is always useful to cross-reference the pertinent environmental regulations and standards when describing baseline conditions. If regulations and standards are absent, this should be explicitly noted. The

## Box 5. Conducting baseline surveys

### *General criteria for data collection:*

- Information contributed by the main sectors covered by the REA should be at approximately the same level of detail, with any bias reflecting the emphasis of the REA. Setting common data standards and formats in advance can be useful.
- Data should prove or disprove specific hypotheses related to the study's objectives and answer specific questions about the environmental situation in the region. The TOR should specify who will use the data being developed and how.
- Where possible, data collection should be undertaken in conjunction with domestic institutions. The use of international consultants to do basic data collection can be very costly and needs special justification.
- Local populations, NGOs, research institutions and universities should be used as sources of information. This saves time and resources and gives access to unique information.
- Keep description to a minimum and emphasize analysis.

### *Lessons of experience*

- Use modern satellite imagery and remote-sensing techniques for resource surveys of large sparsely settled or unpopulated regions about which little is known. These tools facilitate rapid and relatively accurate mapping and analysis of geology, geomorphology, soils, natural vegetation, land use and so forth when coupled with ground verification (see also

*Updates nos. 3 and 9, on GIS and EA*). In the Pilcomayo River Basin (Argentina, Bolivia, Paraguay), satellite imagery was the key to the rapid analysis of land capability and the delineation of development zones worthy of more detailed study.

- Use resource survey specialists who are experienced development practitioners as well as good scientists. Such specialists can direct and train local professionals along practical and efficient lines of investigation as well as interpretation of data from several disciplines for analytical purposes.
- Where possible, a single national agency should be responsible for resource surveys. This greatly facilitates the compatibility and integration of data.
- Use maps to synthesize the final products of sectoral investigations. Integrating mapped information is one way to merge the work of different disciplines. As devices for data integration, map-overlay techniques and composite maps are particularly useful, although availability of base maps is limited in many countries. In the Eastern Cibao valley of the Dominican Republic, for example, the map-overlay technique was used very effectively for agricultural zoning. The combination of information about geomorphology, vegetation and land capability in specific areas facilitated the identification of viable agricultural and agro-industry projects.

**Source:** *Integrated Regional Development Planning: Guidelines and Case Studies from OAS Experience*. Organization of American States, 1984.

REA report should also critically take into account the quality of available data and note major data gaps.

**Description of development plan and associated projects.** To the extent that the REA is intended to assess an existing development plan, including associated project proposals, the REA needs to provide a detailed description of the plan and the proposed projects. If several variations of a plan are being considered, or if one or more plans are under conceptual development, the REA should describe these in sufficient detail for a useful analysis of impacts and consequences.

**Inventory of other plans and projects.** The development context of a region is as important as its resources and population dynamics. The quantity of existing plans and proposed projects—prepared with or without Bank or other international development assistance—will normally be high. (In the Chapare region in Bolivia, for example, 54 agencies supported development activities during the same period, many of them conflicting.) Making an inventory of all relevant plans and projects is exceedingly important, but can be overwhelming.

Guidelines from the Organization of American States (OAS, 1984), on integrated regional development plans, suggest some ways to avoid problems:

- Identify all significant development plans and projects in the region, no matter what agency is involved, but collect detailed information only about those that serve or contradict the proposed development objectives. Efforts at being too comprehensive will only delay the study.
- Organize planned projects in a time sequence, and avoid including projects that fall outside the time horizon of the study.
- Be sure to identify projects with high-level political support that have already gained momentum.

**Cumulative impact assessment.** The main objective of a REA in terms of impact assessment is normally to estimate (or forecast) the potential *cumulative impacts* of planned activities on a region's environment, natural resource base, and socio-economic conditions, taking into account the baseline situation, and activities included in the inventory of plans and projects, and expected spontaneous developments.



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The purpose of this assessment is first and foremost to be able to analyze the environmental impacts of the planned activities—usually formulated as a development plan—against other options, *before the opportunity for realistic evaluation of these alternatives is closed* (see below under *Analysis of Alternatives*). The underlying objective should be to determine which options present a framework for environmentally sustainable development.

**Step one.** The first step is to undertake limited, preliminary impact assessments of the major individual investments under consideration, covering potential direct and indirect, positive and negative impacts. These assessments cannot be as rigorous and thorough as for project-specific EAs, due to the fact that REA is an upstream planning instrument normally undertaken at a pre-feasibility stage where investments have not yet been outlined sufficiently to make detailed analysis feasible or economically justified. If any proposed sub-project is expected to cause significant impacts, the REA should recommend a course of action to address them, including carrying out a project-specific EA.

**Step two.** The second step is to look at the sum total of the individual activities and estimate their cumulative effects. For example, regional authorities may be contemplating a plan within a largely forested watershed which includes agricultural expansion, hydropower development and rural road construction. All these activities would result in some deforestation as a direct impact. There would most likely be *induced* impacts from these developments, such as migration and land settlement along roads. This, in turn, could lead to increased deforestation as an *indirect* impact. Improved access for loggers could lead to additional deforestation.

The REA needs to take into account these impacts, first separately and then in terms of their added and *cumulative* impact. The cumulative effect has often been found to be bigger than the sum of its parts. It may be, for example, that the total deforestation from the three developments described above would reduce the forest cover of the river basin to such an extent that remaining tracts would be too small as to be viable habitats for wildlife. Loss of wildlife would then be a cumulative effect on top of the deforestation. Or, the cumulative impact might surface in the form of rapidly increasing soil erosion and siltation of rivers. This in turn could negatively effect the hydropower development as well as other economic activities. Where project-specific EAs could effectively assess the impacts of each individual investment and develop good mitigation plans to limit and manage these impacts, they would not be well placed to analyze such cumulative and interactive effects. Only a REA type assessment can determine how multiple projects, in a variety of sectors, may cumulatively affect the environment and each other, including

the risk that the economic viability of one or several projects might be undermined.

In many cases, it may also be important to include economic policies in the cumulative impact assessment. For example, tax and subsidy rates on extraction and use of natural resources may greatly influence extraction rates and patterns of consumption. Sometimes, changing such variables may alter the significance of environmental impacts more profoundly than technical or other changes in plans and programs. Economic analysis is needed to address such issues, a topic covered in a forthcoming *Update*.

**Analysis of alternatives.** The REA should always compare the results of the impact assessment against the impacts of realistic alternative plans, if they exist, and the “no plan” (business as usual) option. If there are no plans under consideration other than the one the REA is related to, the REA should not develop elaborate alternatives just for the sake of analysis, but rather compare the plan with other broad strategic options for the region. Perhaps *the* most important purpose of a REA is to analyze the environmental costs and benefits of major alternative strategy and investment options, and recommend a course of action that will best achieve environmental sustainability.

Comparison of alternatives becomes particularly important when a region is under environmental stress, where severe competition for scarce natural resources is predicted, or when considering plans for a relatively pristine area. Options should be evaluated carefully for extent of irreversible impacts and effects on long-term productivity of the region’s natural resources.

Alternative investment options should be considered in terms of their individual and cumulative impacts. Private as well as public sector activities may be included in the analysis, as appropriate. Where several donors are involved in the region, the REA should review their existing and/or planned activities and, if necessary, suggest ways to improve coherence and complementarity.

Alternative mitigation options may also be included in the analysis, where preparation of individual investments is relatively advanced. Experts responsible for REA preparation may propose mitigation measures and compare them with those proposed by the government or third parties. In other cases, this analysis is better included in the mitigation plan.

It is useful to prepare a matrix summarizing the project-specific and cumulative impacts of the various options under consideration. A forthcoming *Update* will provide further guidance on analysis of alternatives in EA.

**Recommendations towards an optimal regional investment plan.** The REA can be a useful vehicle to design an optimal regional investment plan based on the previous analysis, by feeding into strategy formulation, the identification of potential projects, development of environmental guidelines for certain sectors or activities (e.g., land zoning), and the formulation of a detailed and coherent investment or action plan. More often, however, the mandate for the REA will only allow it to give recommendations for improving an existing plan. At any rate, REA provides unique opportunities to internalize environmental factors into regional development planning to minimize future environmental costs and ensure long-term economic and environmental sustainability.

**Environmental management strategy.** Based on its findings, the REA should propose a strategy for strengthening environmental management within the region. The plan would normally include: (a) measures to ensure that environmental impacts of proposed projects are adequately mitigated; (b) general guidelines for long-term environmental monitoring; and (c) a plan for institutional strengthening.

**Mitigation.** Mitigation measures are generally of a detailed, technical nature, and therefore normally developed within project-specific EAs. However, REA can be an effective tool for identifying, at an early stage, projects that will require special mitigation measures. A REA may also suggest broad solutions for reducing negative impacts on important regional environments and natural resources, or develop mitigation guidelines for specific activities. For example, construction of secondary sewage treatment plants may be recommended to contain the effects on coastal ecosystems of anticipated rapid urban growth. Or, requiring catalytic converters on automobiles might be a solution for containing the growth of urban air pollution. Reforestation along important waterways to reduce soil erosion is another example of a mitigation measure that requires a comprehensive, strategic approach.

REA may be an effective vehicle for recommending mitigation measures that can only be implemented at the regional level for regulatory or economic reasons. For example, a regional EA may fall within an urban jurisdiction with mandate to set its own air quality standards. Similarly, costly mitigation solutions that require economies of scale (such as a hazardous waste incinerator) are normally best introduced in conjunction with development planning at a regional, sectoral or even national level.

**Monitoring.** The REA should provide general guidelines for long-term environmental monitoring to ensure adequate implementation of the regional program or set of projects and evaluate progress. The findings of the baseline data section should be used to measure progress over the course of implementation. The REA should also recommend measures needed to collect and organize needed data. Geographic Information Systems (GIS) should be considered, if not already in place, to support regional environmental monitoring activities.

**Institutional strengthening.** The REA might recommend training or additional hiring, or more sweeping changes such as reorganization of units or agencies, and redefinition of roles and responsibilities. Under certain circumstances, a REA may recommend that a new institution be created to manage a region's natural resources base, e.g., a river-basin authority.

This section might also include recommendations on policy and regulatory instruments for environmental management in the region. If not already in place, an environmental screening and review process for individual projects should be designed and instituted.

### For further reading

Little has been written about regional environmental assessment. However, there is a body of literature on regional development and environmental planning, such as those indicated below. In addition, the REA prepared for the Argentina Flood Protection Project is highly recommended reading and is available (in Spanish) from the Bank's Public Information Center. The Environment Department also has available TORs for REAs.

An *Update* is forthcoming on the application of REA for development planning within river basins. The existing *Updates* referenced in this document also provide guidance on aspects relevant to REA (e.g., coastal zone management, Geographic Information Systems, and public involvement in EA).

### Other relevant sources of guidance are:

Asian Development Bank. 1988. *Guidelines for Integrated Regional Economic-cum-Environmental Development Planning*. Environment Paper No. 3 (two volumes). Manila.

Organization of American States. 1984. *Integrated Regional Development Planning: Guidelines and Case Studies from OAS Experience*. Washington, D.C.

This *Update* was prepared by Olav Kjørven. Based on Bank policy and procedures on Environmental Assessment (EA) (Operational Directive 4.01), the *EA SOURCEBOOK UPDATE* provides up-to-date guidance for conducting EAs of proposed projects. This publication should be used as a supplement to the *Environmental Assessment Sourcebook*. Please address comments and inquiries to Olav Kjørven and Aidan Davy, Managing Editors, EA Sourcebook Update, ENVLW, The World Bank, 1818 H St. NW, Washington, D.C., 20433, Room No. S-5139, (202) 473- 1297. The Bank is thankful for the Government of Norway for financing the production of the *EA Sourcebook Update*.