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Comparative SWOT analysis of strategic environmental assessment systems in the Middle East and North Africa region

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ABSTRACT

This paper presents a SWOT analysis of SEA systems in the Middle East North Africa region through a comparative examination of the status, application and structure of existing systems based on country-specific legal, institutional and procedural frameworks. The analysis is coupled with the multi-attribute decision making method (MADM) within an analytical framework that involves both performance analysis based on predefined evaluation criteria and countries' self-assessment of their SEA system through open-ended surveys. The results show heterogenous status with a general delayed progress characterized by varied levels of weaknesses embedded in the legal and administrative frameworks and poor integration with the decision making process. Capitalizing on available opportunities, the paper highlights measures to enhance the development and enactment of SEA in the region.

1. Introduction

As a decision support tool intended to facilitate transition to sustainable development through integrating environmental considerations into policies, plans and programs, strategic environmental assessment (SEA) has globally played an appreciable role in the decision making process on land use planning, transportation policies, development sectors and infrastructure plans. The rationale for SEA stems from the need for an approach that extends beyond the downstream analysis and mitigation of adverse impacts of development to cater for the interdependency of the environment with development and growth. Its unique feature lies in its potential to promote sustainable development through integrating environmental considerations at high levels of decision making and acting as an early warning of large scale cumulative and synergistic effects to enable strategic decision making.

Since the enactment of the 2001/42/EC European Council Directive and the Kiev 2003 Protocol, SEA has been on a rising trend of adoption and mainstreaming where its implementation has become common practice in developed countries and has gained momentum worldwide with around forty countries reportedly having formal SEA systems (Garfi et al., 2011; Noble, 2009; Sanchez and Sanchez, 2008; Sheate and Partidarion, 2008; Partidario, 2007; ECA, 2005; Abaza et al., 2004). Promoted by international organizations, its application in developing countries, although critically important, remains limited (Gachechiladze-Bozhesku and Fischer, 2012; Lemos et al., 2012; Garfi et al., 2011). Studies on SEA systems have focused on the evaluation of local country-specific SEA application and performance, on comparative sector-based SEA assessments, and on case studies of SEA application and methodology invariably addressing countries around the world (Lemos et al., 2012; Partidario and Coutinho, 2011; Noble, 2009; Sinclair et al., 2009; Retief et al., 2008; Joao, 2007; Partadario, 2007; Chaker et al., 2006; Cashmore et al., 2004; Partidario and Fischer, 2004; Sadler, 2004) but with a sparse referral to countries in the Middle East and North Africa (MENA) region (Sharifzadegan et al., 2011; Unalan and Cowell, 2009; Say and Yucel, 2006; Dalal-Clayton and Sadler, 2005).

The MENA region, consisting of 20 countries (Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Palestinian Authority (PA), Oman, Qatar, Kingdom of Saudi Arabia (KSA), Syria, Tunisia, Turkey, United Arab Emirates (UAE) and Yemen), spans over a geographical area of 8.7 M km^2 that is disproportionally populated and endowed with natural resources. While most if not all suffer from similar environmental problems consisting mainly of water scarcity, land, coastal and marine degradation, and weak environmental institutions (Tolba and Saab, 2008), country-specific environmental management is defined by the varying severity of these challenges, as well as by the diversity

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of political systems and policy making processes that exist among countries exhibiting different levels of transparency, accountability, efficiency and effectiveness.

The most recent published data on SEA systems in the MENA region by El-Fadl and El Fadel (2004) reported that no country has a SEA system. Since then, little is known about the nature and practice of emerging SEA systems in the MENA region where its need, as in any other developing region, capitalizes on its ability, along with other environmental planning and management tools, to incorporate environmental and social considerations into planning, otherwise usually ignored. Assessing existing structures and applications is an indispensible step to understand weaknesses and barriers as well as benefits and opportunities to properly proceed into mainstreaming effective SEA systems in the region. This paper evaluates weaknesses and strengths and potential threats and opportunities for SEA systems mainstreaming in the MENA region through a comparative SWOT analysis of legal, institutional, procedural and application frameworks while delineating future needs to enhance the effectiveness of SEA implementation in the region.

2. Methodology

The methodology consists of a quantified SWOT analysis of SEA systems constructed by coupling SWOT with multi-attribute decision making (MADM) within a comprehensive analytical framework to assess, evaluate, compare and quantify cross-country systems based on pre-defined evaluation criteria. SWOT analysis is a qualitative examination that pinpoints internal and externals factors at play in a specific environment that helps in understanding the status and formulates follow-up strategies (Kajanus et al., 2012; Chang and Huang, 2006). To improve the incomplete analysis inherent to SWOT, attempts for quantified analysis through coupling SWOT with multi-attribute decision making (MADM) methods have been increasingly reported (Svekli et al., 2012; Gao and Peng, 2011; Amin et al., 2011; Lee and Lin, 2008).

The use of MADMs allows the systematic evaluation of the SWOT factors and the commensuration of their intensities (Kajanus et al., 2012; Kurtilla et al., 2000). The Analytic Hierarchy Process (AHP), the Analytical Network Process (ANP) and the Stochastic Multi-criteria Acceptability Analysis (SMAA-O) have been combined with SWOT analysis (Kahraman et al., 2007; Yuksel and Dagdeviren, 2007; Chang and Huang, 2006; Shrestha et al., 2004; Stewart et al., 2002; Lahdelma et al., 2003; Kurttila et al., 2000; Miettinen et al., 1999; Saaty, 1977, 1980; Edwards and Barron, 1994). In this study, the four-aspect MADM additive valuation method is used to quantitatively compare countries' performances. In contrast to more complex MADM tools, the four-aspect additive valuation method provides a comparable rigid result while being simpler in structure and satisfactory in comparative analysis application with minimal constraints on the decision making processes. The four-aspects of the selected MADM tool consist of 'alternatives' which refer to countries being compared at the MENA level, 'criteria' which refer to the predefined evaluation criteria, 'performance' which refers to countries progress on key factors and 'weights' which refer to the relative importance of each factor. Accordingly, the analytical approach consists of:

1. Determination of evaluation criteria categorized into key internal (strengths and weaknesses) and external (threats and opportunities) factors that aid or impede SEA effective implementation for individual country assessment and comparative SWOT enabling
2. Collection of country specific information
3. Definition of weights of identified key factors and scoring system for country performance
4. Calculation of weighted performance scores for individual countries
5. Benchmarking of overall weighted performances to calculate and compare coordinate values.

While the use of quantitative SWOT in the framework of SEA systems evaluation has not been reported in literature, the use of a systematic framework to evaluate SEA systems has been promoted with criteria based on SEA contribution to decision-making (Sanchez and Sanchez, 2008; Dalal-Clayton and Sadler, 2005) as well as by performance criteria for the evaluation of the effectiveness of existing SEA processes (Retief, 2007; IAIA, 2002). While, it is argued that different criteria should be used to evaluate SEA systems in countries with different planning systems (Retief, 2007; Fischer and Gazzola, 2006; Marsden, 1998), common criteria are used for the comparative assessment in this study based on three performance areas, namely: institutionalization, implementation process and application, and influence on decision making, within which six criteria are evaluated with 13 indicators (Table 1).

To feed into the SWOT analysis, these criteria are categorized into internal (I) factors (i.e. legal framework (I1), administrative framework (I2), and procedural framework (I3)); and external (E) factors (i.e. number of SEAs undertaken (E1), SEA impact on decision making (E2) and political will (E3)). Internal factors consist of those factors that define efforts, measures and steps taken by the responsible authority to initiate, develop and mainstream SEA systems whereby their presence or absence signifies strengths and weaknesses, respectively. External factors are those factors in the external uncontrollable environment that the responsible authority can seize as opportunities to benefit from in its pursuit of SEA framework development or that denotes a threat that will hinder the aspired development. As undertaking SEAs could be the result of multiple factors at play that may or may not be related to the legal, administrative and procedural framework in operation, the number of SEAs undertaken is considered, for the purpose of this analysis, an external factor. In fact, many SEAs have been undertaken based on requests by donors, international operators or local authorities despite the absence of an operational SEA system in a country.

Country data for indicators' analysis are compiled from available literature supplemented with countries' self-assessment of their SEA systems and experiences through an open-ended survey (Table 2) administered to accessible focal points at relevant national authorities in MENA countries (Table 1 Supplementary Material). Focal ministries for environmental management were identified in each country, where available, and then EIA/SEA focal units/individuals were contacted with the questionnaires. Respondents varied in positions ranging from EIA/SEA officers to Head of Departments and Branch Directors. The survey targeted legal and operational frameworks, examples of successful SEAs and lessons' learned, challenges and weaknesses to SEA implementation, as well as subjective weighing of the relative importance of key factors for building strong SEA systems and defining SEA future in individual countries. Note that while one survey response per country was targeted, multiple responses were received in some cases and were screened for discrepancies before incorporating into the database for subsequent analysis.

This weighing process highlights the potential heterogeneity in how countries perceive the appropriate framework for SEA implementation within their system. Relative percentages assessed by respondents were then averaged and weighted to develop a standard weighing system that is applied uniformly to all countries. The unified weights eliminated or minimized the influence of subjectivity in responses as well as allowed the application of weights to cases of countries that were inaccessible through the

Table 1
Performance areas with corresponding criteria, indicators and scores for comparative performance assessment.

Performance area	*Criterion*	*Indicator*	*Scoring range*			
Institutionalization of SEA	Legal Framework	– Enabling legislation for SEA exits – Specific SEA legislation for SEA exists – SEA guidelines exist	No legislation 0	Only enabling legislation 1	Enabling & SEA draft legislation 2	Enabling & SEA specific legislation 3
	Administrative Framework	Competent Authority(ies) specified for : – SEA Overseeing – SEA Preparation – SEA Review	No competent authority (CA) 0	CA same as EIA 1	CA specified in legislation 2	Party to prepare SEA & CA specified 3
SEA implementation process and application	SEA type and application Level	– SEA is applied to plans and/or programs and/or policies – SEA conducted is sectoral and/or programmatic and/or cumulative and/or regional				
	Procedural Framework	– Steps included in the SEA process: screening; scoping; impacts; alternatives; impact mitigation; public participation – Review process procedures exist	No specified procedures 0	Procedures specified or undertaken but incomplete 1	Procedures specified & complete but no details of review process 2	Procedures specified & complete with specified review process 3
SEA Influence on decision making	SEA mainstreaming	– Number of SEAs undertaken	No SEAs undertaken 0	On-going/ planned SEA studies 1	1 – 2 SEA studies or pilot studies 2	More than 2 SEA studies 3
		– Political will for SEA implementation	No political will 0			Political will 3
	SEA impact	– SEA results are adopted in decision making process	SEA not related to decision making 0	SEA included in decision making but no impact 1	SEA induced changes in decision making to an extent 2	SEA results influence decision making 3

survey. Quantifying the performance of MENA individual countries on these key actors followed a pre-defined scoring system (Table 1), which was applied to countries based on collected data.

The scoring system is pre-defined and standardized based on basic requisites for the effective implementation and mainstreaming of SEA systems to closely reflect the current status of SEA systems in the MENA region. Scores were set to a range of 0–3 applied to all factors where 0 presented no action towards SEA (poor) while 3 presented well established and operational SEA system (excellent). The weighted scores were derived by summing the multiplication of performance scores with importance weights derived for factors. The coordinate values for internal and external assessments were calculated by subtracting weighted scores from the benchmark defined as the mean value of weighted scores and plotted on a SWOT numerical matrix.

Table 2
Main survey questions.

Summary of main questions
1. Is there an established SEA system in your country? Do you plan to have one?
2. What is the status of the legal SEA framework? (legislation, guidelines)
3. Who are the institutions involved? i.e. competent authorities
4. Are there any SEAs conducted already in your country?
5. Briefly describe SEA process including who reviews the SEA studies?
6. What is the overall quality of the submitted/reviewed SEAs?
7. Are SEAs tiered to decision making? How? Why?
8. What are the weaknesses of the SEA system in your country?
9. What are the strengths of the SEA system in your country?
10. What are the challenges for SEA system implementation in your country?
11. What are the lessons learnt from SEA application in your country?
12. Describe success stories of SEA implementation in your country?
13. How many SEAs have been undertaken so far in your country? What is their type and level?
14. How would you describe the political will towards SEA system? Towards tiering SEA with decision making?
15. Weigh the relative importance in percentage of a) legal framework, b) administrative framework & c) procedural framework to build a strong SEA system?
16. Weigh the relative percentage importance of a) SEA studies, b) impact on decision making & c) political will as key determinants of SEA future in your country?

3. Results and discussion

Initial comprehensive screening discerned 14 countries out of 20 (i.e. 70%) with existing SEA frameworks or SEA studies. While 57% of the latter countries responded to the survey questionnaire, the disparity, inconsistency and inequality in the scope and scale of accessible country-specific data presented a limitation to the analysis. Nevertheless, the general SEA system status and SWOT analysis are discussed for all MENA countries, with a detailed comparative assessment for countries with existing SEA frameworks or SEA studies.

3.1. Comparative evaluation of SEA systems

3.1.1. SEA institutionalization

All examined MENA countries have general enabling as well as EIA legislation which often overlap with their framework laws on environment. In contrast, specific SEA legislation (Table 3) is at different stages of development in the region. Data presented is collected either through surveys or from national legal texts and references as cited. About 14 countries do not have any kind of SEA legislation. Morocco, Yemen and UAE are in the process of updating their legislation whereas Egypt is requesting SEAs based on the existing enabling legislation. Similarly, Jordan, Oman, Tunisia and Qatar currently conduct SEAs in the absence of specific legislation. KSA, Qatar and Israel, although they request environmental assessment of plans, still categorize it within EIAs. On the other hand, Lebanon has a recently enacted SEA legislation and Turkey has a draft one. The Emirate of Abu Dhabi, present a special case where it has unilaterally enacted technical guidelines to organize SEA implementation in the Emirate.

Table 3
Comparative assessment of SEA institutionalization in MENA countries.

Country	Legal framework		Administrative framework	
	Enabling legislation	Specific SEA legislation & guidelines	Authority for SEA administration	Authority for SEA preparation
Algeria	Law 3/1983 on the Protection of the Environment	No specific SEA legislation or guidelines	Ministry of Land Use & Environment	n.a
Bahrain[a]	Legislative decree No. 21/1996 on Environment	No SEA legislation or guidelines	Directorate of Environmental Assessment and Planning	n.a
Egypt	Law 4/1994 amended by Law 9/2009 on Environmental Affairs	No legislation or guidelines; requested based on Law No. 4/1994	Ministry of Environment; Ministry of Tourism	Available SEAs by EEAA.
Iran	Constitution, Article 50 Decree 138/1994 of 2nd development plan	No specific SEA legislation or guidelines	Department of Environment	n.a
Iraq	Law No. 27/2009 on environmental protection and improvement	No specific SEA legislation or guidelines; new EIA legislation	Ministry of Environment	n.a
Israel	Planning and Building Law of 1982	Regulation 5763/2003 on impact assessments of plans, still cited as EIA	Ministry of Environment	Statement Editor(s)
Jordan	Law No. 52/2006 on Protection of Environment	No SEA legislation or guidelines	Ministry of Environment	n.a
Kuwait	Law No. 21 of 1995 on Protection of Environment and amendments	No SEA specific legislation or guidelines	Environment Public Authority	n.a
Lebanon	Law 4/2002 (Code of the Environment) where Article 23 states that an EA be done to any study, program or investment	SEA decree enacted in April 2012 after 7 years of drafting, guidelines appended to SEA decree	Ministry of Environment	Environmental Consultancy firms
Libya	Law No. 15/2003 on Protection of the environment	No SEA regulations or guidelines	Environment General Authority	n.a
Morocco	Law 2/2003 on Environmental Impact Assessment	No SEA legislation or guidelines; being put in place now	National Committee for Impact Assessment;	Available SEA by international consultants
Oman	Decree No. 114/2001 on enactment of Law on Protection of Environment	No SEA legislation or guidelines	Ministry of Environment and Climate Affairs	n.a
Qatar	Decree Law No. 30/2002 on Environmental Protection	No SEA legislation or guidelines. EIA is requested for plans	Ministry of Environment; Higher Council for Environment	Available SEA by international consultant
Syria[b]	Law No. 50/2002 on Environment	No SEA legislation or guidelines	Ministry of Environment	n.a
Saudi Arabia	Resolution No. 193/2001 on General Environment Code and Implementation Rules	No SEA legislation or guidelines; EIA is required for plans	Presidency of Metereology and Environment; Ministerial Committee on the Environment	Agency in charge of implementation
Tunisia	Law 14/2001 on assessment of environmental impacts	No SEA legislation or guidelines	Ministry of Environment and Sustainable Development	n.a
Turkey[c]	Law. 2872/1983 on Environment amended by Law 5491/1988 with Article 10 on assessment of environmental impacts from planned activities Law 4856/2003 on the Establishment and Duties of the Ministry of Environment and Forestry	National legislation on SEA drafted awaiting enactment (as per SEA Directive, 2001/42/EC) No guidelines exist	Department of SEA and Planning of Ministry of Environment	Ministry of Environment and Forestry to conduct EIAs and SEAs, but not clear if directly or through third parties
Yemen[d]	Law No. 26/1995 on the environment protection Law No. 11/1993 on protection of marine environment Environment Protection Council	No SEA legislation or guidelines	Ministry of Water and Environment	n.a
UAE	Federal Law 24/1999 amended by Federal Law 11/2006 on Environment where Article 3 to 8 stipulate impact assessment of projects and activities but without defining projects and activities.	Legislation at national level being updated to include SEA SEAs conducted in Abu Dhabi based on requirements of Environment, Health and Safety Management systems &Technical Guidance Document for SEA (TGD-SEA) (2010).	Environment agency – Abu Dhabi (EAD) in Abu Dhabi Emirate	EAD approved and registered consultants operating within Abu Dhabi Emirate

[a] Naser, 2012.
[b] Haydar and Pediaditi, 2010.
[c] Say and Yucel, 2006.
[d] Loon et al., 2010.

At the administrative level, the national environmental authority is defined as the competent authority for SEA implementation whose mandate is stipulated by available legislation or draft legislation in the case of Lebanon, Israel, Abu Dhabi – UAE and Turkey. However, in general, in the absence of explicit SEA legislation, the authorities responsible for EIA supervision and approval are currently overseeing SEAs in examined countries. Although this indicator was used for comparison, it does not reflect on the level of expertise and capacity available at these authorities to administer, supervise and approve SEAs.

3.1.2. SEA application and implementation process

Although SEA application to policies is available within the legislation of some countries (i.e. Turkey, Abu Dhabi, Lebanon), to date, no SEA has been reported on policies in the MENA region and to a lesser extent on programs (Table 4). The most common

Table 4
Comparative assessment of SEA application and implementation process in MENA countries.

Country	SEA application level (policies, programs, plans)	SEA application sector and type	Number of SEAs	SEA process					
				Screening	Scoping	Impacts	Alternatives	Mitigation	Public participation
Bahrain	No legislation to specify; Conducted SEAs on bilateral agreement	Conducted SEAs on trade sector	Ongoing [1]	No legislation to specify No information available					
Egypt	Conducted for plans, despite absence of legislation	Conducted for coastal tourism development	[4]	Case by case	Yes	Yes	Yes	Yes	Yes
Israel	Obligatory for planning and building plans	Local, district or national plans for defined areas	[2]	Yes per regulation	Yes per regulation	Yes per regl.	Yes per regulation	Yes, per regulation	Not clear
Jordan	No legislation to specify	Development Areas, Water Sector	[1]	Na	na	na	na	na	Not clear, but meetings are held
Kuwait	No legislation to specify; Conducted SEAs on bilateral agreement	Trade sector	Ongoing [1]	No legislation to specify No information available					
KSA	Enabling legislation stipulates SEA for plans	No known conducted SEAs	[0]	Not specified by legislation No information available					
Lebanon	Decree requires SEA application to plan, policy, program and investment levels. Available SEAs were conducted on plans' level	Decree stipulates for all sectors. Conducted on land use planning for coastal and mountainous zones development	Pilot +[2]	Yes, Article 3 of decree requires screening based on matrix and criteria	Yes, Article 2 require scoping based on set require-ments	Yes, Annex 3 of decree	Yes, Annex 3 of decree	Yes, Article 7 stipulates inclusion of monitoring plan	Yes, Annex 3 of decree
Morocco	No legislation to specify Conducted SEAs on plans and programs	Sector development plans	Ongoing [3]	No legislation to specify No information was available Conducted SEAs were not accessible to analyze					
Oman	No legislation to specify, Conducted SEAs are on plans	Development plans	[1]	No legislation to specify; No information was available Conducted SEAs were not accessible to analyze					
Qatar	Enabling legislation stipulates SEA for plans	Conducted SEAs on master plans	Ongoing [1]	No information was available Conducted SEAs were not accessible to analyze					
Tunisia	Not specified, conducted SEAs are on Programs and plans	Infrastructure programs Development Plans	[2]	No legislation to specify; No information was available Conducted SEAs were not accessible to analyze					
Turkey	Plans and programs based on draft national legislation	All sectors Available pilot SEAs were conducted on land use planning	Pilot	Yes, based on draft national legislation	Yes, based on draft national legislation	Yes, based on draft national legisl.	Yes, based on draft national legislation	Yes, based on draft national legislation	Yes, based on draft national legislation
UAE	Plans, programs, policies as per Technical Guidance Document 2010 Available SEAs conducted on projects and master plans	All sectors. Available SEAs were conducted for urban master plans in Abu Dhabi	[2]	Yes, based on screening matrix in Technical Guidance Document (TGD) − SEA	Yes, based on TGD − SEA require-ments	Yes, based on TGD − SEA	Yes, based on TGD − SEA	Yes, based on TGD − SEA	Not mentioned in TGD - SEA
Yemen	No legislation to specify	Coastal zone plan	Ongoing [1]	No legislation to specify No information available					

application of SEAs is on plans and particularly spatial plans concentrated on land use and urban planning including coastal zone development and management particularly in Egypt and the UAE and land use planning in Lebanon and Turkey. The application of SEAs on spatial planning provides a smooth and solid opportunity to practice the full process of SEA in a multi-dimensional context that targets social, economic, physical and environmental challenges. Other SEAs involved the twinning of land use planning with the development of other sectors such as tourism (Turkey, Egypt) and agriculture (Morocco) as well as regional development plans (Israel, Jordan, Qatar), infrastructure programs (Tunisia) and trade agreements (Bahrain, Kuwait). In terms of procedures, Turkey adopts the EU SEA Directive process in its draft legislation which is one requirement for its access to the EU.

In the proposed SEA legislation of Lebanon and the *Technical Guidelines of Abu Dhabi*, the requirements for screening and scoping are provisioned in matrices where impacts identification, analysis of alternatives and mitigation are clearly stated and detailed. Only the Lebanese legislation has explicitly outlined systematic approaches and analytical tools for comprehensive analyses. In Israel, the SEA process is briefly outlined. All these counties developed a form of public participation targeting mainly governmental stakeholders except for Israel and Abu Dhabi. In Lebanon, public participation is included at the scoping stage and at milestones of the SEA process. In Morocco, Tunisia, Egypt, and Jordan, although not stipulated in any specific legislation, it is included throughout the SEA process.

3.1.3. SEA review process

SEA review is a critical step of the SEA process where the competent authority for review is the same national environmental authority to oversee and supervise EIAs in most countries. In Lebanon, UAE and Israel the review process is included in the legislation. The process deadlines and requirements are explicitly mentioned however the review criteria are either mentioned in the scoping reports (Lebanon), hinting to compliance criteria or not mentioned at all. In Morocco, Egypt, Tunisia and Jordan the practiced review process includes regular committee meetings among stakeholders to comment on and guide the SEA. Although this is acceptable at this stage, it is preferable to develop a clear review process that ensures harmony, transparency and accountability in SEA reviews. No clear information is present on the review processes in other MENA countries.

Undertaking SEAs in the absence of legally binding legislation and within a non experienced institutional context, a general satisfaction with the quality of reported SEAs is reported by countries' self assessment through the surveys. This is justified by the fact that most undertaken SEAs are pilot studies meant to set good examples i.e. in Turkey and Lebanon (Unalan and Cowell, 2009) or are funded and prepared by international organizations (i.e. Millennium Challenge Corporation, Deutchse Gesellschaftfuer Technische Zusammerarbeit, World Bank, United Nations Development Program etc.) whose experience help deliver effective studies i.e. in Morocco, Tunisia, Jordan, Bahrain, Kuwait, Yemen and Qatar.

3.1.4. SEA influence on decision making

Success stories of SEA implementation are reported in the countries' self assessment of their SEA status (Table 5). The pilot projects in Turkey and Lebanon have been successful in demonstrating the SEA process, involving stakeholders and recommending changes to proposed plans. In view of their pilot nature, it is not apparent whether decision makers will consider the SEA findings and recommendations in plans. Focused on spatial planning, development SEAs for Al-Aqaba Area and the Red Sea were considered successful by the Egyptian Ministry of Environment in broadening available alternatives and foreseeing mitigation measures. In Morocco, a series of agriculture and fisheries-related projects developed within a compact development program administered by the government for five years were reported to present success stories of SEA implementation. In Tunisia and Abu Dhabi, SEAs highlighted unforeseen impacts associated with infrastructure programs that required halting and modifying the programs. On the other hand, no SEAs are reported to be undertaken in Algeria, Syria, Libya, Iran and Iraq.

Table 5
Comparative assessment of SEA impact on decision making in MENA countries.

Country	SEA influence on decision making	
	SEA results incorporated in decision making process	Political will
Bahrain	First SEA currently undertaken, requested by Government of Canada on a bilateral trade agreement	Not clear
Egypt	SEA results supported and guided decision making process and improved plans; SEA is included in the plan document	Increasing interest
Israel	SEA integrated in regional development planning processes	Not clear
Jordan	SEA for Developmental Areas are undertaken in parallel to planning process	Not clear
Kuwait	First SEA currently undertaken, requested by Government of Canada on a bilateral trade agreement	Not clear
Lebanon	SEA influence on decision making is not clear	Increasing interest and support yet slow
Morocco	Conducted SEAs influence on decision making is not clear	Increasing interest
Qatar	First SEA currently undertaken for Halula Island	Not clear
Tunisia	SEAs on infrastructure programs urged halting of project and further public participation	Not clear
Turkey	Pilot SEAs conducted preceded and helped in SEA legislation drafting.	High political will
UAE	SEA report should not make recommendations, or conclusions about the proposed plans or programs within the scope of EAD review	High political will in Abu Dhabi
Yemen	First SEA currently undertaken for the coastal zone development in Yemen	Not clear

However, the existence and implementation of an SEA framework does not necessarily lead to an impact on planning and decision making processes, although the aspired objective is to simulate good planning and implement sustainable policies. It is apparent that the current focus is on mainstreaming SEA and hence it is too early to discuss the influence of SEA on decision making at a stage where decision makers have not yet enacted SEA legislation. Nevertheless, the requirements to include SEA findings in plans (Egypt), and of summarizing SEA outputs and required changes to plans (Lebanon, Turkey) reflect that envisioned SEA systems aim at influencing decision making. However, the practice of undertaking SEAs as an administrative procedure as implicit from countries' experience and not as an integral component of decision making threatens the "raison d'être" of implementing SEAs as policy tools.

The resemblance in the form of progress, problems and gaps between EIA and SEA systems in the MENA region is remarkable. In 2004, twenty-two years after the first MENA country enacted its EIA enabling legislation, few countries had EIA regulations. In addition, the procedures and components of EIAs were still not clear and EIAs were poorly integrated into decision making, however, competent authorities were assigned and EIAs were undertaken (El-Fadl and El-Fadel, 2004). Though there is no clear assessment of the current status of EIA systems in the MENA region,

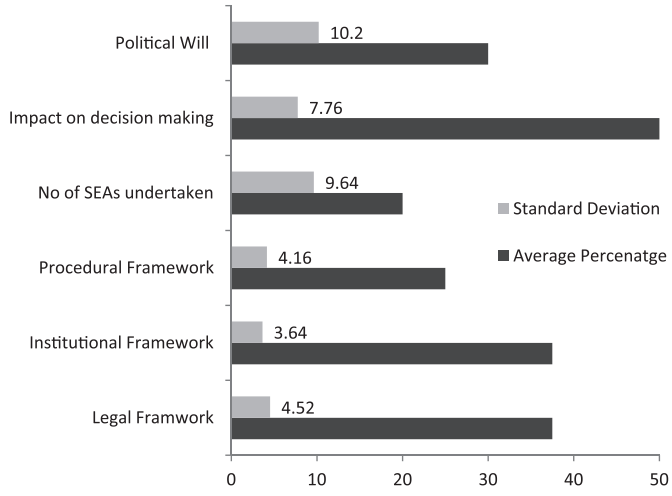

Fig. 1. Average importance and standard deviation of internal and external factors as weighed by respondents.

it is apparent that countries have greatly improved which should facilitate the adoption of SEA through lessons learned.

3.2. Comparative quantitative SWOT analysis

Defining the magnitude of internal (strengths and weaknesses) and external (threats and opportunities) factors at play in individual countries facilitates effective SEA mainstreaming and implementation in the MENA region. The weighing of these factors by country respondents revealed, on average, equal weighing (~37%) of the role of legal and institutional frameworks in building strong SEA systems with lower stress on procedural frameworks. Fig. 1 summarizes the average weights reported by survey respondents for internal and external factors as well as the standard deviations observed in their responses. While a larger sample size would be more statistically representative, the survey results indicate a general and more pronounced agreement between respondents on the importance of internal factors ($\sigma = 4.1$) whereas a wider discretion is observed for external factors ($\sigma = 9.2$).

On average, the 'impact of SEAs in decision making' is reported, among the external factors, to be a significant determinant of the future of SEA (50% importance weight) followed by 'political will'. Overall, responses translated differences in status in various countries. The high weights for the legal framework and political will in Turkey, for instance, directly reflect on requirements for EU membership and efforts towards this end. For Lebanon, internal factors were valued equally whereas the impact of SEA on decision making stood out as a key determinant of SEAs future; reflecting the recently operational SEA framework and the absence of proper tiering to the decision making process. An interesting pattern was observed for Egypt, Morocco and Tunisia whereby the institutional framework was selected as key determinant in building SEA systems despite the absence of specific legal and procedural frameworks. Therefore, since SEAs are currently undertaken in these countries, investing in institutions that will govern SEAs can be a most effective route in comparison to tardy legislation drafting and enacting scenarios associated with long durations. Finally, the number of SEAs undertaken was not perceived as a major factor in building a strong SEA system in all three countries however the 'political will' and 'impact on decision making' were considered to be significant particularly in Egypt and Morocco.

Integrating SWOT with MADM, the qualitative comparison of countries' performances with respect to SEA systems is quantified based on the weights assigned for internal and external factors and countries' scores on each. Table 6 summarizes the calculations to quantify countries' total and per factor performance. Note that a minimum score of 1 was defined to assess 'SEA impact on decision making' for countries with no survey responses as a conservative bound, based on their data and relative to other countries. Similarly, a mean score of 2 was set to assess 'political will' in these countries in an attempt to represent neutrality of this factor. Based on per factor weighted score, the internal and external scores of each country are added together and subtracted from the benchmark value. The mean values of internal and external scores are adopted as benchmark values. The resulting values, ranging between −1 and +1, are the coordinate values plotted in the quantified SWOT matrix. Hence, each country has a pair of coordinates that represent its performance on the internal and external factors respectively. Coordinate values larger than benchmark values represent comparative strengths and opportunities; while coordinate values smaller than the benchmark constitute weaknesses and threats.

Fig. 2 depicts the quantified SWOT matrix representing MENA countries comparative performance towards building and operating effective SEA systems. The axes represent the continuum of factors at play. The abscissa stands for internal (strengths & weaknesses) factors and the ordinate stands for external (opportunities

Table 6
Weighted scores of countries' performance.

Factor	Weight	Bahrain	Egypt	Israel	Jordan	KSA	Kuwait	Lebanon	Morocco	Oman	Qatar	Tunisia	Turkey	UAE	Yemen
Sufficient legal framework	0.375	1	1	3	1	1	1	3	1	1	1	1	2	2	1
Weighted performance		0.375	0.375	1.125	0.375	0.375	0.375	1.125	0.375	0.375	0.375	0.375	0.75	0.75	0.375
Institutional set-up	0.375	1	1	3	2	3	1	3	1	1	1	1	2	3	1
Weighted performance		0.375	0.375	1.125	0.75	1.125	0.375	1.125	0.375	0.375	0.375	0.375	0.75	1.125	0.375
Procedural framework	0.25	0	1	3	1	0	0	3	1	0	0	1	2	3	0
Weighted performance		0	0.25	0.75	0.25	0	0	0.75	0.25	0	0	0.25	0.5	0.75	0
Weighted sum	1	0.75	1	3	1.375	1.5	0.75	3	1	0.75	0.75	1	2	2.625	0.75
Internal assessment value[a]		−0.696	−0.446	1.554	−0.071	0.054	−0.696	1.554	−0.446	−0.696	−0.696	−0.446	0.554	1.175	−0.7
No. of SEAs undertaken	0.2	1	3	2	2	0	1	2	3	1	1	2	2	2	1
Weighted performance		0.2	0.6	0.4	0.4	0	0.2	0.4	0.6	0.2	0.2	0.4	0.4	0.4	0.2
Impact on decision making	0.5	1	2	1	1	1	1	2	1	1	1	2	1	2	1
Weighted performance		0.5	1	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	1	0.5	1	0.5
Political will	0.3	2	1	2	2	2	2	2	2	2	2	2	3	2	2
Weighted performance		0.6	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.9	0.6	0.6
Weighted sum	1	1.3	1.9	1.5	1.5	1.1	1.3	2	1.7	1.3	1.3	2	1.8	2	1.3
External assessment value[b]		−0.271	0.329	−0.071	−0.071	−0.471	−0.271	0.429	0.129	−0.271	−0.271	0.429	0.229	0.429	−0.271

[a] Benchmark value for internal assessment is 1.45.
[b] Benchmark value for external assessment is 1.57.

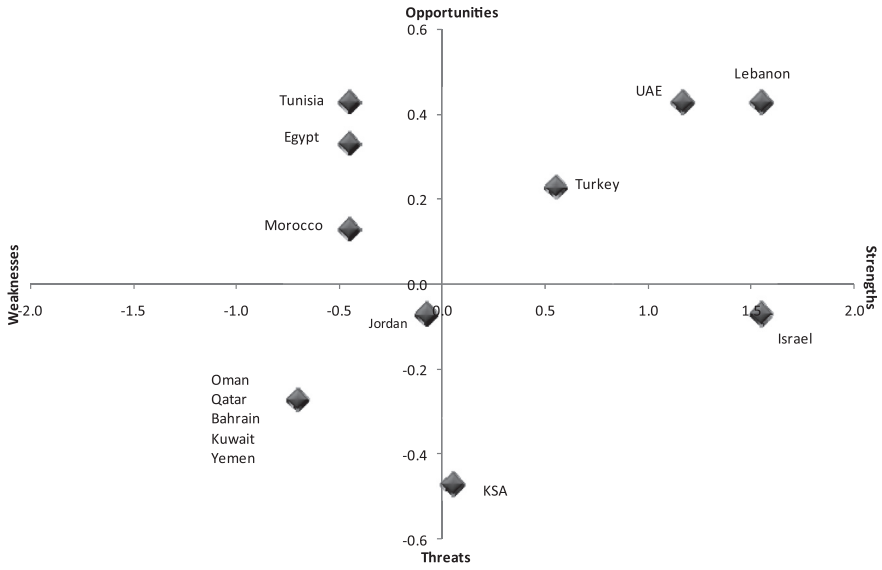

Fig. 2. SWOT matrix of MENA countries' performance towards mainstreaming SEA systems.

and threats) factors. The axes form four performance quadrants numbered in a counter-clockwise direction starting with I in the top right quadrant. Strengths and opportunities delineate quadrant I reflecting a positive and enabling context for SEA mainstreaming and implementation while mirror quadrants reflect partial supportive (quadrants II and IV) or hindering (III) contexts for the progress of SEA as a planning tool. Iraq, Iran, Syria, Libya, Algeria and Palestine were not included in the SWOT analysis due to their disqualifying status where no form or aspect of SEA systems exists or is foreseen.

Turkey, Lebanon and Abu Dhabi (UAE) fall in quadrant I of Fig. 1 and exhibit internal strengths as well as enjoy potential opportunities for operating their established SEA systems. As the initiation of SEA system in Turkey was highly driven by the desire of Turkey to access the European Union, it surely facilitated and fastened the formal implementation and mainstreaming of SEA system in the country. However, the threat remains whether Turkey would recognize SEA as a planning support tool and tier it to the planning process or just as a means to an end. Israel, on the other hand, falls on the thin line between quadrants I and IV exhibiting sufficient strengths to mainstream their SEA system, yet, at a crossroad between threats and opportunities that will solidify based on how they proceed with their SEA mainstreaming efforts.

Egypt, Tunisia and Morocco fall in quadrant II inferring internal weaknesses, particularly concerning the absence of a specific legal and institutional framework; however, they enjoy potential opportunities mainly residing in the fact that SEA studies are already undertaken with momentum. Jordan possesses a particular status where it is currently at a major crossroad of equal internal and external forces aligning it at a fresh start. Hence, every step that Jordan will undertake may critically influence and define the future of SEA in the country. A boost of strength is needed through a quick drafting and enactment of SEA legislation. KSA falls at the thin line between quadrants III and IV exhibiting clear external weaknesses, however, have equal internal forces (strengths and weaknesses) at play. This stagnant status will delay progress in KSA and as such an enabling environment should be set up or incentives constructed for the government to structure and operate an effective system. Quadrant III hosts all remaining countries which have embedded equal internal weaknesses and are faced by impeding threats, albeit variably. Their weaknesses stem from the absence of proper legal, institutional and procedural SEA frameworks; hence can be converted to strengths depending on political will which basically presents the major threat.

In comparison to El Fadl and El Fadel (2004), there is evident progress and increased mainstreaming of SEA systems in 14 MENA countries. Fifteen out of 20 countries, however, still suffer from inherent internal weaknesses while fourteen countries face impeding threats, both hindering the establishment or implementation of the SEA systems. Apart from Lebanon, there is no country in the MENA region that has a fully established functional system of SEA. Nevertheless, tiering the SEA and planning processes and applying SEA to policies, programs and plans remain a major threat to proper implementation in all countries. This is interestingly comparable to the emergence and progress of EIA systems in MENA regions where Lebanon and Turkey were also the forerunners of EIA implementation and mainstreaming (El-Fadl and El-Fadel, 2004).

Nevertheless, the observed current undertakings of SEAs in the MENA region, the general awareness of the need to develop and enact legislation and the overlapping of competent authorities for SEA and EIAs constitute an opportunity to capitalize on despite the absence of a functional system. While this study investigated and analyzed the status and impact of SEA systems at countries' level, the potential role of SEAs as a policy tool to manage and plan environmental issues at the regional level is equally important. In this regard, SEAs can influence programs, policies and plans on trans-boundary water, oil and gas resources that can alleviate regional politics of environmental issues.

4. Conclusion and future outlook

This study presents a first attempt at evaluating SEA systems in the MENA region. It examined through a comparative qualitative assessment the SEA systems' status, implementation and processes as well as through a quantitative assessment the individual country's strengths, opportunities, weaknesses and threats to pave efficient national roadmaps for effective implementation of SEA systems. Limited accessibility to country data on SEA systems as well as the low country response rate restricted the information database available for analysis; highlighting an important gap in the literature on SEA systems and implementation. Nevertheless, countries in the MENA region appear to be at different stages of SEA

adoption and implementation, evolving towards effective SEA systems, albeit slowly, as is the case in many other locations worldwide.

Capitalizing on available opportunities, MENA countries are encouraged to enhance the development and enactment of SEA legislation as well as to strengthen the institutional framework for SEA to compensate for the lack of effective, transparent and systematic planning processes. In this context, specificities in the SEA frameworks need to a) include screening and scoping stages in the procedural framework of SEAs and ensure all plans, programs and policies are subject to environmental assessment; b) initiate SEA application to policies through pilot studies as a step to mainstreaming; and c) promote the role of SEA as policy tool and not only an administrative procedure through effective tiering of SEA with planning and decision making processes.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.jenvman.2013.03.053.

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