

## EIA OF URBAN PROJECTS IN DEVELOPING COUNTRIES: CHALLENGE, EXPERIENCE, SUGGESTIONS

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### THE URBAN ENVIRONMENT IN DEVELOPING COUNTRIES

Environmental challenges posed by developing countries' unrelenting urban growth were considered a relatively minor issue in the 1970s and 1980s, but have come to the forefront of international attention during the 1990s. Rapid urbanization, coupled with increasing industrialization and energy consumption, have put considerable pressure on the urban environments of developing countries. In time these pressures result in deteriorated environments, health hazards, and losses in productivity, all of which usually hit the urban poor harder than the rest of the population (Markandya and Rhodes 1992; Bradley et al. 1992; ). Five of the six cities with the world's worst air pollution records are in developing countries (WHO figures, quoted in MEIP 1993). And in the early 1990s, **Bangkok** was losing one-third of its potential gross city product because of congestion-induced travel delays (Midgley 1994).

Although the overall trend is worrisome, counterexamples show that a deteriorating environment is not the inevitable destiny of developing cities. Good urban planning can help reduce the environmental degradation and personal discomforts sometimes associated with urban growth and can harness

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economic development instead to the improvement of urban conditions. For example, in Curitiba, Brazil, integration of road networks, land use, and public transportation, together with decongestion of the central city and preservation of the historic center, has significantly reduced the negative environmental spillover of the economic and population changes of the last 20 years (Rabinovitch and Leitmann 1993).

Likewise good environmental impact assessments (**EIAs**) can factor sound environmental management into urban projects. But while there are many records of urban planning experiences, less is known about the results of **EIAs** applied to urban projects, particularly in developing countries. **EIAs** are new to developing countries and especially so for their cities. Furthermore, the outcomes of **EIAs** circulate only sporadically, and wide public access to their findings is limited, at best, to the summaries available during public consultation periods. In an attempt to assess how well **EIAs** are handling urban environmental concerns, this paper draws on what is probably the largest accessible data bank on **EIAs** in developing countries—the World Bank project portfolio. The paper considers some 13 major **EIAs** of urban projects completed in recent years to draw best-practice lessons, and to make suggestions for future **EIA** exercises.

### **FIRST, CAN WE AGREE ON WHAT IS MEANT BY 'THE URBAN ENVIRONMENT'?**

Does it make sense to label some projects, and hence their **EIAs**, as urban projects? What are the conceptual differences between, say, the **EIA** of a power plant located in the middle of a rural area or in the middle of a city? In short, what is the urban environment? Most **EIA** literature gives scant consideration to this question. The World Bank's massive three-volume **EIA** guidelines, for instance, has only 14 pages devoted to urban environment (World Bank 1991). The same cursory treatment is found in the environmental management literature at large. Very few definitions of the urban environment exist, and they can all be criticized for being either too broad or too narrow. Consider the following proposals:

- ▶ An Organization of Economic Cooperation and Development (**OECD**) document suggests several definitions of the urban environment, each with an increasing degree of comprehensiveness: (a) the urban environment as limited to urban landscape; (b) the definition in (a) plus urban

pollution and its consequences; (c) the definition in (b) plus public services and traffic; and, finally (d) the definition in (c) plus resources consumption and sustainability (OECD 1990: 20–21).

- ▶ The UNDP–World Bank Metropolitan Environmental Improvement Program (MEIP) put forward a looser definition: "MEIP approaches its work from a spatial and environmental media perspective. Metropolitan regions are looked at as spatial systems in which development activities need to be planned, implemented, and monitored with focus on their impact across the region's air, water, and land" (World Bank 1993: 1).
- ▶ In fact, most authors don't even attempt a definition of urban environment. Instead, they jump directly to a list of the urban environmental problems. For example, Dixon (1993: 19), discussing Latin American cities, says, "The urban environmental challenge is fundamentally a people and health issue...[and] the most pressing problems are the brown problems of pollution." The World Bank-sponsored Environmental Action Programme for Central and Eastern Europe (World Bank 1993b) proposed the following priority for urban environments: first—air pollution, second—water pollution, third—hazardous wastes, fourth—nuclear issues. Finally, after reviewing some 35 recently produced national environmental action plans, Bernstein (1994) found that the most often cited urban environmental concerns were solid waste management, water supply and sanitation, and, to a lesser degree, air pollution from mobile and industrial sources. More systematic lists of urban environmental concerns are furnished by Bartone et al. (1994) and Leitmann (1993).

Although the lack of an explicit and agreed-upon definition of urban environment can be troublesome, it probably reflects the fact that perceptions and priorities regarding urban environment are evolving and any definition would fail to acknowledge these changes. Nevertheless, most practitioners would agree that, whatever its limits, the urban environment is essentially multi-sectoral and highly interrelated. For example:

- ▶ Referring to Asian cities, Brandon and Ramankutty (1993: 58) state, "While urban environmental problems are cross-sectoral in nature, most of the planning and investment work in urban areas is still done in sectors—industry, water supply and sanitation, housing, transportation, energy, and so forth. In addition, policies formulated at different levels

(national, provincial, municipal) have an impact on urban activities and environmental quality.”

- ▶ The Commission of the European Communities (1990: 24) proposed, “In focusing on individual problem areas, it is important not to lose sight of the fact that the urban system is a complex and interrelated whole... [and] the extent of these interrelationships demonstrates the danger of ad hoc decision making: the solution to one problem is often the cause of another. Effective management of our urban environment requires a strategy based on an overview of the urban system, with integrated decision making in key areas... most critically between land use and transportation planning.”

High densities, rapid population growth, a large and growing built environment, and permanent inflow of energy and natural resources make the urban environment highly interrelated. Changes in one sector will trigger a chain reaction through the rest. While similar features may be found in many natural environments, urban environments remain unique, when we take into account the number and density of components and the speed at which change can propagate through them.

In a simplified picture of a development project’s impact, a new urban investment would have immediate environmental impacts—for example, on land use and pollution. These are the direct environmental impacts that usually make up the main concern of the **EIA**. But in addition to these direct impacts, any urban project would probably bring about indirect and cumulative impacts. For instance, new infrastructure will foster economic and occupational changes in its vicinity that will, in turn, produce serious impacts on the environment. This second wave of environmental effects can be thought of as indirect impacts stemming from the original project. **Also** the **sum** of several environmental impacts, over time, can result in synergetic effects; these are the cumulative impacts.

Of course, the actual chain of interactions—including what to look for and how far to search for it—should be city- and project-driven. Small or very specific projects may have little or no indirect and cumulative impacts worth pursuing. On the other hand, one would expect significant indirect and cumulative impacts to be present in any major urban project. Usually too, population and land use changes would be at the core of the propagation and amplification mechanisms that foster indirect and cumulative impacts.

## THE EIA SAMPLE AND SOME KEY QUESTIONS

For this review, all World Bank projects that included full EIAs up to mid-1995 were screened; from this universe, specifically urban projects were identified.<sup>2</sup> This initial selection rendered some 50 urban-related projects in more than 20 developing countries. This group was narrowed down, based on the significance of the urban impact, the availability of the full EIA study, and the regional mix of the group (due to the continent's low urbanization rate, few African urban projects were found). Table 1 lists the final 13 projects which formed the basis of this review.

**Table 1. Projects whose EIAs were reviewed**

<b>Asia</b>	
China 1	Second Shanghai metropolitan transport project
China 2	Liaoning environmental project
India	Bombay sewage disposal project
Indonesia	Surabaya urban development project
Korea	Kangju and Seoul sewerage project
Lebanon	Solid waste and environmental management project
Sri Lanka	Colombo environmental improvement project
<b>Africa</b>	
Egypt	Private sector tourism infrastructure and environmental management project
<b>Latin America and Caribbean</b>	
Brazil 1	Water quality and pollution control project
Brazil 2	Espirito Santo water and coastal pollution project
Brazil 3	Minas Gerais water quality and pollution control project
Mexico	Second solid waste management project
OECS	Waste management project (OECS—Organization of Eastern Caribbean States—encompasses 6 island countries: Antigua and Barbuda; Commonwealth of Dominica; St. Kitts and Nevis; Grenada; St. Lucia; St. Vincent and the Grenadines.)

<sup>2</sup> EIA requirements were first introduced by the World Bank in 1989 and significantly revised in 1991. Therefore, the projects reviewed correspond to the period 1991-1995. All projects located in an urban area were considered, a priori, to be urban projects, regardless of their sectoral aim (housing, urban transport, water, pollution control, etc.).

Besides culling general information (goals, main component, expected benefits, costs) this review looked for the following information:

- ▶ The scope of the EIA exercise and how the EIA handles urban indirect and cumulative impacts
- ▶ The analytical methods used and their adequacy to handle urban environmental issues
- ▶ The EIA recommendations, and how they influenced the overall project design

Projects that offered examples of best practices were reviewed in more detail and a questionnaire was circulated to EIA team leaders. Appendix I gives short descriptions of the main features of selected projects, in support of the discussion of findings that follows.

## **RESULTS OF THE REVIEW**

Table 2 below gives an overview of how well the projects' EIAs scored in the three **areas** under review, based on the following criteria:

- ▶ To assess the scope of the EIA and its adequacy, a detailed reference framework was developed to check the EIA documentation.
- ▶ Analytical methods were considered state of the art when they gave project- and site-specific impact estimates, based on in-situ data collection and quantitative modeling. EIAs extrapolating impacts from elsewhere, or limited to qualitative descriptions, were considered standard or substandard—the latter if outcomes fell short of the EIA's declared goals.
- ▶ The EIA's impact on the project was assessed in terms of the number of changes made in project design, and importance of those changes when brought about by the EIA's findings.

Rating long and complex EIAs with an ordinal yardstick is a rather subjective exercise. Therefore, table 2 should be viewed simply as an aid to the discussion that follows. In the aggregate, half the EIAs reviewed scored well, while the rest got low scores in one or more of the reviewed areas.

**Table 2. EIAs review**

Project	Scope, impacts considered	Analytical methods	Impact on project design
Asia			
China 1	N. In di	<b>S/SS</b>	M
China 2	C. <b>Ap</b> di	<b>SA</b>	H
India	C. <b>Ap</b> di. in. cu	<b>SA</b>	H
Indonesia	N. In di (only partially)	<b>S/SS</b>	L
Korea	N. <b>Ap</b> di	<b>S</b>	L
Lebanon	C. <b>Ap</b> di, in	<b>S</b>	H
Sri Lanka	N. In di	<b>S</b>	M
Africa			
Egypt			
L. America & Caribbean	N. In di	<b>S</b>	M
Brazil 1			
Brazil 2			
Brazil 3			
Mexico	N. In di (only partially)	<b>S/SS</b>	M
OECS	C. <b>Ap</b> di. in. cu	<b>S</b>	H
	N. In di (only partially)	<b>S/SS</b>	L
	N. In di (only partially)	<b>S/SS</b>	L
	C. <b>A</b> di. id. cu	<b>SA</b>	H

Scope: **N**—Narrow; **C**—Comprehensive; **In**—Inappropriate; **Ap**—Appropriate; di, id, cu—direct, indirect, and cumulative impacts

Analytical methods: **SA**—state of the art; **S**—standard; **Ss**—substandard

Impact on project design: **H**—high. **M**—moderate, **L**—low

To put these ratings in perspective, one should recall that there are good reasons to expect EIAs of the World Bank to be above average in quality. First, World Bank projects tend to run to large-scale investments, with generous budgets for preparation that can afford to underwrite good technical teams and sophisticated analysis. (In five of the cases international consulting firms managed the EIAs.) Second, the World Bank maintains a strong say in the whole process, setting stringent requirements on such issues as project screening, definition of the EIA scope, review procedures, public involvement, and dissemination. Last but not least, the quality of the EIAs is also enhanced by the fact that both the World Bank and the borrower country, are

aware that large, internationally financed projects tend to attract the scrutiny of local and international NGOs and of the press.'

It is therefore reasonable (though not certain) to conclude that shortcomings found in this small sample of rich and tightly monitored EIAs, will crop up even more frequently in EIAs at large. So what are those shortcomings? They are mostly (a) limited scope of the environmental impacts exercise, (b) some cases of substandard analytical tools, (c) limited attention to social components other than pollution-related health issues, (d) limited or no consideration of environmental costs and benefits in economic terms, and (e) vague mitigation plans.'

### What Went In, What Stayed Out

This review was particularly concerned with monitoring the first stage of the EIAs when the scope of the exercise was defined and decisions were made about how far to go to address urban environmental concerns. To this end, a conceptual framework was developed, as presented in table 3. Since the boundaries of each EIA should be project specific, table 3 was not used to score projects according to how many issues they addressed. Rather it was used as a heuristic tool, to map the EIA proposed scope and answer the question: Were all the relevant issues in or was something important left out?

As table 2 shows, when checked against questions posed by table 3, the majority of the EIAs reviewed opted for a narrow scope, and seldom considered indirect and cumulative impacts. In fact, few of them discuss environmental impacts in an urban context, taking the city as the unifying framework. Actually, most projects produced several independent EIAs—one for each main project component—but most failed to analyze the interactions between components, let alone their impact on the wider urban environment. For example:

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<sup>3</sup> The World Bank negotiated the *terms of reference* for the EIAs with the local authorities and reviewed both partial and final outcomes of each exercise. Actual production of the EIA fell under the responsibility of the borrower, which usually hired a local or foreign consulting firm.

<sup>4</sup> Shortcomings (b), (d), and (e) are not urban-specific, but are common to the EIA of many types of projects (see World Bank 1993a and 1994).

- ▶ *China's Shanghai metropolitan transport project* will have a significant impact on the metropolitan transport system (especially when it is considered as a part of the many ongoing transport investments); it will affect land use and transport patterns which in turn will affect the city's larger environment. Yet these issues are not addressed in the project EIA.
- ▶ *Indonesia's Surabaya urban development project*, investing in road and drainage, will open up a large tract of periurban areas to urbanization. As these lands are currently used for irrigated agriculture and fishponds, the project will have considerable environmental repercussions in the future. Again, the **EIA** does not comment on the indirect and cumulative environmental impacts of these land use changes—with the exception of resettlement and the compensation of the population to be displaced.
- ▶ *Egypt's private sector tourism infrastructure and environmental management project* presents a very good analysis of direct environmental impacts and mitigation measures in the project site, but fails to take into account indirect impacts. Although the project states that the tourist developments will act as a pole of attraction for the densely populated regions of the Nile valley and the delta, it does not elaborate on the environmental impacts of such population shifts. Likewise, the EIA focuses on pollution treatment in the Red Sea resort areas (direct impacts of the project) but does not comment on the population growth and subsequent environmental problems in the nearby non-tourist local villages where the workers for the tourist resorts live (indirect project impacts) and their potential need for pollution treatment.

Granted, a broad **EIA** scope is not always necessary. A narrow approach can make sense for projects either too small or too specific to have wider impacts. Korea's project, a large investment in wastewater treatment in Seoul and Kangju cities, is an example of the latter. In both cities the new treatment capacity was an expansion of the existing facilities on the same sites and with the same technology currently in use. Both cities had master plans that considered the siting and future expansion of wastewater treatment plants. Therefore, the EIA could justify its disregard for urbanwide considerations and concentrate on the projects direct impacts (wastewater treatment technology, water quality after treatment, and final disposal of water and sludge).

Table 3. The possible scope of EIAs of urban projects

Project impact on	Motive of concern (why the impact is important)	Dimensions of the impact and/or the concern
<b>Resources deterioration (pollution)</b> <ul style="list-style-type: none"> <li>• Air pollution</li> <li>• Water pollution</li> <li>• Solid wastes</li> <li>• Hazardous wastes</li> <li>• Toxic substances/radiation</li> <li>• Noise</li> <li>• Soil pollution/erosion</li> <li>• Vegetation deterioration</li> <li>• Global pollution (ozone, greenhouse)</li> </ul>	<ul style="list-style-type: none"> <li>• Human health</li> <li>• Economic efficiency</li> <li>• Biodiversity losses</li> <li>• Urban assets losses</li> <li>• Global climate</li> </ul>	<p>a. <b>Spatial dimension (where to look)</b></p> <ul style="list-style-type: none"> <li>• Indoor (household, workplace)</li> <li>• The city</li> <li>• The urban fringe</li> <li>• The hinterland</li> <li>• Global issues</li> </ul> <p>b. <b>Links dimension (how far to go in cause-effect chains)</b></p> <ul style="list-style-type: none"> <li>• Direct impacts</li> <li>• Indirect impacts</li> <li>• Cumulative impacts (synergetic)</li> </ul> <p>c. <b>Time dimension (for how long)</b></p> <ul style="list-style-type: none"> <li>• The project time scale</li> <li>• The city time scale</li> </ul> <p>d. <b>Social dimension (addressing the 'who' issue)</b></p> <ul style="list-style-type: none"> <li>• Poverty</li> <li>• Equity</li> <li>• Resettlement</li> </ul> <p>e. <b>Remedial dimension (how far should mitigation go)</b></p> <ul style="list-style-type: none"> <li>• Reduce negative impacts</li> <li>• Promote beneficial impacts</li> </ul>
<b>Resource consumption</b> <ul style="list-style-type: none"> <li>• Water</li> <li>• Energy</li> <li>• Transport</li> <li>• Land/soils</li> <li>• Vegetation</li> <li>• Food/fibers</li> <li>• Materials</li> <li>• Labor</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainability</li> <li>• Economic efficiency</li> <li>• Biodiversity losses</li> <li>• Urban assets losses</li> <li>• Effects on pollution</li> </ul>	
<b>Space use (urban layout/land use)</b> <ul style="list-style-type: none"> <li>• Siting conflicts (zoning)</li> <li>• Urban barriers</li> <li>• Amenity losses</li> <li>• Congestion</li> <li>• Protection of natural and constructed valuable sites</li> </ul>	<ul style="list-style-type: none"> <li>• Forced resettlement</li> <li>• Quality of urban life</li> <li>• Economic efficiency</li> <li>• Biodiversity losses</li> <li>• Urban assets losses</li> </ul>	
<b>Hazards</b> <ul style="list-style-type: none"> <li>• Natural hazards</li> <li>• Constructed hazards</li> </ul>	<ul style="list-style-type: none"> <li>• Human safety</li> <li>• Biodiversity losses</li> <li>• Other economic losses</li> </ul>	
<b>Ecosystem health</b> <ul style="list-style-type: none"> <li>• Green belts</li> <li>• Buffer zones</li> <li>• Encroachment on fragile or valuable ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity losses</li> <li>• Quality of life</li> </ul>	

On the other hand some of the EIAs reviewed offered examples of large projects that called for, and actually featured, a broad focus.

- ▶ The ***Bombay sewage disposal project*** EIA considered population and land use changes over a 20-year horizon. Current and prospective land use, resettlement concerns, and land acquisition problems were factored into alternative project designs. The EIA even looked for cumulative impacts outside the project limits, at the watershed level, to show how the project outcomes were heavily dependent on the fate of discharges elsewhere in the regional water system.
- ▶ The ***OECS solid waste management project*** also applied a broad definition of environment, embracing social, cultural, economic, and ecological considerations. This was a sensible approach, for a solid waste management project in a small island-country setting would have countrywide impacts. The EIA factored in population growth and the analysis of industrial activities, land use patterns, tourism, and household economy in relation to the generation of wastes, as well as opportunities for waste minimization, home recycling, and composting. Also, extensive consultation with all affected parties was undertaken, including nontraditional stakeholders such as the cruise companies.
- ▶ ***Brazil, Espirito Santo water and coastal pollution management project*** also generated an EIA with a fully urban scope. Population and land use patterns trends played an important role in the EIA's discussion of sites for water treatment plants. The EIA was successful in red-flagging locations that already have their share of dirty industries, (cumulative impacts) or which would hinder access to nearby natural resources (indirect impacts).

### **Analytical Tools**

Turning to analytical tools, best practices were found in the assessment of pollutant emissions, media concentrations, and pollution abatement achieved by different project configurations. The following EIAs were reviewed with respect to these factors:

- ▶ ***Bombay sewage disposal project*** EIA developed a highly detailed mathematical model to assess river and marine coastal water quality for each proposed alternative. Extensive sampling in river and marine waters was undertaken for baseline and model calibration purposes.

- ▶ *China Liaoning environmental project EIA* also developed mathematical models of citywide water and air quality (the latter model used an urban bubble approach). The modeling was used to assess the environmental gains of different project configurations, and also to forecast regional environmental quality and identify further pollution control investments.

At the other end of the scale, the weakest analyses were found in so-called "sector projects," in which the final size of the investments, the technical components, and siting decisions are not available at project preparation, when EIAs are carried out.<sup>5</sup>

- ▶ *Mexico's second solid waste management project*, which was to give financial support to cities interested in upgrading their solid waste management systems, is an example of this sort. The EIA limited itself to a very general description of current solid waste management problems in Mexico and offered minimal data or orientation to the project in question. Preliminary demonstrative master plans, prepared for eight cities, added only the location of proposed landfills and some comments on surrounding land use.

Finally, it is troubling to note that while many EIA exercises apply state-of-the-art methods to assess air or water quality, nothing comparable was done with respect to social and economic issues. Stakeholders' views and needs were generally handled with a few public hearings or with crude, at best, surveys. Detailed social analysis was only attempted when large resettlement impacts were expected (see Gutman 1994b). Despite the existence of well-established tools to tackle the economic valuation of environmental impacts (see Dixon et al. 1988), economic valuations seemed beyond the scope of all EIAs reviewed. This lack of depth in social and economic issues, common to many EIAs (see World Bank 1993a, and 1994), is particularly worrisome in urban-related projects where one would expect both social and economic dimensions to be of great importance.

### **From EIA to Project**

Good EIAs are expected to contribute to the final project design, give the public a say in the project, and add to overall environmental awareness

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<sup>5</sup> Sector projects are usually open ended—a line of credit to support rural development, industrial modernization, etc.; or they support policy goals rather than works—privatization of public utilities, economic restructuring, etc.

among involved parties. The following EIAs significantly influenced the final project design.

- ▶ The *Bombay sewage disposal project* EIA led to the elimination of a major project component—a system of aerated lagoons. The EIA showed that the assimilative capacity of the recipient stream was insufficient to withstand the lagoons' discharges, even with the best treatment level proposed. The EIA also made recommendations that resulted in the redesign of the sewage marine outfalls, the planning of wholly new components—a slum sanitation program, and a proposal to reduce the national marine water quality standards.
- ▶ The *OECS solid waste management project* EIA was central to the introduction of waste reduction strategies in the project design, including legislative and policy measures to encourage reductions in waste generation, promotion of backyard and community composting, and reuse and recycling practices. It also supported the financing of recycling and composting facilities at the landfill sites and made recommendations regarding the design and operation of the new landfills and the closure of existing waste disposal sites.
- ▶ The *Brazil Espirito Santo water and coastal pollution project* EIA ruled out several project locations that would have come into conflict with the future expansion of urban areas. In one case, the assessment of cumulative negative impacts resulted in mitigation and compensation measures not foreseen in the original project.

Public participation didn't rank high among the EIAs reviewed. In some cases it was directly ruled out by local authorities (Lebanon). In others it was omitted altogether by the EIA team (Mexico), or was acknowledged as too late and too limited (Bombay, China 1 and 2). Projects that did allow for public participation benefited from early identification and solutions of otherwise potentially conflicting issues. For instance—

- ▶ In the *OECS solid waste management project*, public participation led to a redesign of one of the landfills that could have affected adversely an endangered bird species that nests nearby.
- ▶ In the *Brazil Espirito Santo water and coastal pollution project* EIA, community involvement revealed that the siting of one of the sewage

treatment plants would close access to a clay deposit used by local artisans. A detailed solution was worked out with the participation of the affected population and incorporated as part of the project

Finally, EIA requirements helped strengthen environmental awareness among involved parties. For example, in Egypt and Sri Lanka, where no environmental management system was in place, EIAs helped introduce environmental considerations into project development discussions. And partly as a result of the EIA exercises, half the projects reviewed finally included a component for capacity building aimed at the local environmental agency which was in charge of implementing or controlling the environmental mitigation plans.

## CONCLUSIONS

### **From EIA to Project to Urbanwide Environmental Planning**

As long as good EIAs done for urban development projects can incorporate environmental concerns into urban development, can we dispense with traditional urbanwide physical and environmental planning? Hardly! Although EIAs can certainly improve development project designs, there are still limitations to what they can achieve.

Usually an EIA is undertaken to consider the potential environmental impacts of an already-identified project. Hence, EIA techniques can help only insofar as they can enhance a project's positive impacts and avoid or mitigate negative ones. EIAs have little to offer with respect to the initial decisions to consider projects for investment in the first place. To identify needed environmental projects or foster citywide environmental policies, more pro-active instruments are called for, like national environmental action plans (NEAPs), or city environmental plans, which usually make up part of a metropolitan development plan. Far from being alternatives, the citywide and project approaches are complementary. Good citywide environmental plans, in particular, can help the project-by-project EIA, providing much needed city-specific environmental goals and standards against which development projects should be assessed.

### **More Use of Social and Economic Analysis**

Currently social and economic issues stemming from a project's environmental impact constitute a gray area, which is often left aside by both the

project assessment and the EIA teams. The former could argue that they are not aware of environmentally driven issues. And the EIA teams seem to consider EIA as an exercise on the assessment of impacts on the natural environment and their technical solutions.

Although an EIA focus on natural environments may be taken for granted, the lack of attention to social and economic dimensions seriously undermines the same EIA's recommendations, particularly in relation to social valuation of environmental impacts (*what is important for the involved community*) and the economic valuation of the alternative solutions put forward by the **EIA** (*the economic trade-offs faced by stakeholders to ameliorate environmental impact*). Since effective methodologies exist to tackle both social and economic issues, and both represent only a modest increment to EIA costs, there is no reason for urban EIAs to continue to ignore the economic and social impacts of environmental change.

### **Adopting an Urban Environment Perspective**

This review has suggested that many EIAs of urban-related projects fail to adopt a urban environment perspective. They tend to concentrate on direct pollution impacts and give limited or no consideration to indirect and cumulative impacts and other wider urban environmental concerns, including social and economic effects. While this could be a sensible approach to small or very specific interventions, it surely understates the urbanwide environmental impacts of large projects.

The most critical EIA stage in this regard is the scoping stage. Yet the importance of a detailed scoping exercise—a clear discussion of what is in and what is out of the scope of the EIA—is many times overlooked, a fact that can be inferred from the absence of explicit reference to this process in most EIA reports. All too frequently, when a list of the impacts to be considered appears, it is presented as technically fixed, without any discussion about why the selected impacts are relevant or key to the project. This was the situation in all **13 cases reviewed**.<sup>6</sup>

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<sup>6</sup> Although not reporting on the scoping exercise will not harm the EIA study—provided that the scoping is in fact well performed—it does affect the EIA report's usefulness in answering questions from the public and deflecting criticism about the relevance of the exercise as a whole. This problem is further compounded by the fact that most EIA teams are formed ad hoc. and disband soon after the EIA's completion. Consequently, it is almost impossible to contact the EIA report authors a short time after its presentation.

Adopting an urban environment perspective should not entail reassessing the entire citywide environment in each EIA. So the question remains, how far should the EIA go? One possible answer is that the EIAs of urban-related projects should pay attention to the city's priority environmental problems. But then the environmental impacts of a particular project may fall out of the city priority list. My suggestion is to approach the scoping of the EIA of an urban project as the intersection of a sector-specific EIA (say, the EIA of a power plant or a urban highway) and a wider list of urban environmental concerns.

If this approach were adopted, the scope of the EIA of urban-related projects would differ from both a sector specific EIA and a citywide urban environmental assessment in that—

- a. it would address direct project impacts, as it is the case today, but
- b. also delve into indirect and cumulative city-specific impacts brought about by the project. while
- c. bypassing some citywide urban environmental concerns that are not affected by the project.

Although there are many references to sector-specific environmental impacts—the environmental impacts to be expected for different types of industry, transport, energy projects, and the like<sup>7</sup>—there are few references to help check for possible urban environmental impacts.<sup>8</sup> The approach used in this review, as presented in table 3, suggests that any such guideline on potential urban impacts should feature:

- ▶ *A systematic coverage of potential project impacts.* Most of the literature on urban environments is based on case studies and thus tends to bypass some potential environmental problems not found in the city at stake. For example, few urban environmental assessments in developing countries include noise levels, radiation, upward or downward revision of property values, effects on personal and municipal budgets, or toxic substances, any of which could emerge as a result of a specific project development.

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<sup>7</sup> See World Bank 1991; Davis et al. 1991; UNEP 1987; Becker and Porter 1986; OECD 1994; UN 1994; UN-ESCAP 1990; Jain 1993; Turnbull 1992.

<sup>8</sup> See Bartone et al. 1994 and Leitman 1993.

- ▶ ***A systematic consideration of resource use issues.*** Although resource use is often viewed as a country-scale issue, rather than an urban one, it relates to several important city-level concerns, such as (a) long-range urban sustainability and (b) depletion of urban and periurban natural resources (water, green belts, recreational areas). Considerations of resource use are also important because of the links between efficient resource use and pollution abatement. Also several policy interventions to reduce resource consumption are usually taken at a municipal level (resources pricing, recycling, etc.).
  
- ▶ ***Ways to address the cross-sectoral, multidimensional character of the environmental impacts and concerns,*** particularly in relation to (a) the spatial dimensions, (b) the causalities involved, (c) the time scale of the impact, (d) the social concerns, and (e) the range of remedial actions to be considered .

## APPENDIX 1. PROJECT PROFILES

Large projects usually feature large EIAs, or at least large EIA reports (over 500 pages for most of the projects reviewed). These short profiles cannot do justice to the original reports and the sole aim is to provide the reader with some information on the projects and the basic facts and findings of the EIAs in support of the discussion. Further information can be found in World Bank annual reports, project staff appraisal reports (SARs), and the relevant country's and World Bank project files. Although the World Bank publishes widely, project documents are disclosed mostly during public consultation periods and may not be currently accessible.

### CHINA 1—SECOND SHANGHAI METROPOLITAN TRANSPORT PROJECT FY93<sup>1</sup>

**Total project cost:** \$ 657.1 millions

**EIA performed by:** Local research institute

**Project Description.** With a population of 7.5 million people, Shanghai is one of the fastest growing cities in China, both in term of economic activity and population. The project would finance about 22 km of the second stage of Shanghai's Inner Ring Road (IRR), a 4-lane elevated viaduct linking the new Nanpu and Yagpu Bridges over the Huangpu River. The project also includes investments in two bus depots and one bus interchange and a traffic management and safety component.

**Project Goals and Benefits.** Included (a) alleviating current and forecast traffic congestion by providing additional traffic capacity, (b) transport and non-motorized vehicles more attractive and safer through exclusive lanes for bikes and public transport, (c) increasing accessibility to the Pudong development zone. Project benefits have been estimated in terms of vehicle operating cost savings, savings in personal travel time, and reductions in accident costs.

**The EIA: scope, analytical tools, findings, recommendations.** China has its own EIA requirements and in this case part of the EIA was completed before the World Bank was approached. The environmental impacts considered (a) construction nuisance (noise, dust, social and traffic disruption) and (b) air quality impacts in a 1-km corridor and noise in a 200m corridor during operation. Comments on public hearings and a detailed list of mitigation measures are also part of the EA. Simple modeling techniques were used to forecast noise and air quality.

In relation to the location of the road, most of the alignment of the highway is over an existing major road (Zhongshan Rd.) except in the northeast portion where the new highway will open up a residential area resulting in greater connectivity but much worse environmental quality. This deviation was chosen to avoid a dense prime residential area adjacent to the current roadway. Resettlement of households in the highway right-of-way is significant, with resettlement costs adding up to 30% of the project costs.

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<sup>1</sup> FY refers to the World Bank fiscal year that ends 30 June. All money figures are in current U.S. dollars, usually of the project FY or one year earlier.

During the **EIA** review, the Bank asked for further analysis of location issues in the northeast section. At the Bank's request the project included a permanent program of air pollution monitoring in the **IRR**, together with support for the preparation of a citywide transport pollution control plan.

The EIA does not elaborate on (a) induced impacts on traffic (traffic forecasts under different alternatives and different transportation modes) or (b) induced impacts on surrounding areas (land uses changes). The latter is a remarkable shortcoming, not only on environmental assessment terms but also on economic grounds, since assessing land uses changes is a standard practice in urban development projects as a way to estimate project's benefits.

The EIA also fails to elaborate on global issues related to a citywide or national transport policy—for example, the level of motorization aimed at and the related energy consumption and pollution problems. The Bank is considering a sectoral loan for urban transport that will address some of these issues.

#### CHINA 2—LIAONING ENVIRONMENT PROJECT

FY94

**Total project cost:** \$ 338,1 million

**EIA cost** \$ 100 thousand

**EIA performed by:** Foreign consulting firm

**Project Description.** Liaoning Province in the northeast of China has a population of 36 million people, 25 million of which are urban. Liaoning is an important industrial region confronting acute problems of water supply and air and water pollution. Furthering an urban infrastructure project that focused on water supply, the Liaoning environment project would invest in (a) improvements in water quality, (b) improvements in urban air quality, (c) improvements in municipal solid waste management, (d) industrial pollution control, (e) improvements in resources use, and (9) environmental management and training. The investment will be concentrated in 5 cities: Anshan, Benxi, Dalian, Fushun, and Jinzhou.

**Project Goals and Benefits.** The project would mitigate environmental degradation in a heavily polluted region, resulting in economic and social benefits in terms of reduced health hazards, reduced resource consumption and increased sustainability.

**The EIA: scope, analytical tools, findings, recommendations.** The project underwent two EIAs. The first was commissioned by Chinese authorities to comply with national environmental regulations and was executed by a local team. Later, a foreign consultant firm was hired to address the World Bank's broader environmental concerns. This profile refers to the latter EIA. The EIA studied 9 project alternatives in 3 subregions (27 cases). In each case the EIA gave (a) estimates of the environmental improvements achievable by the proposed measure, including a discussion of technical alternatives: (b) construction-related environmental issues and mitigation measures, including the need to resettle 274 families; and (c) operation-related environmental issues and mitigation measures.

The main analytical tool used was the quantitative modeling of pollution loads and resulting environmental quality, using an urban-bubble approach for air pollution. Urban considerations included population health, population growth, and protection

of historical and archeological values. Most EIA recommendations were included in the final project design.

#### INDIA—BOMBAY SEWAGE DISPOSAL PROJECT

FY95

**Total Project Cost:** \$ 296 million

**EIA cost** \$ 310 thousand

**EIA performed by:** Local research institute

**Project Description.** Currently less than 2% of Bombay's (12 million people) wastewater undergoes treatment before disposal to adjoining coastal and creek areas. With the sewage collection system already in place, this project would address treatment and appropriate disposal of waste waters. It included:

1. Construction of aerated lagoons at Ghatkopar (380 million liters day, m<sup>3</sup>/d) and Bhandup (176 m<sup>3</sup>/d)
2. Construction of 2 large sea outfalls at Worli and Bandra, each tunnel 3 km long and 3.5 m diameter and discharging an average 800 m<sup>3</sup>/d
3. Slum sanitation programs and related works to serve 1 million people
4. Improvement in 5 existing sewage pumping stations and conveyance systems

**Project Goals and Benefits.** The goal of the project was to provide water treatment for some 90% of all city buildings and 45% of its population. Benefits expected include improvements in population health, quality of life, and improvement of environmental quality in currently polluted beaches, creeks, and coastal waters.

**The EIA: scope, analytical tools, findings, recommendations.** The most important feature of this EIA is that it moved from the traditional focus on the environmental impact of the project construction and operation, to a rather new question: the project's ability to attain its proposed environmental goal. This approach made the EIA central to the project design.

The core of the EIA was a highly detailed mathematical modeling exercise, used to assess the recipient bodies' water quality resulting from alternative project configurations. This methodology, although well established, is quite demanding in terms of sampling efforts for baseline and model calibration purposes.

Urban considerations were significant throughout the EIA, including (a) the forecasting of population changes and land use patterns to the year 2015; (b) the assessment of land use and land acquisition problems of each alternative (as a result of these considerations, the final project design entailed no population resettlement, a major achievement for any of India's urban development); (c) a focus on the distribution of the project benefits; (d) the assessment of the cumulative and interdependent character of pollution throughout the network of urban centers discharging to the same watershed.

Among others, the EIA recommendations led to the following changes in the project design: (a) the elimination of a major project component, a system of aerated lagoons which was to be built near the Malad creek: the EIA showed that the assimilative capacity of the Malad creek was insufficient to receive the discharges of the projected aerated lagoons; (b) the incorporation of a slum sanitation program; and (c) the redesign of the marine outfalls. The EIA also revealed the need for India to revise

its marine water quality standards that currently pose unrealistically high demands that have never been enforced.

#### INDONESIA—SURABAYA URBAN DEVELOPMENT PROJECT

w 9 4

**Total project cost:** \$ 617.6 million

**EIA performed by:** A consortium of local and foreign consultants

**Project Description.** Surabaya, second largest city of Indonesia (3.5 million people in 1990) is the capital of East Java and the development pole of East Indonesia. The project included investments in (a) urban transport and traffic management, (b) water distribution, (c) storm drainage, (d) sanitation, (e) solid waste management, (f) site and house improvement, (g) institutional development and capacity building.

**Project Goals and Benefits.** The project goals were to improve (a) urban service level and affordability, (b) urban management, (c) urban environmental quality. The project was also expected to alleviate urban poverty through investment in services for poor neighborhoods.

**The EIA: scope, analytical tools, findings, recommendations.** The project EIA followed Indonesia's procedures, with adjustments to comply with the World Bank requirements. Major environmental concerns were to reduce forced resettlement and construction nuisances.

The EIA followed a descriptive and qualitative approach. Regarding construction impacts, no comments were made on risks of erosion and sedimentation. Although the drainage and road development components of the project will allow the urbanization of large tracts of currently periurban areas, neither project nor EIA comments on the city growth and land use impacts (the EIA mentions that city authorities plan to undertake a land use plan some time in the future). Finally, while the project would increase urban water supply by 40%, the EIA does not comment on increased requirements for wastewater collection and treatment.

#### KOREA—KANGJU AND SEOUL SEWERAGE PROJECT

FY93

**Total project cost:** \$ 508.1 million

**EIA performed by:** Government agency

**Project Description.** The project would double the existing wastewater treatment capacity at Seoul, the nation's capital, and Kangju, the fifth largest city. The project also included some related minor works and institutional development for wastewater management and water conservation.

**Project Goals and Benefits.** The project would reduce pollution in the Yongsan and Han Rivers and in the country's western coastal areas. It would also remove wastewater from inner city rivers, improving health and well-being among the population living and working near water courses currently polluted by raw wastewater. The water conservation component will help to increase efficiency in water use and will result in reduced wastewater generation.

**The EIA: scope, analytical tools, findings, recommendations.** In both cases the new treatment capacity would be an expansion of the existing facilities in the same sites and with the same technology currently in use. Therefore environmental impacts

were considered minor by the World Bank. Nevertheless, based on Korea's requirements, the local authorities prepared a full EIA.

Both cities have master plans that consider the siting and future expansion of wastewater treatment plants. Hence location was not considered an issue and the EIA concentrates on a description of the proposed wastewater treatment technology and water quality standards after treatment. Sludge will be disposed of in sanitary landfills or will be incinerated, since recycled composts have no demand in Korea. World Bank experience shows that Korea has a highly efficient civil service and environmental concerns are respected through the implementation and operation of projects.

#### **LEBANON—SOLID WASTE AND ENVIRONMENTAL MANAGEMENT PROJECT FY95**

Total project cost: \$ 135 million

EIA cost \$ 500 thousand

EIA performed by: Foreign consulting firm

**Project Description.** Urban development in Lebanon is concentrated in coastal areas where years of civil war have severely disrupted the operation of public services. As a result, refuse of all types is dumped into the coastal areas without any treatment. To alleviate this situation, the project would invest in (a) refuse collection equipment, (b) 15 sanitary landfills and 3 compost plants, (c) refurbishing an existing incineration plant at Amrosiyeh, (d) hospital waste collection and disposal facilities, (e) preparation of a coastal reclamation program, (f) technical assistance for participating institutions.

**Project Goals and Benefits.** The project goals were to provide appropriate solid waste management for all major urban areas in the country, reduce health hazards and reclaim polluted coastal areas.

**The EIA:** scope, analytical tools, findings, recommendations. The EIA had to cope with several limitations, including (a) weak or non-existing local environmental norms, (b) ongoing political crisis, (c) the need to perform the EIA without definition regarding potential landfill sites. The EIA proposed solution included:

1. Several EIAs of project subcomponents were undertaken and completed during the project preparation stage. These studies addressed the more controversial issues and also served to set a standard for future EIAs to be performed as the project progressed. They included the assessment of compost plants at Saida and Zahle, the Amrosiyeh incineration and compost complex, and a hospital and industrial waste survey.
2. Detailed environmental guidelines to assess potential sites for future landfills, once the sites are identified and prior to land acquisition.
3. Detailed guidelines for environmental mitigation during construction, operation, and monitoring of all the facilities to be financed by the project.

**As** for EIA findings and recommendations, the project's final design incorporated many EIA suggestions regarding the compost plants, the incineration plant, the management of hospital wastes, and procedures for closing and reclamation of existing dumps. An important spillover of the EIA was the Lebanon authorities'

decision to apply the **EIA** management recommendation to all the country's solid waste management system.

**SRI LANKA—COLOMBO ENVIRONMENTAL IMPROVEMENT PROJECT** **FY95**

**Total project cost:** \$ 95 million

**EIA performed by:** Foreign consulting firm

**Project Description.** Colombo, the capital of Sri Lanka, is the principal urban and industrial center of the country. With 4 million people, the Colombo metropolitan area houses a quarter of Sri Lanka's total population. The project included investments in (a) a new municipal landfill for the city, upgrading of collection and recycling, and strengthening of waste management capability; (b) industrial pollution control, including institutional strengthening of environmental authorities, an industrial waste minimization program, treatment plants to collect and treat wastewaters from 2 industrial areas, and 2 industrial solid waste management facilities in the same industrial areas; (c) restoration of Beira Lake, an urban lake highly polluted by industrial and household discharges; and (d) infrastructure upgrading in low income settlements.

**Project Goals and Benefits.** The project—the first to tackle pollution problems in Colombo—was expected to have a major beneficial impact through (a) reducing both household and industrial pollution, (b) reducing environmental health hazards among poor population, and (c) reversing pollution in nearby streams and Beira Lake. A strong emphasis was placed on promoting waste prevention practices, strengthening public agencies' management capabilities, and encouraging private sector participation (it was expected that private investors would build, own, and operate both the solid waste and water treatment plants in the industrial zones).

**The EIA: scope, analytical tools, findings, recommendations.** As part of the project a very detailed EIA of the siting of the municipal landfill and the transfer station was performed. Because the industrial solid waste and wastewater plants would be financed by a private firm, the **EIA** of these components was postponed to the negotiations with potential investors in relation to the technical characteristics of the treatment plants. The decision to limit the project **EIA** to a very detailed analysis of a single component is an example of the range of current different approaches to sector projects. Since at their inception these projects usually lack a definition regarding key components (size, siting, technology), EIA requirements are sometimes advanced (as in the Lebanon project previously highlighted), postponed (as in this case), or just bypassed (as in the Mexico project below).

**EGYPT—PRIVATE SECTOR TOURISM INFRASTRUCTURE AND ENVIRONMENTAL MANAGEMENT PROJECT** **FY92**

**Total project cost:** \$ 753.33 million

**EIA performed by:** Local consulting firm

**Project Description.** The Nile River and the Red Sea coast are among Egypt's most valuable tourism resources. Both are severely endangered by increasing pollution and ecosystems deterioration. The project would invest in (a) provision of infrastructure

in 4 tourist areas of the Red Sea, (h) construction of additional berthing facilities for Nile cruises in 6 sites along the Nile, (c) investment in other traffic and navigation facilities in the Nile. (d) implementation of policy measures to improve the tourism sector, (e) institutional strengthening of the tourism development agency and the environmental protection agency.

In parallel with the project, GEF (Global Environmental Facility) made a grant to Egypt to undertake (a) coastal zone management in its entire Red Sea area, (b) development of EIA capability, (c) management of recreational coastal areas, (d) establishment of a marine protected area in the southern portion of the Red Sea.

**Project Goals and Benefits.** The project aims were (a) to support tourism, one of the most important Egypt's economic sectors, and (b) to protect valuable environments currently under heavily negative impacts. Until this project there were no port facilities prepared to receive and handle ship wastes, which were routinely dumped into the Nile. As for the Red Sea, uncontrolled tourism development and lack of waste treatment was severely damaging coral reefs and nearby marine and island ecosystems.

**The EIA: scope, analytical tools, findings, recommendations.** This project was only marginally urban, its focus being tourism and coastal zones management. The EIA has a very detailed treatment of river and coastal zones environmental problems and required management measures. The analytical approach is mostly descriptive and qualitative. Although quite complete in the analysis of direct impacts of the project components, this EIA illustrates current widespread limitations in addressing indirect or induced impacts. For example the EIA summary states, "Thus the project will act as a pole of attraction for the densely populated regions of the Nile valley and the delta"; but the EIA does not elaborate on the environmental impacts of such population attraction. Likewise, the EIA focuses on pollution treatment in the Red Sea resort areas but does not comment on the population growth and subsequent environmental problems in the nearby nontourist local villages (Haghada and Hafaga) where most of the workers of the tourism resorts live.

#### **BRAZIL I—WATER QUALITY AND POLLUTION CONTROL PROJECT**

**FY92**

**Total project cost: \$ 494 million**

**EIA performed by: Local consulting firm**

**Project Description.** The project supported investments in pollution control and infrastructure in the cities of Sao Paulo (Gaurapiranga basin) and Curitiba (Upper Iguaçu basin). Investments encompassed (a) water and sewage works in low-income neighborhoods, (b) solid waste management, (c) urban rehabilitation, (d) water basin rehabilitation, (e) water basin management, (f) population resettlement. A distinctive approach of this project was the creation of administratively autonomous and self-financed water basin authorities responsible for water quality control.

**Project Benefits.** The project goals were to (a) abate current water pollution levels and preserve water quality in Sao Paulo and Curitiba, (b) support the establishment of sound policies for water pollution control in the 2 participant states, (c) help

develop cost recovery mechanisms to ensure the sustainability of the water management institutions, (d) increase quality of life in low income areas of both cities.

**The EIA: scope, analytical tools, findings, recommendations.** The EIA followed Brazilian directives, which include 3 stages: (a) an EIA during the project planning; (b) a second presentation to the environmental authorities prior to the beginning of work to assess if the EIA recommendations have been incorporated; and (c) a third report at the beginning of operations. Because the project has the characteristics of a time-slice project, the design of several components were not available at the time of the EIA and were not considered in the EIA. Furthermore, the EIA was made in record time (less than 3 months). Probably because of this haste, the EIA is rather vague in its scope. The analytical tools used are mostly qualitative and based in extrapolation from other cases. For both subcomponents, further environmental studies and follow-ups seem to be the principal recommendation. Among the EIA shortcomings is a lack of environmental management proposals. For example, the EIA of the Sao Paulo subcomponent acknowledges that water quality improvements are critically dependent on the accomplishment of all project activities (there are 49 of them), yet the EIA fails to produce recommendations regarding how to cope with failures in any of these 49 activities. One possible failure could be the inability of the newly created water authorities to check squatter settlements in the basins' protected areas, a process already at work during the project and EIA preparation.

#### **BRAZIL 2—ESPIRITO SANTO WATER AND COASTAL POLLUTION MANAGEMENT PROJECT**

**FY94**

**Total project cost: \$ 308.5 million**

**EIA cost \$ 350 thousand**

**EIA performed by: Local consulting firm**

**Project Description.** The project would increase water supply and construct 12 sewage collection systems and 10 treatment plants to serve 9 cities of Espirito Santo state, including its capital city, Vitoria. It would also invest in strengthening the state water and environmental agencies.

**Project Goals and Benefits.** The project would increase water supply to 640,000 persons and provide sewage collection and treatment for some 770,000 persons; improve population health; and reclaim river and coastal areas for tourism and recreation, enhancing environmental quality.

**The EIA: scope, analytical tools, findings, recommendations.** The EIA included (a) the evaluation of the project design in terms of the water quality in recipient streams, (b) ecological and social constraints to the siting of water treatment facilities, (c) construction and operation impacts, and (d) guidelines for EIA of future project subcomponents.

Water quality scenarios were mathematically modeled in order to recommend the best use of the assimilative capacity of the recipient body and sort out the least-cost treatment alternative that complied with the desired quality standards. Unfortunately, the modeling was done with little baseline information, casting doubts on the accuracy of the recommendations. Urban issues—including population and urban

growth, and current and future land uses—played an important role in the EIA discussion of facility siting. Some locations were ruled out because they would conflict with the future expansion of urban areas. The assessment of cumulative negative impacts inflicted on one neighborhood justified special mitigation and compensation measures. The EIA recognized urbanwide links that made the project outcomes dependent on the overall watershed management and also called for trans-media management (e.g., the impact of riverside dumping of solid wastes). The project final design accepted the EIA suggestions to change the original location of half the facilities.

**BRAZIL. 3—MINAS GERAIS WATER QUALITY AND POLLUTION CONTROL PROJECT** **FY92**

**Total project cost:** \$ 307.6 million

**EIA performed by:** Local consulting firm

**Project Description.** The project would help reduce pollution in Belo Horizonte metropolitan area (2.3 million people), a city severely damaged by pollution from households, mining, and industrial activities. The project included investments in (a) flood control and drainage, (b) municipal and industrial wastewater collection and treatment, (c) municipal and industrial solid waste management, (d) urbanization, (e) environmental protection

**Project Goals and Benefits.** The goal of the project was to improve the environmental quality of the heavily polluted urban basins of the Arrudas and Onca rivers in the metropolitan area of Belo Horizonte, the capital of the state of Minas Gerais.

**The EIA: scope, analytical tools, findings, recommendations.** This project was originally part of *Brazil 1—water quality and pollution control project*, and was developed in the same fashion. Both projects share the same EIA scope and development and comments made to Brazil 1 are pertinent here. As analytical tools, the Brazil 3 EIA uses impact matrixes to identify and rank the environmental impacts of 8 project subcomponents. The treatment is qualitative: recommendations are vague.

**MEXICO—SECOND SOLID WASTE MANAGEMENT PROJECT** **FY94**

**Total project cost:** \$ 415.5 million

**EIA performed by:** Local consulting firm

**Project Description.** The project would give sub-loans to some 23 medium-size Mexican cities to help them develop comprehensive and integrated solid waste management programs. The loan includes financing for planning, construction, operations, and cost recovery management, as well as resources for the institutional strengthening of the federal regulatory agency.

**Project Goals and Benefits.** The project would help develop and enforce a national policy for municipal solid waste management (MSWM) in a significant number of cities. The project would also help cities to (a) strengthen waste management capability, (b) develop cost recovery strategies, (c) encourage private sector participation in solid waste management, (d) attain technological improvements (e) incorporate scavengers into the new waste management system.

**The EIA: scope, analytical tools, findings, recommendations.** The strong points of the EIA are limited to the social assessment and the design of policies and procedures to incorporate scavengers and other informal workers in the new waste management system. This issue was carefully considered and researched, through detailed surveys of the population involved and discussion of technical, economic, and social alternatives. Aside from this issue, the EIA provided only a very general description of current solid waste management problems in Mexico, based on minimal data, and elicited no relevant conclusion for the project at stake. Preliminary master plans prepared for 8 cities limited their environmental concern to a cursory description of the location of the proposed landfills.

It could be argued that this being a sectoral project, detailed EIAs would be called for at the time of the sub-loans to cities interested in investing in their MSWM. Yet other approaches to similar sectoral projects have advanced a case studies of one or more cities' waste management system in order to (a) present it as a model for future subproject EIAs and (b) furnish the sectoral EIA with some information about what environmental issues should be expected during the project implementation (see the Lebanon project reviewed above).

#### ORGANIZATION OF EASTERN CARIBBEAN STATES (OECS)—WASTE MANAGEMENT PROJECT FY95

**Total project cost:** \$ 50.5 million

**EIA cost** \$ 500 thousand

**EIA performed by:** Foreign consulting firm

**Project Description.** The project would invest in the management of solid waste and ship wastes in 6 island countries in the Eastern Caribbean (Antigua and Barbuda, St. Kitts and Nevis, Dominica, St. Lucia, St. Vincent and Grenadines, and Grenada). The preparation of the project and its subsequent funding attracted the support of the World Bank, GEF, the Japanese PHRD Fund, the Caribbean Development Bank, and the European Development Bank. The number of countries and institutions involved highlight the complexity of the project.

**Project Goals and Benefits.** The project would benefit local populations through reductions in environmental health hazards and would help protect natural environments that are the base for tourism, the main economic activity of the region. It would also help reduce marine pollution in the Caribbean Sea.

**The EIA: scope, analytical tools, findings, recommendations.** The EIA addressed three main issues: (a) the selection of technical solutions, (b) environmental considerations during construction and operation of the facilities, and (c) conservation issues associated with the project.

The EIA undertook a detailed environmental assessment for each of the participant countries, encompassing, among other things: (a) drilling in all potential landfill sites to evaluate hydrogeological aspects, (b) extensive consultations with all affected parties, (c) public forums of countrywide audience.

The EIA recommended the construction and operation of sanitary landfills, but also emphasized parallel waste management activities. Due to land use constraints in

island environments, landfill siting alternatives were exhaustively assessed, resulting in the incorporation of many conservation concerns into the project, such as the restoration of Greatheeds Pond—a regionally significant wetland in St. Kitts, and the protection of key habitats for the sea turtle and the Grenada dove. Among the EIA final recommendations were—

- Legislative and policy measures to reduce waste generation
- Promotion of backyard and community composting to reduce the volume of wastes requiring off-site management
- Promotion of reuse and recycling practices
- Design of countrywide collection systems
- Design of new sanitary landfills
- Design of the recycling and composting facilities at the landfills
- Design of port reception facilities
- Provision for handling special wastes
- Provisions for cost recovery, management, and operation of the upgraded SWM systems
- Recommendations regarding the closing and reclamation of existing dump sites.

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