

**EVALUATION OF PERFORMANCE
OF EIS REGULATIONS:
AN EMPIRICAL INVESTIGATION OF ISRAEL'S PROGRAM**

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INTRODUCTION

The government of Israel considered the environmental impact statement (**EIS**) program one of its environmental quality protection efforts as early as 1973 (State of Israel 1973). Ten years later these intentions were implemented and formal legal directives were put into effect requiring the preparation of **EIS** for selected land use plans and projects (Planning and Building Law 1982). Since then scores of **EIS** reports have been completed (State of Israel 1992). Several analyses of the directives were made by Shiffman (1985), Amir (1985), and Rotenberg (1986). More descriptive assessments, which were based on field experience gained during administration of the program in its first decade, were made by Rotenberg (1992), Brachia (1993), and, in a study that was limited by a few cases, by Enosh (1993). Until now, though, no empirical evaluation was made of the overall working of the program.

The present study was intended to overcome this lack. Its objectives were to assess the quality of implementation of Israel's **EIS** program, its effectiveness and the compliance with **EIS** procedures. The paper starts with an analysis of the main elements of Israel's **EIS** program, describes the

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methodological approach of the study, and presents the results of the study. The final conclusions indicate possible improvements for the **EIS** program.

ISRAEL'S EIS PROGRAM

Legal Basis

EIS constitutes one of several legal tools administrated by Israel's Ministry of Environment (MOE) for protection of environmental quality. **EIS** directives were added in 1982 to the planning and building law of 1965 (the citation in the text for these directives will be *PBL 1965, 1982*). They define **EIS** as a document that assesses the relationships between a proposed land use plan and the environment in which it is to be implemented. The statement should identify and evaluate projected environmental impacts and specify the means for their prevention.

The law requires approval of all plans that propose physical changes in buildings and changes in land use. This might include a land use plan for a whole municipality or for a single project such as local road, school, power plant, etc. Normally, plans would need two types of approval on the general and detailed levels: the first determines its land use status and the later one provides for approval of building permits. A requirement for an **EIS** could be applied in each of the plans.

When the **EIS** program was linked to PBL, it became an integral part of a wider public review instrument that encompasses state, district, and local physical planning activity in the country. The link gave environmental considerations greater importance and required their integration as legitimate factors in decision making by physical planning institutions during the plan's preliminary and final approval stages.

The PBL covers physical planning through agencies at three levels: at the national level through the National Planning Building Board (NPBB); district, through six District Planning and Building Commissions (**DPBC**), and local through many local planning and building commissions (LPBC) serving an individual municipality, or group of settlements organized in regional councils. Environmental evaluation and **EIS** are administrated in each of these levels.

Eight EIS directives address several aspects of impact assessment: which land use or project plans requires an **EIS**, who made the decisions as to which environmental aspects should be assessed, the types of terms of reference for the elaboration of the report, and instructions for review and approval (PBL 1965, 1982).

Directive 2 specifies three different situations in which an **EIS** is required:

- (2b.1) Plans that are likely to produce considerable environmental impacts and always require an **EIS** such as power plants, airports, seaports, and hazardous waste sites.
- (2b.2) Plans whose potential negative impact is likely to be extensive beyond the area of the locality require an **EIS** only after preliminary screening by the national planning and building board (NPBB) or by a district planning and building commission (DPBC), who approves plans. These include plans for landing strips and marinas, national water carrier sites, dams, quarries, sewage treatment plants, and areas for solid waste disposal.
- (2b.3) Plans for industrial projects require **EIS** when proposed for locations that are not in industrial zone or in areas that were not previously planned as such and whose scale and type of production process might cause extensive environmental impacts beyond the border of the locality. The requirement in this section assumes that environmental problems in an industrial zone were assessed at an earlier stage and a new project there would not need **an EIS**.

Directive 3 mandates that for any other type of plan an **EIS** could be demanded by Ministry of Environment representative or other member of a DPBC or NPBB at any stage of the plan approval process. Directives 2 and 3 provide flexibility in project screening by linking the demand for **EIS** to type of land use, production process, scale, location, and other circumstances. This allows attention and energy to be focused on the most critical cases, Groups 2b.1 and 2b.2 are project specific while 2b.3 provides for consideration of other cases representing special interests represented on these committees. The **EIS** is mandatory for 2b.1 projects, but 2b.2 and 2b.3 projects permit some discretion by decision makers; in either case the demand for **EIS** can be made only by the bodies mentioned above or by one of their members. Public participation in this stage is limited.

Implementation of the **EIS** program requires the involvement of many ministries that operate through various agencies. Two major players implement the **EIS** program—the Ministry of the Interior that operates through the three planning and building commissions and the **MOE**. Their roles in **EIA** program are interlocking, as follows. The **DPBC** and **NPBB** include representatives of various ministries. One of the representatives is from the **MOE**; this person also functions as the environmental adviser for the district. (Separate advisers operate in each of the six **DPBCs**.) This representative, in addition to general decision-making duties on the commission as an environmental adviser, has two other duties on the commission: to prepare for each plan or project an individual set of guidelines for the preparation of an **EIS**, and to administer and guide the preparation of the **EIS** by the entrepreneurs. Once the **EIS** report is completed, the **MOE** representative evaluates it along with additional experts from the national level, and make recommendations to the commission. These findings and the **EIS** constitute the environmental impact used in making the final decision by a commission or the board.

The planning commission and its environmental adviser are required to prepare an individual set of guidelines for each plan. According to directive **4**, the following five groups of aspects must be addressed: (1) assessment of the site environmental characteristics; (2) discussion of locational advantages of alternative sites; (3) description of project and activities to be carried out on the site; (4) assessment of potential environmental impacts and means by which they may be prevented; and (5) specification of changes required in the original plan to mitigate the impact. Table 1 describes a list of aspects for each of the five subjects required in directive **4**. As explained below, the list of aspects was generated from cases in the sample.

EIS Procedures and Participants

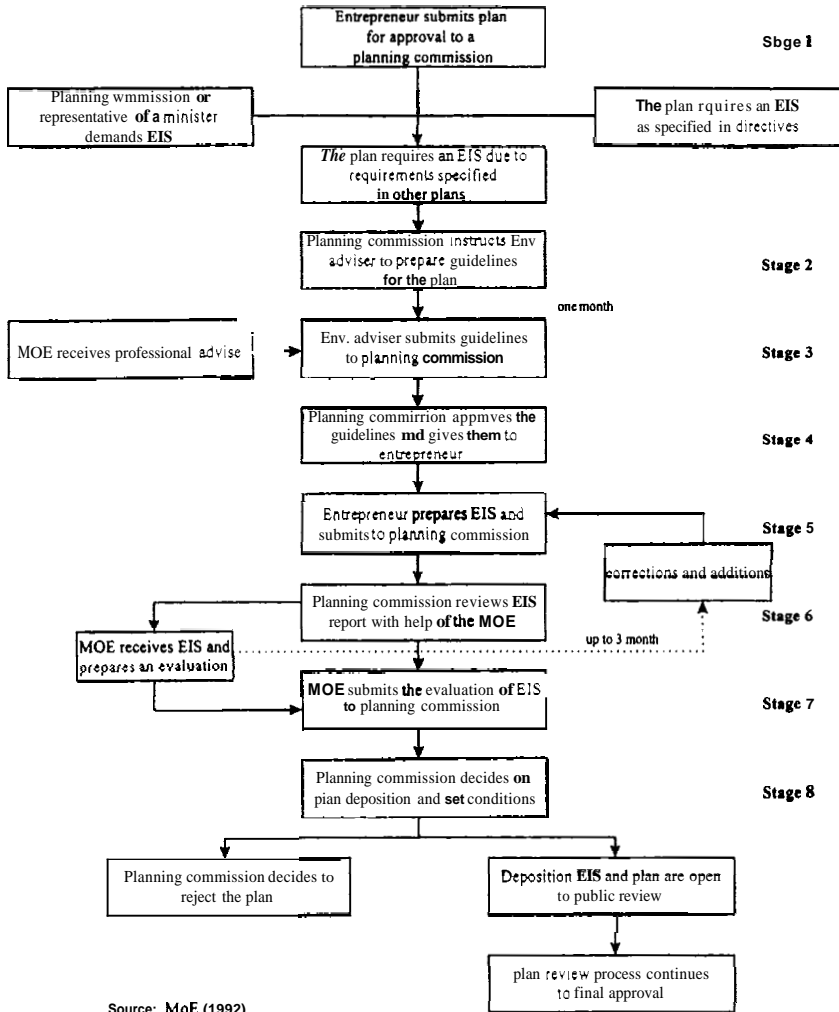
The **EIS** program involves several “players”: the private entrepreneur or a governmental authority and their consultants who prepare the plan and the **EIS**; one of the three types of physical planning and building commissions on the national, district, or local levels; the environmental adviser who represents the **MOE** on the district level; the national and district **MOE** offices; other environmental management units at the local and regional level; and the public at large.

EIA procedures formally include eight stages as follows (see figure 1):

- The procedure begins in stages 1 and 2 after completion of the plan and when the entrepreneur submits a plan for approval. The commission decides whether the plan requires an **EIS** screening. If it decides in the affirmative, it instructs the environmental adviser to prepare the relevant guidelines for the plan as mandated in directive 5a.
- In stages 3 and 4 the adviser proposes guidelines using the professional expertise of the MOE. The specially prepared guidelines are presented to the commission for approval and transferred to the entrepreneur (directive 5b).
- In stage 5 the **EIS** report is prepared by entrepreneur or consultants according to specific guidelines. Completed report is submitted to commission for review (directive 6a).
- In stages 6 and 7 the commission reviews the completeness and content of the **EIS** using MOE expertise. Based on their review and further consultations with the assessors, the MOE submits to the commission a professional assessment of potential environmental impacts of the proposed plan (directive 6b).
- At stage 8 the commission rejects or accepts the report and the plan with or without changes. If it is accepted without changes, the plan and statement are deposited for public review before the final decision is made on plan approval (directive 7).

The directives do not specify the place for public participation in the **EIA** process. The period for public participation in and influence on the final decision begins at stage 8 of the **PBL** plan review process. Once the environmental review is completed and the final report is finished, it is submitted as an additional document of the plan for a 60-day deposition period. Because the directives were not specific about this requirement in the past, these procedures were not always implemented. This was particularly true of the first group of **EISs**. Reports were not deposited but were submitted directly to the commission after the plan deposition period and without being opened to the public. **Now** the report is deposited with plans and public participation can take place during the deposition period. Groups and individuals with legal standing in the case can make objections and ask to be heard by the **DPBC** before it makes a final decision on the whole plan.

Figure 1. Procedures for Operation of EIA/EIS System



Source: MoE (1992)

It is also important to note that in the initial stage, when the plan is submitted to the commission, the commission conducts a preliminary evaluation of the plan completeness and commission sets the requirements for environmental review. The completeness of the **EIS** is evaluated separately at a later stage. At the final decision-making stage, the plan and the **EIS** report are seen as one. Generally, some or all environmental recommendations from the EIA review are incorporated into the plan's legal documents. In some recent cases, the whole **EIS** report was adapted as part of the legal document of the plan. In practice, the directives—being part of the PBL—merge the stages of environmental evaluation and plan review into one decision-making process.

METHODOLOGY

Former Reviews of EIA

Review of research done on this subject during the last two decades shows the majority of studies to be general-theoretical rather than empirical. According to Clark, Bisset, and Wathern (1980), studies have dealt with several issues: impact of NEPA (National Environmental Protection Act) and the general requirement for **EIS** at the federal level; decision-making procedures of other agencies; project planning, environmental management, and research; the content of **EIS**; the role of experts; and the contribution of **EIS** as a tool for efficient and effective environmental planning. Other theoretical studies evaluated the merit of post-**EIS** evaluation studies (Sadler 1988). They deal with the quality of projections, level of implementation of measures originally intended to mitigate environmental impact, the availability and use of data, administrative expertise, and the cost to the public of the **EIA process**.

Several studies have evaluated the quality of **EIS** systems operation, content of **EIS** reports, and evaluation methods. Lessing and Smosna (1975) surveyed the quality of geological data **used** in 100 **EIS** reports and found most of the information inaccurate, irrelevant, and sometimes misleading. Another study by Kreith (1973) evaluated the effectiveness of **NEPA** by analyzing 200 different **EIS**. The study showed that none of the projects with significant environmental impact was canceled due to the findings in the **EIS** reports, which led the author to question the value and contribution of **EIS** to environmental protection.

Two empirical studies tested the suitability of various EIA evaluation criteria by evaluating samples of reports. Elkin and Smith (1988) and Lee and Colley (1990) used criteria that evaluated **EIS** preparation guidelines developed by two agencies that administer EIS programs (Canadian National Park and British DOE). The research method in this approach was designed to evaluate EIS programs on the basis of relevant laws and specific directives by which these agencies manage their operations. Both studies suggested and rested, in several case studies, criteria that assess the suitability of **EIS** preparation guidelines and evaluate the quality of their implementation. The use of such criteria ensure evaluation of program performance on the basis of its explicit requirements.

Methodology Applied in Current Study

The methodology used in the evaluation of Israel's **EIS** program is similar to the studies above and applies similar research strategy. The evaluation is based not on general criteria but on contents that apply to the specific situation as described in the law and directives. The study uses criteria that were generated from the specifics of the Israeli EIA/EIS model to evaluate performance, etc. It does not question the requirements and decisions but evaluates the degree of their implementation.

Five sources were used to assess the 16 cases: legal requirements and procedures specified in the **directives**, specific **EIS guidelines** prepared in each case, text of **EIS reports**, documents from the **files** of the review process, and content of **interviews**. Level of performance or implementation of the various aspects of the policy was measured by the gap between what was specified in the directives and individual guidelines and in the actual implementation of the five groups of aspects required in directive 4. Data on level of implementation were collected from the guidelines, reports, and files (Mosseri 1993). The study provides three separate types of results on each stage of policy evaluation process (figure 2): compliance with legal basis (table 1), **EIS** implementation (table 2), and **EIS** effectiveness (table 3).

Method of analysis of compliance

The first stage of analysis included a content analysis of each set of guidelines organized for each of the five groups of aspects. The data were processed to show the number of guidelines in which assessment of the aspects was required (see values in the first column on the left in table 1). The values summarize all guidelines and constitute a quantitative description of the guidelines content.

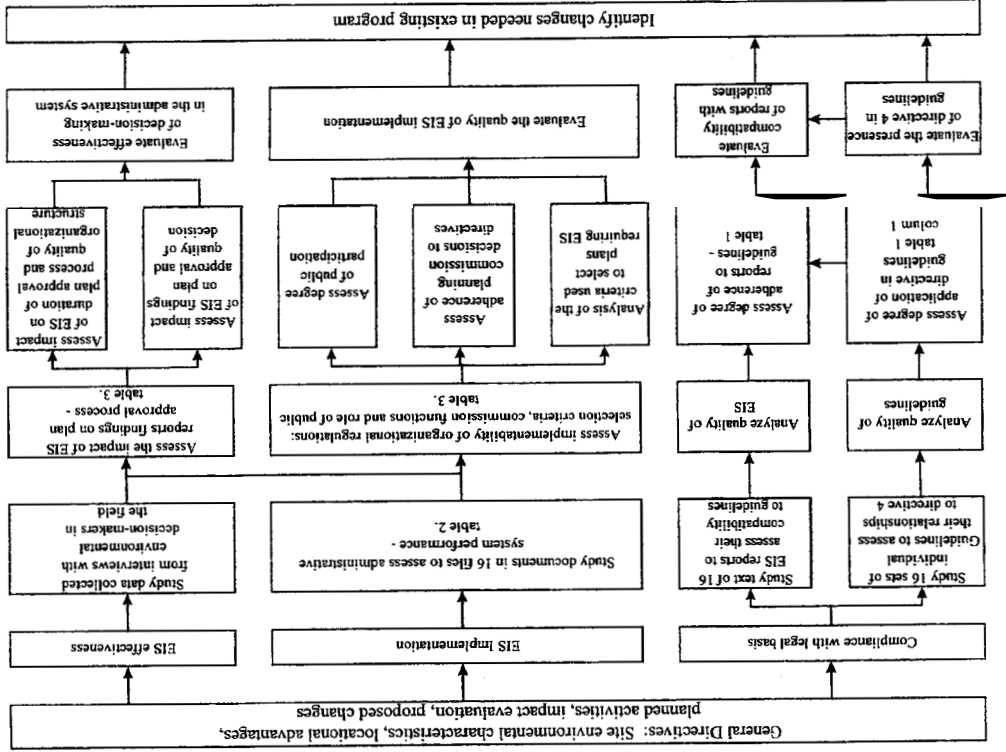


Figure 2. Evaluation Process of EIS Program

Table 1. Environmental Guidelines and their Compatibility with EIS Reports

Aspects by five directives	Number of guidelines that include the aspect ¹	Reports compatibility with guidelines					
		A ²	B	C	D	E	NA
1. Description of Environment (n=15)							
- Climatology	10		3	5	2	2	3
- Air quality	7(13) ³		2	4	1	1	8
- Hydrology	8 (12)	1	3	3	1	3	4
- Soils and geology	9 (4)		2	6	1		6
- Topography	3		1	2		1	11
- Vegetation	6 (6)		3	3		1	8
- Wildlife	5 (8)		2	3			10
- Landscape values	6 (15)	2	2	2		6	3
- Archeology	3 (1)	2		1		1	11
- Noise	7 (9)	1		5	1	4	4
- Land use	13 (12)		3	9	1	2	-
Total	77 (80)	6	21	43	7	21	
2. Location factors (n=15)							
- Non-environmental factors	3	2		1		5	7
- Environmental factors	2	1		1		4	9
- Alternative locations	5	1		4		1	9
- No change alternative	1			1			14
Total	11	4		7		10	
3. Description of proposed activity (n=16)							
- Site planning of activities	12	2		10		1	3
- Infrastructure development	10	5		5			6
- Use of equipments	6	2		4			10
- Construction stages	13	3		10			3
- Landscape reclamation	14	7		7			2
- Drainage solutions	10	5		5			6
- Sewage treatment	7	2		5			9
- Road and parking layout	8	2		6		1	7
- Proposed traffic load	12	4		8			4
Total	92	32		60		2	
4. Environmental impacts							
Rating levels (n=16)							
- negative / positive	3	3				3	10
- short / long	3	2		1		1	9
- direct / secondary	3	3					13
Total	9	8		1		4	

Air pollution impact (n=13)							
- Specify type of pollutant	9		4	2	3	4	
- Use of pollution standards	3		1	1	1	7	3
- Specify measurement method	7	1		6		3	3
- Comparison to base line levels	11	10		1		2	2
- Method of impact calculation	7			7		3	3
- Specify preventative measures	11	5		6		2	
- Specify accident, spec. conditions	5			5		6	2
Total	53	16	5	28	4	27	
Noise impact (n=12)							
- Pollution standards						9	3
- Pollution method and equipment	2	1		1		7	3
- Measurement units	7	2		4	1	5	10
- Calculation method	3			3		7	2
- Comparison to standards	2	1		1		1	9
- Evaluation method	3		1		2	6	3
- Preventative measures	10	2		8		1	1
Total	27	6	1	17	3	36	
Visual impact (n=15)							
- Identification method	10	6		3	1	1	5
- Evaluation method	1			1		5	14
- Preventative measures	13	5		8			2
Total	24	11		12	1	7	
5. Changes in plan instructions (n=16)							
- Operation and construction stages	5	1		4		1	5
- Earthworks	2	1		1		1	13
- Visual aspects	8	1	2	5		8	
- Operations instructions	7		2	5		6	3
- Building permit conditions	5			5			11
- Monitoring	5			5			11
Total	32	3	4	25		16	

¹Values in this column show the number of guidelines in which assessment of the aspect was demanded.

²Letters A-E indicate types of compatibility between what was demanded in guidelines and what was implemented in the EIS report. Values in the five columns show the distribution of reports in the sample for each aspect as follows: A-aspects demanded in guidelines but missing in report. B-aspect is less detailed in the report than demanded in guidelines. C-aspects detailed in reports as demanded in guidelines. D-aspect is more detailed in report than demanded in guidelines. E-aspect is included in the report but not demanded in guidelines. NA-aspect not demanded in the guidelines and not mentioned in report.

³Numbers in parentheses relate to the fourth directive - assessment of environmental impact. They show the number of guidelines in which impact on resource assessment was demanded.

The n values in table 1 indicate the number of sets of guidelines that were used out of the total 16. This is a benchmark to show the maximum values that could have been achieved in guidelines and reports for a group of aspects. Differences in the n values among groups are due to the variety in type of information provided in the guidelines. (Some of the guidelines were only marginally concerned with a particular aspect.) Values on aspects were used as a general indication of level of compliance of guidelines with the five groups of aspects specified in directive 4. Higher values (up to maximum n value for the groups) indicate that guidelines included a greater number of aspects of this group; that is, the values in table 1 show wide differences in the general level of compliance of guidelines between groups (2) and (3). The number of aspects in guidelines related to the location factor (2) is much smaller than number related to group (3)—description of proposed activity.

The results of the analysis in the first stage was used in the next stage to assess the compliance of reports with demands made in guidelines.

The second stage of compliance analysis describes and summarizes the data collected from content analysis of the 16 EIS reports in the sample. Assessments of compliance were intended to identify two results: the degree to which demands that were specified in the guidelines were assessed in the report and the degree to which the content of reports is generated from the guidelines. Degree of compliance is described in five levels, A through E. Level C represents items that are fully compatible with guideline requirements in aspect. Levels A and B describe items required in the guidelines whose consideration in the report was missing (A) or less complete (B). Levels D and E represent items that were more detailed in the reports than required (D) and items not required in the guidelines (E). Total values show the distribution by level for each group of aspects. Values in the table describe distribution of the sample for each aspect. Values in the NA column concern aspects that were not required in the guidelines and are not mentioned in reports.

Analysis of compliance of reports with guidelines and vice versa was assessed in three steps: comparison of values in the guidelines column with values in column A; with values in columns B, C, and D; and with values in column E. Results of first step show level of noncompliance with guidelines. The second step shows the degree of full compliance (C) and extent of its completion (B, D). The third step shows the aspects that were not demanded but were added during the assessment.

Analysis of values in the NA column shows the degree of relevance of the aspect to the guidelines and assessment. A highest value would equal the n value for the group of aspects. Comparison of NA value with the guidelines values and with total of values in **A-D** columns shows levels of demand and use of the aspect in the guidelines and assessment respectively. The higher the value in E, the less is the use of this aspect in the guidelines.

Method of analysis of EIS implementation

A second part of the assessment of reports included evaluation of quality of reporting. The purpose was to assess the degree of compliance of reports with guidelines regarding the use of data sources and to evaluate the quality of report organization, documentation, and data.

Table 2 summarizes the data for the 16 reports with respect to three types of parameters. The first part presents the degree of compliance in regard to use of data sources and their level of completeness. The 16 reports are classified according to the same five A-E levels as used in table 1. The second part of table 2 summarizes results on presence of prescribed formats and the degree of inclusion of documents in the reports. The third part of the table assesses quality of data and text. Data quality is ranked into three levels. Parameters were generated from specific or implied demands in the guidelines or were based on the experience of the researchers with evaluation of **EIS** reports in Israel.

Method of analysis of EIS effectiveness

The third table describes results of the assessment of decisions made by various administrative units during the implementation process with respect to process-specific instructions stated in the directives. Analyses of the values show the degree of impact of the reports on final approval of the plan. The second part of table 3 deals with directive 6b. The data show distribution of reports in the sample according to the length of time in number of months that took to complete the various stages in the **EIS** procedures.

The data in the table are based on content analysis of documents in plans files that were prepared by the respective planning commissions and on interviews with their staff. In each case the file includes the commission's decisions and the date they were taken. Analysis of the decisions indicates the degree to which commissions approved selected stages required in the directives and their outcome. Comparison of the data in table 3 with the

length of time stipulated for the stages in the directives enabled assessment of quality of implementation.

Table 2. Quality of Reports

1	Compliance of reports with guidelines on the uses of data sources ¹	A	B	C	D	E	F
		3	4	4	-	5	3
2	Format of reports and documents	Yes			No		
	Do reports include list of sources	6			10		
	Were data sources used in the text	13			3		
	Data was presented in order demanded	12			4		
	Were text of guidelines included in reports	13			3		
3	Quality of data and text	Good		Fair		Poor	
	Quality of data in report ²	3		6		5	
	Relevance of data to issues	7		5		4	
	Quality of data organization	5		8		3	
	Quality of text	11		4		1	

1 Letters A-E indicate types of compatibility between what was demanded in guidelines and what was implemented in the EIS report. Values in the five columns show the distribution of 16 reports in the sample for each aspect as follow: A - aspects demanded in guidelines but missing in report. B - aspect is less detailed in the report than demanded in guidelines. C - aspects detailed in reports as demanded in guidelines. D - aspect is more detailed in report than demanded in guidelines. E - aspect is included in the report but not demanded in guidelines. NA - aspect not demanded in the guidelines and not mentioned in report

2 Two reports were not assessed for this aspect

Table 3. EIS Implementation and Effectiveness

Stages			no. of reports by month		
	yes	no	short	med	long
Basis for plan selection (n=14)¹					
- Use of criteria in special cases	2 ²	3			
- Request for guidelines	14				
- Environmental adviser guided entrepreneur	14				
Basis for plan approval (n=12)					
- Review required changes in plan	11	1			
- Plan approval related to EIS findings	7	4			
- Plan approval related to MOE review	7	4			
Public participation (n=13)					
- Report submitted before plan deposition	9	4			
Impact of report on approval (n=12)³					
- Report findings influenced approval	7	2			
Number of months to implement stage (n=14)					
- From plan submission to request of an EIS			4 ²		3
			1-2 ⁴		9-13
- Preparation of guidelines			7	4	1
			1	2	3
- Preparation of reports			6	2	6
			<6	6-12	12<
- Ministry of Environment review			<8		6
			<3		3<
- From request for EIS to completion of environmental review			3	1	10
			<3	6-12	12-24
- From deposition of plan to its approval			7	4	3
			8-9	48-60	77-103

¹ Data were not available for missing cases.

² Number of reports.

³ Impact of 3 reports could not be completely verified.

⁴ Number of months.

Research sample

Since the main objective of the research was to evaluate the implementation of Israel's EIA policy at large, we chose a heterogeneous sample that is representative of the cases that were completed by 1991. This choice was in line with the nature of the directives; they were not tailored to differentiate between the subject matter of the case but set similar general requirements to all cases. Greater specialization in the implementation of EIA policy began in 1992 when an attempt was made by the MOE to develop guidelines for types of projects (State of Israel 1992).

The sample in this study included 16 cases, about half of the EIS reports that were completed by 1991. Up to then the program had begun assessment of 177 plans. The majority of evaluations were not yet completed, had stopped, or were not prepared according to the required procedures adopted in 1982. The 16 cases, selected from 33 completed studies, represented various types of projects, came from various administrative and geographic regions, and were completed between 1987 and 1991. This period represented the most developed state of the program at that time. The sample included plans for open pit excavation sites, highways and interchanges, power generation and transformation plants, solid waste burial sites, an industrial park, a shopping mall, and a water-related recreation project.

Finally, the study of environmental impacts as required in directive 4.4 was divided into three subtypes. As indicated in table 1, the first subtype pertains to demand in guidelines for assessment of impact on various resources; the second to the use of rating levels in the assessment of impacts; and the third to demands in guidelines and actual assessment of technical aspects in the assessment of selected impacts on three selected resources.

Results on environmental impact on resources are presented in table 1 in parentheses in the first column and under group 4 of aspects. These values show use of directive 4 in the guidelines and reports. The first group of values (in parenthesis) is limited to analysis of use of directive in guideline only for the group. Analysis of reports of compliance with guidelines for all resources is not included in this study. For the second stage, we chose to present results for only three resources but in more detail. These represent different aspects on air, noise, **and** impact on visual quality. The three are often considered important parts of EIA in Israel, and were deemed as such in the evaluation Israel's EIS system.

RESULTS

Results are presented for each of the three stages of the program evaluation process: compliance with legal basis, **EIS** implementation, and effectiveness.

Compliance with Legal Basis

Guidelines

The objective of this stage is to present the results of the assessment of the degree to which **EIS** preparation guidelines follow the **EIS** directives. The results are present in sections 1–5 in table 1.

1. Description of environment. The site characteristics that were demanded most were climatic, soil, water, and land use characteristics of the site, while demands for other subjects were minimal (see section 1).

These findings show that guidelines did not relate directly to specific sites or proposed project characteristics but were based on a format that was applied equally on different projects, indicating that the elaboration of guidelines is standardized and not the whim of the local environmental adviser.

2. Locational factors. Directive 4.2 requires the **EIS** to include detailed explanation of the reasons for the preferred location and of the activity resulting from its implementations. The directive is worded in a general way and does not specify the need to study alternatives. We chose to analyze two groups of aspects (see section 2): (1) the nature of the aspect that decided the preference for the location, and (2) whether the plan and **EIS** studied alternative locations and whether they use a “no-change” alternative. The results show that the majority of guidelines did not require the specification of reasons for location and only one-third of the sample guidelines required assessment of alternatives.

The first findings could imply that decision makers were not expected to seriously challenge the propriety of the design of the proposed project at the **EIA** stage and, therefore, did not require the assessor to justify the plan on general or environmental grounds. The latter two indicate the limited power of assessors and the decision-makers to deal with locations different from the one proposed in the original plan. The minimal requirement for the evaluation of the no-change alternative is another indication that in most guidelines, the need for the project as proposed in the location is not negotiable at this late planning stage.

3. Description of proposed activity. The project description was often included in the guidelines (see section 3), particularly aspects such as landscape reclamation or specification of construction stages of development activities that affect most types of development. The relatively wide use of directive 4.3 in the guidelines could be attributed to the availability in plans of well-specified information on proposed activity and operations which are usually needed for plan implementation.

4. Environmental impacts. Results on impacts are described in table 1 in sections 1 and 4 in three parts. Values on demands in guidelines for assessment of impacts on the various resources are presented in parentheses in the guideline column in section 1. Values from the guidelines show differences in demand between implementation of directives 1 and 4, that is, between the demand in guidelines for a description of site resources and a demand for assessment of the impact on them. The latter was demanded more often than the former. The most-demanded items were for assessment of impact on visual resources, water and air quality, and land use.

Such differences in demand for two parts of the directive could be explained by the lack of acceptable format to which Israeli environmental advisers could adhere to or to the lack of general and commonly acceptable interpretation of directives when writing the guidelines.

Demand in the guidelines for classification of types of impacts was minimal (see section 4). Frequency of demands in the three types (negative-positive, short-long, direct-indirect) were three out of 16. None of the guidelines required the identification of the substitutability or reversibility of impacts.

The low level of demand could be the result of the general lack of environmental data. Demand for intensive evaluation that differentiates between several levels of impact would generally require a highly developed database, which is not always available for the completion of an **EIA** in Israel. It could be that advisers who are required to provide the data, or assist the entrepreneur to secure the data, limit their demands to the level of analysis that could be generated from existing data .

The third group of **EIA** included values that deal with technical aspects of the evaluation of air and noise pollution and visual impacts (section 4). In the case of air pollution, analysis of the frequency of demands for all cases shows that the majority of guidelines required specification of pollutant

types, comparison *to* an existing baseline condition, and identification of preventative measures. There also was demand in half of the cases for specification of measurement and calculation methods and only in a few cases were assessors required to use existing standards or to evaluate the potential impact of special conditions and accidents.

Lack of consideration of certain technical aspects and of their uneven application among similar types of cases might be due to the general language of the directives, which permits wide interpretation. Since each guideline in the sample was prepared individually and not always by the same experts, their preparation was not always guided by previously agreed-upon uniform standards, methods and project-specific requirements.

There was demand in the guidelines for noise evaluation in all of 12 cases that were considered relevant to the subject (C). **For** most other technical aspects, the demand occurred in less than 20 percent of the cases, although it was higher for specification of measurement units and prevention measures. Concern with visual impact was relatively high. In most case studies, assessors were requested to specify impact prevention measures (**13** out of 15), but only one set of guidelines specified the method that was used in the evaluation of visual impact.

In practice, final evaluation by the **MOE** of reports goes beyond the guidelines. The **EIS** preparation process has “a life of its own” and often generates more additional assessments than required. These values were noted in column E. **MOE’s** final **EIS** review is usually based on the content of the report, evaluating both the aspects demanded in the guidelines and those added by the report writers.

5. Changes in plan instructions. The fifth group of aspects is concerned with changes and additions to the original plan that could be considered by the assessors at the end of the assessment. All **16** sets of guidelines permitted the inclusion in the final **EIS** of changes or additions **to** the plans’ original instructions. Half or less **of** the cases specified the need to include an individual aspect. There also was a lack of consistency in demand among different aspects, such as for monitoring, building permits, and construction stages. The inclusion in the plan of instructions on visual resources and on facility operation was demanded the most.

Environmental Impact Statement

The objectives of this part of the study are to present the results on the level of compatibility between the contents of the guidelines and the actual content of the reports. It compares the presence and level of consideration of selected aspects in the reports with those in the guidelines.

The first part, *Compliance with guidelines*, contains analysis of results related to the five parts of directive 4 detailed in table I. The assessment in this **part** included identification of the degree to which demands specified in the guidelines were considered in the reports and of the absence of aspects in guidelines on the final content of the report. The second part, *Quality of reports*, includes data documented in table 2. It analyses the use and quality of data in reports and the form of its presentation.

Compliance with guidelines

Description of environment. Totals from 15 reports for compliance with directives on aspects that dealt with description of environment indicate that less than 8 percent of the aspects demanded in guidelines were not assessed in the report (6 of 77). More than 92 percent were in compliance, of which 56 percent in full compliance (C=43). Nearly a quarter (23 percent) of the aspects in the reports were not demanded in the guidelines (E=21 of 92). Compliance by aspect was highest for demand of assessment of soils and wildlife. Landscape values and noise were added the most during the assessment. Only one-third of guidelines and reports included aspects concerning topography, wildlife, and archeology (see NA column).

The data show a very high level of compliance with what was demanded in the directive 4 guidelines, although there was variation in the intensity of assessment. Also, reports included more data on aspects than was originally demanded in guidelines. In this directive, assessment process generated more information.

Locational factors. Analysis of compliance with directive 4.2 shows that more than one-third of the demands in guidelines were not included in reports (4 of 11). Two-thirds were in full compliance. However, reports included more locational aspects that were generated during the assessment than those demanded and included in guidelines (10 vs. 7). Even though reports were intended to evaluate environmental impacts of locations, only five of 15 dealt with it. Finally, consideration of alternative locations or zero

alternative were reported as demanded in a third of the reports, even though plans are not required by law to include either.

Proposed activity. Analysis of compliance with directive 4.3 shows that only two-thirds of aspects demanded were included in the report ($C=60$ of 92). Only two reports included aspects not demanded. Highest compliance levels concerned with aspects that dealt with site planning and with construction staging issues. Aspects that were particularly lacking were those describing the infrastructure, landscape reclamation, and drainage solutions. The data imply that the reports did not provide complete information on the proposed activity that was being assessed.

Assessment of environmental impacts. Analysis of compliance with directive 4 was concerned with the use of rating levels and the use of technical aspects in the assessment of selected impacts on three resources—air, noise, and visual resources. Most demands for the use of rating levels were not included in the report ($A=8$ of 9). Four out of five aspects used in reports were not demanded in guidelines. The data show that the use of guidelines was minimal. Because of the small number of observations and the low level of compliance, it was impossible to explain fully the reasons for the low levels. One factor could be the lack of detailed requirements in the directives or guidelines of the need to fully specify impact levels or the assessor's decision not to provide a clear assessment when the findings showed negative impact.

Air pollution impact. Analysis of compliance with guidelines in the use of various technical aspects used in the assessment of air pollution impact shows that 30 percent of the aspects demanded were not included in reports ($A=16$ of 53). Also, 42 percent of aspects in the reports were not demanded in the guidelines. Least compliance was found in demand for use of baseline levels (1 of 11). Highest compliance was found in demand for specification of measurement and type of calculation methods and of specification of special accident conditions. About half of demands for specification of air pollution prevention methods were not included in the reports. These findings led us to conclude that guidelines regarding air pollution impact had only a partial effect on the content of reports. A considerable part of the findings was generated independently of the guidelines. Two important subjects—the use of standards and consideration of probable impacts of accidents—were included in the report more times by the assessors than the number of times demanded. These findings indicate that the influence of guidelines on the

final content of the reports was minimal. When preparing the reports, assessors were more demanding in most aspects than requested in the guidelines.

Noise impact. Analysis of compliance with guidelines in the use of various technical aspects used in the assessment of noise pollution impacts show that about a third of aspects demanded were not used in reports (A = 6 of 21). Most aspects in the reports were generated by the assessors. Of the 57 aspects found in reports, 37 originated from the assessors rather than from the guidelines. None of the guidelines demanded the use of noise standards.

Visual impacts. Analysis of compliance with guidelines in the use of various technical aspects applied in the assessment of visual impacts show that 46 percent of aspects demanded were not used in the reports. Just over a third (35 percent) of aspects used in the assessment were generated by assessors (7 of 20). Reports included more evaluation methods than were demanded in guidelines (5 vs. 1). Level of use of visual identification and evaluation methods was minimal. Reports mostly included methods not specified in guidelines. On the other hand, visual impact preventative measures were requested in most guidelines and were included in 80 percent of the reports.

Comparison of the findings on the three subjects shows that air pollution and noise were studied in more detail than visual impact. These results might indicate the difficulty of dealing with aspects requiring subjective evaluation and the lack of sufficient knowledge on the use of visual analysis methods among assessors.

Changes in plan instructions. The findings in the fifth group of aspects show a high level (90 percent) of compliance with guidelines (B, C = 29 of 32). More than half (55 percent) of the aspects included in the reports were generated by the assessors (16 of 29). The latter also added almost as many legal instructions to the plan as the number demanded in the guidelines in aspects related to visual resources and operation of instructions. The findings indicate a lower influence of guidelines in determining the content of the assessment and the resulting report.

Quality of reports

The data on quality of reports are summarized in table 2. Three types of findings are presented in three parts of the table:

The first part classifies levels of compliance of reports with guidelines on the uses of data sources. Three reports of 16 did not specify any data sources, even though this was demanded in guidelines. Thirteen reports included data sources, of which five were not required. The data on this aspect show that half of the reports comply with the guidelines.

The second part shows level of reporting on data sources. One-third of the reports included list of sources and more than two-thirds of the reports mentioned sources in the text; data were presented in the order demanded in guidelines and included the text of the guidelines as part of the report.

The third part rates the quality of data and text. General quality of data in the reports was rated fair to poor. Level of data relevance in most reports was rated from good to fair. Quality of organization of data was good to fair. The quality of the text was good.

These results show that assessors gave low priority to preparation of sources list but in most cases substantiated the findings. Generally data in the reports were well-organized and reports included a copy of the respective guidelines which shows that, in this subject, guidelines had an impact on the form of the reports. Low data quality was often the result of insufficient processing. Sometimes data were presented in raw form, explained poorly, or evaluated in a form that did not always highlight its relevance and importance.

EIS Implementation

The last stage of the study included evaluation of the performance of the administrative system that is responsible for implementation of the EIS program. Table 3 describes findings collected from documents in the respective files, the text of MOE reviews, and interviews with officials who administered the 16 cases in the sample. The data are organized in five parts. They concern the type of criteria used in plan selection and approval, the extent of public participation, the impact of **EIS** on final decisions, and the time it took to implement the various stages of environmental review.

EIS required

The files show that out of 14 cases, nine plans needed an EIS because of their subject matter according to directive 2b.1, and five plans because of their potential for causing severe environmental impacts (2b.2). In the latter group, only in two out of five cases was any explanation given for their selection. This could be the result of lack of definitions in the directives of

the term *severe environmental impact*. In all cases in which **EIS** was required, guidelines were prepared by the environmental adviser with consultation of the MOE. The adviser also guided the assessor in the field. The results from analysis show that implementation of program in these aspects was mostly complete.

Plan approval: impact of directives

This stage analyzes the degree to which decision makers made changes in the original plan and whether the final decisions were based on recommendations made in the report or on additional recommendations made by the MOE during the review of reports (directive 7). The data show that in 11 of 12 cases, decision makers made changes in the original plan because **of EIA**. In seven cases report recommendations were used as the basis for making changes; in another seven cases, **MOE** additional recommendations were the basis for the final plan approval. In three out of seven reports in the two groups, approval was based on both **EIS and MOE** recommendations.

These findings show that decision makers fulfilled the mandate that was given to them in the directives and made changes in accordance with the results of the assessments. The data show differences between the two types of agencies (DPBC or MOE) **as to** which changes to recommend. In cases where recommendations were proposed in the reports or in **MOE** review but were not adopted by decision makers, it was either because of a lack of sufficient details in the proposals or because suggestions were considered over-restrictive.

Public participation

Analysis of the data in this subject identified the degree to which decision makers, after deposition of the plan and before making the final decision, exposed the reports findings to the public or provided access for their use in plan review stage.

Data show that in nine of the 13 cases, reports were submitted before deposition, as required. Of the nine cases, four plans were submitted before enforcement of the updated version of the directive that prevented the deposition of plan or making of final decision on a plan before submission of the respective **EIS** report.

While public participation in Israel is institutionalized, it is not mandatory. The data files show that even in cases that followed the procedures in the

directives, the public rarely used the reports. This could be explained by the lack of awareness among the public of the existence of this information or a lack of access to it. Reports are not distributed to the public at large and are generally intended for official use only.

EIS Effectiveness

Quality of plan approval

The impact of report recommendations on the final decision could have taken several forms: decision makers could approve the plan when **EIS** indicated no potential negative impact or that impacts could be prevented or ameliorated; they could disapprove a plan when it projected negative impacts that could not be prevented; or they could reject a report when data were found to be not credible and ask for corrections or new assessment.

Table 3 shows that of the 12 reports in which quality of plan approval was studied, there was not one case in which findings in the reports were the cause for a plan to be rejected. In seven cases the report recommendations favored the plan; in two cases the report had no impact on the final decision either way; and in three cases it was impossible to determine the final impact of the report.

The findings indicate that in most cases the requirements for EIS did not stand in the way of development and that reports were prepared in a way that facilitated inclusion of environmental factors in physical development decision making. Basically EIS was used to address possible environmental impact and look into mitigation measures to reduce proposed impact. Neither EIA nor whole Israeli land use plan review process are expected to challenge the need for the proposed plan and project. The review process, by and large, is expected to better the plan and not challenge the need for it on environmental or other grounds.

Directive 6b sets specific limits on the length of time permitted for guideline preparation (one month) and the report review stage (three months) (see figure 1). These requirements were intended to limit delay by governments.

Table 3 shows that in most cases guidelines were completed within a month. It took six to 12 months to prepare a report and about three months to complete the MOE review. But it took one to two years from the time of request for an **EIS** to completion of environmental review; in worst cases,

it took more than three years from the request for EIS at the beginning of plan review to its final approval.

The findings show a high degree of variation in the time required to implement various stages of the EIS program. Time limits on completion stages specified in the directives were always adhered to. Environmental review stages that are part of the general plan review were not the cause for delay in making decisions. The most delaying stages that required the longest periods were the responsibility of the assessor who prepared the report and the commission that acted on findings after completion of environmental review. Environmental review by itself was not found to be a cause for delay of plan approval.

CONCLUSIONS

Quality of Organizational Structure

The EIS review system is the responsibility of the MOE, which bases its review on data and expertise of a range of environmental experts. Their input is then used in the design of guidelines, during early consultations with entrepreneurs, in the review of the reports, and in the writing of recommendations and of environmental conditions for a plan. Over the years the MOE work became the main professional reference for the DPBC, other governmental agencies, and interested citizens when they were required to make decisions on various details related to the final plan approval.

MOE's evaluation of EIS is broader than was originally stated or intended in the directive for this stage. In addition to reviewing the content of reports, it sets the quality standards for reporting and for the breadth of analysis to be used in the EIA. Over the years, MOE has raised the quality of EIS content. The impact of higher standards affected the way plans and their EIS are prepared and reported and on the degree of reliance on EIS results by the DPBC at the receiving end of the plan approval process.

Higher review standards make entrepreneurs seek information at an early stage and during the plan making process. This takes place through informal consultations with MOE on proposed projects, the selection of technologies, locations, etc. This early check of environmental acceptance helps entrepreneurs to minimize planning costs and delays and also start with project designs that have greater environmental acceptability. This consultation

pattern had positive impact on the quality of environmental planning of large-scale projects of the type mandated by directives 2b.1 and 2b.2 and on the length of their processing through the plan approval system. Further, the results developed in the MOE's EIS review, have become an important part of decision making in nonenvironmental public agencies such as the DPBC. MOE input is often the only environmental data prepared for the commission. The results also set the environmental agenda on which decisions are made by various agencies with lesser involvement in the overall plan approval process.

Achievement for Environment

This study was not intended to assess the impact of EIS system on the actual Israeli environment. The directives don't demand or specify administrative procedures to ensure implementation of plan's environmental recommendations. Neither do they provide for continuous monitoring of actual impact as part of the implementation of the results of assessment that were generated in the process. Currently there are no data on the degree of implementation of recommendations. Our study was limited to degree of implementation of the administrative process. A field study of degree of implementation of environmental recommendations of a large sample of EIS and plans in Israel is being carried out at the present.

Based on experience with developments in the field during the 1990s, we believe that the quality of EIS in Israel is getting better. MOE's activity and the resulting wider use of EIS has contributed to greater institutionalization of the requirement. Broader application and intensive development activity in the country in the 1990s has made EIS more acceptable. The use of EIS and results of the assessment and review are becoming more recognized as a public policy tool that is relied upon as a source of information to help in the mitigation of conflict between various interests. It is important to note, however, that these advances are relative and tied, to a large degree, to the general development of environmental awareness, particularly among decision makers in the public sector and specialized interest groups, although less by the public at large. The increase in demand for EIS is also the result of the fast and intensive physical and economic development trend that began in the early 1990s in Israel.

Summary of Results

The main objective of the study was to evaluate the implementation of Israel's EIS program. Implementation was measured by the degree of

compatibility of EIS preparation guidelines with EIS directives and by level of compliance of EIS reports and plan approval files with the guidelines. The last stage included also data from interviews with decision makers.

Lack of uniformity was found in the implementation of directives in the guidelines. Analysis of the data show high variation in the level of use in the guidelines of the directives. Four sets of guidelines were found to be incomplete. Differences were found in the implementation of directives, and level of implementation varied among particular aspects and among sets of guidelines intended for similar project types.

Differences in demands in guidelines were found in description of the environment, in use of evaluation methods and in demand for changes in the plans. Requests for assessment of project location and for the specification of type of impacts were often unfulfilled.

Reports did not always comply with guidelines: In general, reports did not comply fully with the directives or with respective guidelines. While the level of completeness of the guidelines might have influenced the type of aspects that were assessed in the report, we cannot point to a strong correlation between the two. Reports content often included aspects not specified in the guidelines. This was common in aspects that dealt with site analysis and with proposed changes in the plan.

Reports followed the guidelines and in most cases did not consider locational aspects. In cases where reports assessed locations they did not quantify the findings. Assessment of potential impact of visual and other landscape characteristics of the project were rarely included in the reports even though they were demanded in most guidelines.

Final plan approval was influenced largely by the result of the final environmental review of the MOE. Decision makers in most cases adopted the recommendations of environmental review by MOE. All the plans that were assessed were approved for development. In most plans decision makers required some changes in the original plan and insisted on a plan implementation follow-up program.

The public's role in the process was minimal due to limits on its access to report findings during the deposition period. This might explain why data from the reports were not used by the public when the plans were challenged

during the deposition period. Plan approval was in most cases completed within the time limits. The length of time that it took to complete the environmental review was determined largely the length of time that it took to prepare the reports and later corrections required by reviewers.

Possible Improvements of EIS System in Israel

Several suggestions for improvements arise from this study.

Nonspecific directives resulted in broad interpretation of the intentions of the law

Until recent, the law on this subject left the interpretation to decision makers who administer the program. The requirement for preparation of individual guidelines for each project was partly intended to close this gap. But because guidelines were prepared individually for each project, they did not provide a standard interpretation of the directives. Different interpretations of directives by those preparing the guidelines and by assessors might be one of the causes for the wide differences in level of compatibility of both types of documents and in the level of report completeness. To overcome such problems the MOE has developed a more generalized set of instructions and guidelines intended for selected groups of projects of similar types (State of Israel 1992).

Data availability and plan quality influenced the level of completeness of reports

In addition to the generality of the language of the directives, the low level of compliance of reports with demands in the guidelines and the partly incomplete reports can be attributed to the quality of data that was being used, the quality of the plan being assessed, and the level of professional expertise of EIS assessors.

Content analysis of the text of reports shows that in many cases findings were not substantiated with well-processed data. Often, reports presented raw and poorly analyzed data in a form that did not provide explanation of their significance to the issue assessed. Some reports described basic data without analyzing and evaluating them. Most reports did not use evaluation measures to rank alternatives or to describe the intensity and significance of potential impacts.

The preliminary level of analysis found in the reports could be attributed to limitation of available data and the limited amount of information that plan

documents are generally required to include. Until recently the planning agency, MOE, and the local adviser were often not equipped to provide sufficient environmental data. Data-deficient reports could be attributed to unavailability of detailed local data and the wide reliance on secondary data sources. This is common practice since the cost of preparation of original surveys is often beyond the economic means of the entrepreneur.

An additional possible cause of reports' incompleteness is the quality of plans. Physical plans in Israel are not required to justify the need for the project or to present and discuss alternative solutions. Consequently, environmental assessment in this program is limited to evaluation of environmental and locational merit of a single alternative plan.

Program performance could benefit from additional improvement of the public's access to reports and by provision of professional training in EA

Findings on system performance indicate that quality of program's administration satisfied the requirements set in the directives. The implementation process produced environmental evaluations that incorporated environmental aspects into the formal land use decision making.

The findings indicated the need **for** improvement in the selection of plans to be assessed, particularly the cases where the directives don't enumerate the project type (directive **2b.3**). This could be achieved through the development of a better definition of the term **severe impact**, which is used for making decisions in special case plans.

Public participation in the program, while now mandated by the **PBL** and in the recently improved **EIS** directives, is still very low. Relevant public agencies need to make a special effort to facilitate easy access to documents and reports and to encourage the dissemination of data from environmental assessment and review stages to interest groups operating outside the formal administrative structure.

The assessment period is long, often longer than it takes to prepare the plan. Much of the delay is in the time it takes the assessor to prepare the report, rather than delays by agencies that administer the program. To make the process shorter, there is a need to (1) facilitate the data acquisition process through intensive public investment in the development of environmental data banks that are accessible to the public, and (2) raise the level of training of

persons preparing EIS reports through formal EIA training courses for planning officials, professionals, and natural resource specialists.

Earlier coordination of plan making and environmental assessment

At present the formal involvement of the staff of the MOE or environmental adviser in the early stages of planning is not mandated and is not very frequent. The overall findings of the study imply the need for adoption of a process in which planning and environmental assessment are coordinated at an early stage or even mutually executed.

A policy that would formally require the start of EIA at an earlier phase in the plan-making process has recently gained initial acceptance in Israel. A new amendment to the planning and building law, section 37, was adopted in 1994. It requires, in the case of road planning, an assessment of the environmental characteristics and related potential impacts on the proposed site before the start of plan preparation (PBL 1965, 1982: section 37).

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