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Benchmarking performance: Environmental impact statements in Egypt

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ABSTRACT

Environmental impact assessment (EIA) was formally introduced in Egypt in 1994. This short paper evaluates "how well" the EIA process is working in practice in Egypt, by reviewing the quality of 45 environmental impact statements (EISs) produced between 2000 and 2007 for a variety of project types. The Lee and Colley review package was used to assess the quality of the selected EISs. About 69% of the EISs sampled were found to be of a satisfactory quality. An assessment of the performance of different elements of the EIA process indicates that descriptive tasks tend to be performed better than scientific tasks. The quality of core elements of EIA (e.g., impact prediction, significance evaluation, scoping and consideration of alternatives) appears to be particularly problematic. Variables that influence the quality of EISs are identified and a number of broad recommendations are made for improving the effectiveness of the EIA system.

1. Introduction

Environmental impact assessment (EIA) is a process by which the potential environmental impacts of a proposed development are assessed at an early stage of decision-making in order to promote sound environmental management (Glasson et al., 2005). EIA was first introduced by the US National Environmental Policy Act (NEPA) of 1969 and since then provisions for it have been implemented in more than 100 countries (Badr et al., 2004; Barker and Wood, 1999). Academics have questioned the effectiveness of EIA in both theory and practice ever since it was first introduced (Glasson et al., 2005; Heinma and Poder, 2010; Sadler, 1996). The effectiveness of an EIA system in any nation is tested by whether EIA results in improved environmental protection, better decision making and sustainable development (Glasson et al., 2005). Yet many studies concerning effectiveness have focused on the quality of environmental impact statements (EISs) as an indicator of performance of the EIA process (Cashmore et al., 2002; Glasson et al., 1997; Polonen, 2006). Such studies have examined the quality of EISs produced in different countries for various types of developments and for different environmental aspects. Although EIS review work is not an in vogue topic in the contemporary research context, it serves to provide fundamental baseline data on the performance of EIA systems and helps to pinpoint problem areas, which may be spatially or culturally dependent. Critical examination of EIA systems using tools such as EIS review techniques thus remains as important now as it was in the 1990s.

There are two categories of academic studies on EISs quality, aggregated and disaggregated. Aggregated approaches consider overall EIS quality or EIS quality for a specific project type such as landfill or roads. On the other hand, disaggregated approaches focus on the quality of assessments for individual environmental components (such as ecology or water resources) or performance with respect to certain tasks such as the consideration of alternatives or provision for monitoring. Some researchers have employed both aggregated and disaggregated approaches. Typically, these studies have shown that EIS quality is improving over time, albeit from a very low starting point (Badr et al., 2004; Lee et al., 1999; Lee and Colley, 1992; Sadler, 1996), but they reveal significant problems with the quality of particular aspects of EIA (Glasson et al., 2005).

Few studies have been published on EIA effectiveness within the Middle East and North Africa (MENA) region (El Fadl and El Fadel, 2004). Moreover, no previous published study for MENA countries has included a sample of EISs from Egypt. Detailed research on the quality of EISs is needed to provide an indicator of the performance of the Egyptian EIA system.

This purposefully succinct paper thus examines the performance of the Egyptian EIA system through an analysis of the quality of EISs. The article commences with a short introduction to EIA in Egypt[1] and a description of the research methodology. The results of a review of 45 EISs produced between 2000 and 2007 in Egypt are then presented and discussed. The paper concludes with a number of recommendations for strengthening EIA practices in Egypt.

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[1] For a thorough discussion of administrative and legal provisions for EIA in Egypt, the reader is referred to Badr (2009).

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2. An introduction to the legal framework for EIA in Egypt

An EIA system was first established in Egypt through Environmental Protection Law No. 4 of 1994 and its Executive Regulations, which came into force in February 1995 through Prime Minister Decree 338 (ARE, 2009). Articles 19 through 23, 34, 70, 71 and 73 of this law provide for an EIA system. Amendments were made to the Environmental Protection Law and its Executive Regulations through Prime Minister Decree 1741 of 2005 and Law No. 9 of 2009 to ensure greater protection of the environment. The amendments made in 2009 include, for instance, provisions for the establishment of a high-level committee for accreditation of experts and expertise in the field of environmental consultancy.

The Egyptian Environmental Affairs Agency (EEAA) was established in 1982 within the Ministry of the Environment, as the main competent administrative authority responsible for the protection and management of the environment. The EIA Central Department was established within the EEAA in 1994 as the department responsible for supervising project screening, reviewing EISs, and for making decisions on their acceptability (EEAA, 1996). Hence, for certain projects the developer must submit an EIS to the EEAA prior to commencing their project. The EIA Central Department will then review the EIS and issue a decision on its acceptability within 30 days (ARE, 1995).

In Egypt, screening involves the use of lists, thresholds and criteria. The main criteria used to assess the potential for significant environmental impacts include the nature of the project, the extent of natural resources exploitation, the proposed location for the project and type of energy used (EEAA, 2009). On this basis, projects are divided into three categories according to severity of their probable environmental impacts (EEAA, 2009):

1. Category A: projects that typically cause only minor environmental impacts such as ice cream manufacturing and Photoshop. This category of projects requires submission of a completed 'Environmental Screening Form A' in which the developer provides basic data about the project.
2. Category B: projects which may have substantial environmental impacts such as dairy products manufacturing and hotels. The developer is required to provide a preliminarily assessment using 'Environmental Screening Form B' which should provide basic data on the project, relevant aspects of the environmental baseline, possible environmental impacts and proposed mitigation measures.
3. Category C: projects which, due their nature, always have the potential for significant environmental impacts and require the completion of an EIA study, which should identify and assess all potential environmental impacts and define the measures required to mitigate those impacts. Examples of developments covered in this category include cement factories, fertilizer production, power plants, wastewater treatment plants, and residential developments.

Moreover, land reclamation of 400–2000 feddans (1 feddan equals 4200 m^2) is classified as a category B project, whereas reclamation of 100–400 feddans is classified as a category A project and reclamation of more than 2000 feddans is classified as a category C project. In addition, the EIA guideline lists projects that are not subject to EIA requirements but which should comply with environmental conditions and standards. This research focuses on the projects which undergo a full EIA (that is, category C projects) so that the results can be compared meaningfully with international studies on EIS quality.

3. Methodology

Reviewing the quality of documentation contained in EISs is used in this study as a good, albeit imperfect, indicator of the performance of the Egyptian EIA process in practice. The quality of the selected EISs was assessed using the amended version of the Lee and Colley Environmental Statement Review Package (Lee et al., 1999). Although the Review Package was designed for use in the UK, with primarily a best practice focus it has been successfully employed in studies conducted in a number of other European countries and worldwide (Barker and Wood, 1999; Glasson et al., 2005). The Review Package was used with only minor changes being made to accommodate the characteristics of the Egyptian EIA system, in order that the results could be compared with research undertaken elsewhere. The changes included the addition of a new review category (1.6, related environmental legislation and standards) and a review sub-category (3.3.3, outline of environmental management plan).

The review process involves assigning assessment grades, from A to F, according to quality (see Table 1), to various elements of an EIS, according to hierarchically structured review criteria. The Lee and Colley Review Package is comprised of four review areas, each area contains several categories, and each category contains several subcategories (Appendix 1). The main four review areas are:

1. Description of the development, the local environment, and the baseline conditions;
2. Identification and evaluation of key impacts;
3. Alternatives and mitigation; and,
4. Communication of results.

Fig. 1 shows that the number of Category C EISs submitted annually to the EEAA has varied between 131 and 267 since 1998. Forty-five EISs produced for Category C projects between 2000 and 2007 were selected for analysis in this research. EISs for category C projects were chosen for the current study because they are the projects which require a full EIA and hence broadly analogous to EISs produced in other countries. Those EISs produced prior to 2000 were excluded from the study due to their limited availability within the EEAA archive, while at the time that the research was undertaken EISs produced post-2007 were not available. Given that 1440 EISs were submitted to the EEAA between 2000 and 2007, the population sampled constitutes 3.12% of EISs prepared for Category C projects. Each EIS was reviewed independently by two researchers, who subsequently agreed a consensus mark for the individual EISs.

While the EEAA receives all of the EISs produced in Egypt, their collection is, in practice, incomplete and poorly catalogued. The research concentrated, therefore, on a number of specific categories for which EISs could be obtained, namely: industrial projects, energy, infrastructure, tourism, agriculture, and landfill. The initial research objective was to review a randomly selected representative sample of EISs produced every year for each development category during the period 2000–2007. However, the sample for certain development categories (landfill and agriculture) was constrained by the availability of EISs. Thus, the study sample comprised: 10 EISs for industrial projects, 10 EISs for energy projects, 10 EISs for tourism projects, 8 EISs for infrastructure, 4 EISs for landfill and 3 EISs for agricultural developments. The ratios by project types for all EISs produced in 2007, as an example, were as follow: 41%, 25%, 16%, 12% and 6% for tourism, industry, energy, infrastructure and other (agriculture and landfill), respectively. Data were also collected on such factors as the date of EIS publication, EIS length, language used, and the experience of consultant in undertaking EIAs.

Table 1
Assessment symbols (Source: Lee et al., 1999).

A	Relevant tasks well performed, no important tasks left incomplete.
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory despite omissions and/or inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, important task(s) poorly done or not attempted.
F	Very unsatisfactory, important task(s) poorly done or not attempted.
NA	Not applicable. The Review Topic is not applicable or is irrelevant in the context of the statement.

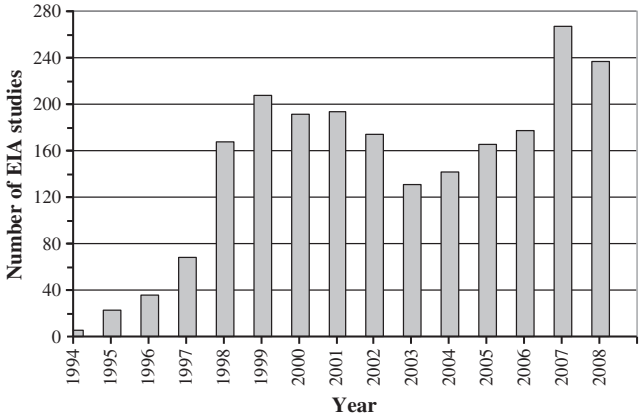

Fig. 1. Number of EIA studies for category C projects received at the EEAA annually (Source: Badr, 2009).

4. Results

4.1. Overall trends in EIS quality

The overall proportion of EISs that were graded as satisfactory (i.e. those receiving an overall score of A, B or C) and unsatisfactory (i.e. those receiving an overall score of D, E or F) is summarised in Table 2. A further distinction is made between EISs classified as good (a score of A or B), borderline (a score of C or D) and poor (a score of E or F). The results show that 69% (31) of the EISs sampled were of a satisfactory quality. Furthermore, 35.5% (16) of the EISs within the sample were assessed as good and 4.5% (2) as poor. Only three EISs were assigned a grade A overall.

A more detailed analysis of the strengths and weaknesses of EIS quality in Egypt was undertaken by analysing the performance of different elements of the review hierarchy; that is *review areas*, *review categories* and *review sub-categories*. The results of the analysis, for the most part, are now discussed collectively under the headings of the four main review areas.

4.2. Results by review area

4.2.1. Description of the development, the local environment and baseline conditions

The best performed assessment tasks were located in review area one, with 93% (42) of EISs sampled assessed as satisfactory and a greater proportion of EISs graded as good (53%, 24) than for any other review area (Table 3). This is in agreement with the findings of previous EISs quality reviews (Barker and Wood, 1999; Cashmore et al., 2002). Particular problem areas related to providing information on the estimated duration of the different project phases, the number of workers entering the site, methods used for quantifying waste generation, and the inclusion of appropriate baseline data. The relatively straightforward tasks (such as those for review category 1.1 "description of the development", which include describing the purpose, objective, design, and other characteristics of the development) tended to be performed best. Previous research has also found that such descriptive tasks tend to be of highest quality, whereas the performance of tasks that require quantitative data is more problematic (Lee et al., 1999). The wastes generated by a development (review category 1.3 "wastes"), a task that usually require quantitative data, was the worst performed review category, with 31% (14) of EISs assessed as unsatisfactory. The more resource intensive tasks also tended to be less adequately performed: for example, the description of baseline conditions was assessed as good in only 40% (18) of cases.

Table 2
Overall quality of EISs.

Overall assessment	Percentage of sample (number (out of 45))
Satisfactory (A, B or C)	69% (31)
Unsatisfactory (D, E or F)	31% (14)
Good (A or B)	35.5% (16)
Borderline (C or D)	60% (27)
Poor (E or F)	4.5% (2)

Table 3
Variations in EIS quality within Review Area 1.

Overall assessment	Review Area 1	Review category					
		1.1	1.2	1.3	1.4	1.5	1.6
% Satisfactory	93	100	91	69	93	84	93
% Unsatisfactory	7	0	9	31	7	16	7
% Good	53	89	55.5	18	62	40	49
% Borderline	47	11	44.5	80	38	55.5	49
% Poor	0	0	0	2	0	4.5	2

4.2.2. Identification and evaluation of the key impacts

This was the least well performed review area, with only 40% (18) of EISs assessed as satisfactory and 22% (10) assessed as poor (Table 4). Common deficiencies observed in this area included: failure to quantify impact characteristics, inadequate explanation of methods used to predict and evaluate impacts, and failure to identify the methods used in scoping or explain which issues had been scoped out of the study. This is significant because these tasks are considered as the heart of the impact assessment process (Lee et al., 1999). One of the principal weaknesses identified for this review area was the prediction of impact magnitude (review category 2.4), with 69% (31) of EISs within the sample assessed as poor and only 15.5% (7) assessed as good. Public consultation practices in the EIA process also appear to be problematic as more than half of the EISs sampled (53%) were unsatisfactory in quality. Indeed, public consultation has often been ignored in practice as it is not a mandatory requirement of the legislation, although the EEAA has recently started to ask developers to conduct public consultation prior to the submission of an EIS. Performance in review area two was thus poor overall as it includes what proved to be the most problematic tasks, namely impact prediction, significance evaluation, scoping and public involvement.

4.2.3. Alternatives and mitigation

Regarding the alternatives and mitigation review area, 71% (32) of the EISs sampled were assessed as satisfactory, with 31% (14) assessed as good (Table 5). Nevertheless, nearly two thirds of the EISs sampled (64.5%, 29) were assessed as borderline and there is, therefore, considerable scope for improvement. Consideration of alternatives (review category 3.1) was the worst performed review category, with more than half of the EISs sampled (58%, 25) assessed as unsatisfactory. This is a well recognised problem internationally, and is generally thought to be a function of the EIA process usually being undertaken at a late stage in the project design cycle, when many of the principal characteristics of the development action have

Table 4
Variations in EIS quality within Review Area 2.

Overall assessment	Review Area 2	Review category				
		2.1	2.2	2.3	2.4	2.5
% Satisfactory	40	87	42	47	29	40
% Unsatisfactory	60	13	58	53	71	60
% Good	24.5	55.5	31	27	15.5	20
% Borderline	53.5	40	33.5	38	15.5	62
% Poor	22	4.5	35.5	35	69	18

Table 5
Variations in EIS quality within Review Area 3.

Overall assessment	Review Area 3	Review category		
		3.1	3.2	3.3
% Satisfactory	71	44	93	71
% Unsatisfactory	29	56	7	29
% Good	31	24	47	35
% Borderline	64.5	58	51	58
% Poor	4.5	18	2	7

been decided (Glasson et al., 2005). Provisions for monitoring (review sub-category 3.3.2) were assessed as satisfactory in 69% (31) of cases.

4.2.4. Communication of results

This was one of the better performed review areas, with 76% (34) of EISs graded as satisfactory (Table 6). Numerous previous quality review studies have found that tasks related to the general structure, layout and presentation of an EIS (i.e. those tasks assessed by review categories 4.1 and 4.2) tend to be performed well (Barker and Wood, 1999; Lee et al., 1999). This was also found to be the case in Egypt. Conversely, inclusion of an adequate and satisfactory non-technical summary (review category 4.4) was not as well performed, with less than two thirds (64%, 29) of the EISs sampled assessed as satisfactory. This is a significant failing because the non-technical summary is important for the effective communication of the EIA results (Glasson et al., 2005). The worst performed tasks within review area four, however, were the use of a glossary, the provision of chapter summaries, and the citation of references. When an EIA was carried out by a number of independent consultants without adequate co-ordination, inconsistencies between various sections of the EIA (due to duplication of information) were also apparent.

5. Discussion

5.1. Key findings

The review of 45 EISs produced in Egypt between 2000 and 2007 for a variety of Category C project types indicates that 69% of the EISs sampled were of satisfactory quality. The results of this research are compared in Table 7 with other published review studies which also used the Lee and Colley criteria. The data indicate that EIS quality in Egypt is broadly similar to the results obtained in the more recent research conducted in other (predominantly European) countries (i.e. the UK); this, in itself, is an interesting finding. For instance, in the study by Badr et al. (2004) 68% of the EISs sampled in the UK for the period 1993–2001 were of satisfactory quality; while Barker and Wood (1999) found that 71% of the EISs sampled in EU countries for the period 1994–1996 were of satisfactory quality.

Regarding the Lee and Colley four Review Areas, the best performed assessment tasks were located in review area one, "description of the development, the local environment, and the baseline conditions" followed by review area four, "communication of results" and then review area three, "alternatives and mitigation". The least satisfactory review area was area two, "identification and evaluation of key impacts". These findings are in qualitative agreement with the results of numerous other studies of EIS quality; that is to say that descriptive and presentational tasks tend to be performed relatively well, while poorer performance is observed for core analytical tasks (Badr et al., 2004; Barker and Wood, 1999; Lee and Brown, 1992).

Table 6
Variations in EIS quality within Review Area 4.

Overall assessment	Review Area 4	Review category			
		4.1	4.2	4.3	4.4
% Satisfactory	76	91	80	73	64
% Unsatisfactory	24	9	20	27	36
% Good	31	56	22	42	31
% Borderline	67	42	78	53.5	56
% Poor	2	2	0	4.5	13

Table 7
Variations in EIS overall quality.

Authors	EISs production year	No of EISs analysed	Country	% Satisfactory
Current study	2000–2007	45	Egypt	69
Sandham and Pretorius (2008)	Unknown	28	South Africa	86
Badr et al. (2004)	1993–2001	50	UK	68
Cashmore et al. (2002)	1990–1999	72	Greek	40
Barker and Wood (1999)	1990–1991	56	EU countries	50
	1994–1996	56		71
Lee and Dancy (1993)	1988–1991	83	UK	43
	1988–1992	40	Ireland	40
Lee and Colley (1992)	1988–1989	12	UK	25

The quality of EISs has also been shown to be influenced by a number of additional factors, including: the nature and size of the projects; the year in which an EIS was prepared; the use of consultants; the experience of participants in the EIA process; the length of an EIS; and, the nature of the project proponent (Barker and Wood, 1999; Cashmore et al., 2002; Glasson et al., 1997). The following subsections briefly examine the influence of some of these variables on the quality of EISs produced in Egypt.

5.2. Variations in EISs quality by project types

The quality of EISs produced in Egypt appears to vary between different project types, although the data should be interpreted with caution given the small sample for some categories. The percentage of satisfactory EISs was highest for infrastructure (87.5%, 7), energy (80%, 8) and industrial projects (80%, 8); lower for tourism (50%, 5) and landfill (50%, 5); and, lowest overall for agricultural projects (33%, 1) (see Fig. 2). EISs for energy and industrial projects were particularly good in quality, with 70% (7) and 40% (4) of EISs assessed as good respectively. This might reflect the nature of the developments concerned: energy and industrial projects tend to be larger in size with high capital costs, and create more complex and controversial impacts. The project proponent might reasonably be expected, therefore, to invest proportionally more resources in the planning of these developments, including the EIA. On the other hand, the quality of EISs produced for tourism and agricultural projects might reflect a perception (which we note is not necessarily accurate) that such developments cause only limited environmental impacts. Given the potential for landfill developments to give rise to significant adverse environmental impacts, the poor quality of a high proportion of EISs produced for this sector is an issue of some concern which needs to be investigated further.

5.3. Length of the EIS

Previous studies have suggested that the overall quality of an EIS appears to be related to the length of the EIS (Cashmore et al., 2002; Lee and Dancy, 1993). The relationship recorded between EIS length and overall quality for the EISs reviewed in this research is illustrated in Fig. 3. The data indicate that there is a strong positive correlation (+0.68) between the length of an EIS and its quality in the sampled population. The average length of those EISs assessed as good was 192 pages, while the average length of the unsatisfactory ones was 73 pages. Shorter EISs were frequently of unsatisfactory quality because they were simply too brief to cover all the required information and at an adequate level of detail. On the other hand, the main purpose of EIA is to inform the decision-making process and a long EIS does not

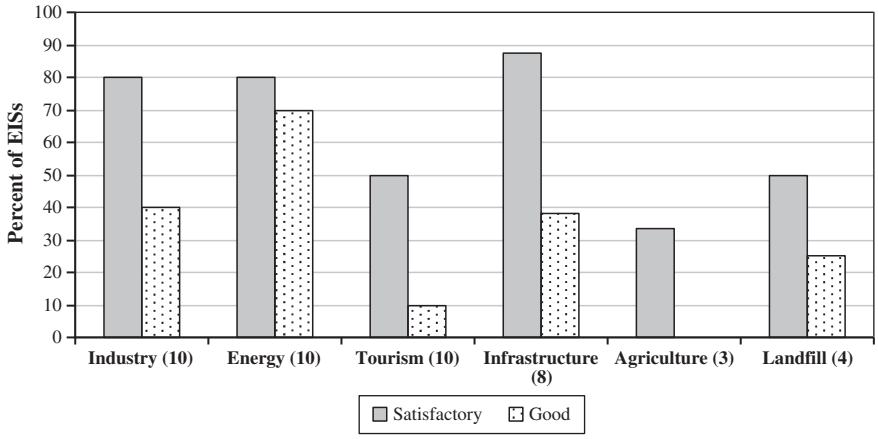

Fig. 2. Percentage of satisfactory and good EISs for different project types.

necessarily achieve this goal more effectively than a concise one. If the EIS documentation is excessively long, stakeholders and decision-makers may have difficulty assimilating the information; consequently, its use in decision-making can become problematic (Glasson et al., 2005).

5.4. Temporal trends in the quality of EISs

Previous research has suggested that the quality of EISs has improved over time (Badr et al., 2004; Glasson et al., 2005; Lee and Brown, 1992). However, in this research only a weak positive correlation (+0.17) was found between the year in which an EIS was prepared and its quality (see also Fig. 4). There are various reasons why the quality has not markedly improved over time in Egypt. Firstly, this study reviewed EISs produced since 2000, five years after formal introduction of EIA. It might be expected that by this time consultants and competent authorities were reasonably experienced in undertaking EIAs. Furthermore, there were no other important external stimuli during the sample period that might have greatly affected quality (e.g. significant changes in the legislation, publication of guidance, etc). The competent authority (EEAA) to whom EISs are submitted is responsible for evaluating and approving them. The data indicate that the EEAA approved half of the unsatisfactory EISs without requesting any further details and the rest of the unsatisfactory EISs were accepted after the developer/consultant provided supplementary information. Training the EEAA EIA centre personal on the use of review criteria and minimum acceptable standards is evidently required.

5.5. The use of consultants

In Egypt, a relatively small number of environmental consultancy firms exist, but there are a large number of independent individual consultants (Badr, 2009). Of the EISs sampled, 40% (18) were prepared by a single consultant and the rest 60% (27) were prepared by consultancy firms. EISs prepared by a single consultant were systematically poorer in quality (50%, 9, satisfactory) than those prepared by consultancy firms (81%, 22, satisfactory). This presumably reflects the fact that preparation of a good EIS typically requires an interdisciplinary team effort (Ross, 1987). Thus the research indicates that the quality of an EIS quality might be affected, to some extent, by the experience of the consultant(s) who conducted the EIA study.

The EEAA has recently started to request that EISs are written in Arabic, which consultants fear has adversely affected quality because scientific and engineering disciplines are taught in English in Egypt. Of the EISs sampled, 62% (28) were written in English and the rest (38%, 17) were written in Arabic. EISs written in English were systematically higher in quality (78.5%, 22, satisfactory) than those written in Arabic (53%, 9, satisfactory) as shown in Fig. 5.

6. Conclusions

The quality of the EIS is of great importance in order to properly inform the public and decision makers about the potential significant environmental impacts of proposed projects and the measures to be taken to mitigate the adverse effects (Canelas et al., 2005; Peterson, 2010). It can be concluded from the results of the current study that over two thirds of EISs received by EEAA were of satisfactory quality,

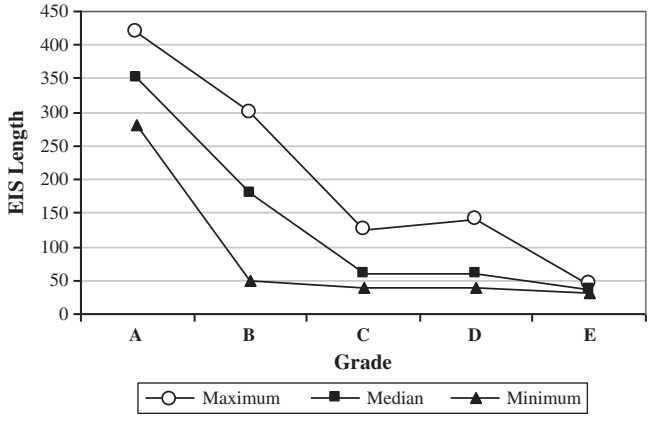

Fig. 3. Variation in EIS quality with length.

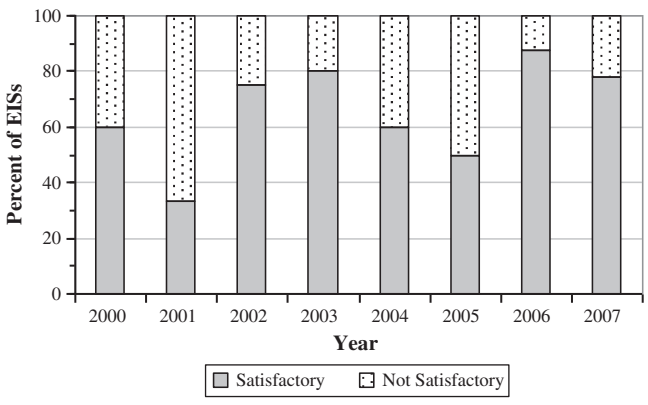

Fig. 4. Temporal trends in the quality of EISs.

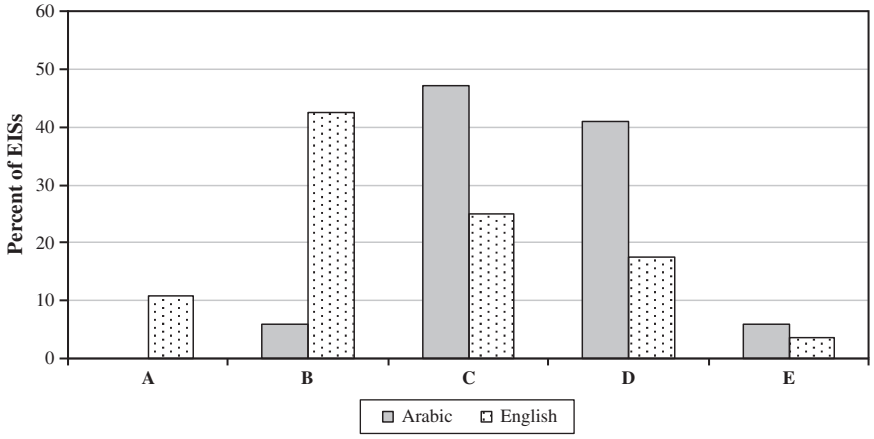

Fig. 5. Variation in EIS quality with language used.

according to the criteria set out in the Lee and Colley Environmental Statement Review Package (Lee et al., 1999). In a qualitative sense, the review results are broadly similar to the findings of many other studies. The description of the development (review area 1) and the communication of results (review area 4) on average were better performed than the consideration of alternatives and mitigation measures (review area 3) and the identification and evaluation of impacts (review area 2). It is evident, therefore, that the more technical and scientific aspects of the EIA process remain problematic in practice.

Quality of EISs was better for large, complex and controversial projects. It could also be inferred that the EIA process is more problematic for certain development categories (i.e. agriculture, landfill and tourism) than others, although further research with a larger EIS sample would be required to confirm this. Short EIS documents were frequently of unsatisfactory quality, and EISs produced by a team of consultants were markedly better than those produced by an individual consultant. The project proponent's commitment to undertaking an EIA and the experience of EIA practitioners may have also had an influence on the quality of EISs prepared. Certain problematic aspects of EIA practices (e.g. consideration of alternatives) are related to the legislative provisions for EIA and it is noted that the Egyptian legislation does not include all the core elements of a comprehensive EIA process.

Nevertheless, there are range of actions that could be taken to improve the quality of EISs and the performance of the EIA process in the short term. These include:

- The EIA centre at EEAA should be given greater financial resources so that they can commission independent EIS reviews where necessary, establish a comprehensive EISs library collection, and build their staff capacity. Their staff should also be encouraged to use a systematic review approach in determining the acceptability of the EISs they receive.
- Personnel working in the other (local) competent authorities should also receive training to raise their awareness about acceptable standards of work.
- The recent legal requirement as in Law No. 9 of 2009 for a systematic framework for EIA consultant accreditation should be implemented under the supervision of a national professional institute. Hence, in future the EEAA should accept only those EIS produced by accredited EIA consultants.
- Guidance on the preparation of the non-technical summary should be developed.
- Initiatives should be taken to improve the quality of EISs produced for landfill developments.
- Systematic national databases are needed for baseline environmental information and EISs.
- Provision should be made for strategic environmental assessment to ensure that environmental impacts are considered very early in the planning process and to aid the consideration of alternatives in project EIA.

Acknowledgments

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Appendix 1. List of review topics of the lee and colley environmental statement review package (source: Lee et al., 1999)

1. Description of the development, the local environment and the baseline conditions
   - 1.1 Description of the development
   - 1.2 Site description
   - 1.3 Wastes
   - 1.4 Environment description
   - 1.5 Baseline conditions
   - 1.6 Environmental legislation
2. Identification and evaluation of key impacts
   - 2.1 Definition of impacts
   - 2.2 Identification of impacts methodology
   - 2.3 Scoping
   - 2.4 Prediction of impact magnitude
   - 2.5 Assessment of impact significance
3. Alternatives and mitigation
   - 3.1 Alternatives
   - 3.2 Scope and effectiveness of mitigation measures
   - 3.3 Commitment to mitigation and monitoring
4. Communication of results
   - 4.1 Layout
   - 4.2 Presentation
   - 4.3 Emphasis
   - 4.4 Non-technical summary

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