“Comparative evaluation of environmental impact assessment frameworks in Morocco and the World Bank using structured performance criteria”

AUTHORS	Zakaria Tih Asmaâ Ait Boubkr

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Zakaria Tih (Morocco), **Asmaâ Ait Boubkr** (Morocco)

COMPARATIVE EVALUATION OF ENVIRONMENTAL IMPACT ASSESSMENT FRAMEWORKS IN MOROCCO AND THE WORLD BANK USING STRUCTURED PERFORMANCE CRITERIA

Abstract

Public infrastructure projects can generate complex and potentially irreversible environmental and social effects; hence, the adequacy of Environmental Impact Assessment (EIA) frameworks is central to safeguarding people and ecosystems. This study provides a structured comparative analysis of Morocco's EIA framework (Law 12-03 and its reform Law 49-17) and the World Bank's Environmental and Social Framework (ESF), using a 17-criterion performance model to identify key alignments, gaps, and priorities for regulatory reform. A documentary analysis of binding laws, decrees, and official guidance was conducted, and each criterion was rated as met, partially met, not met, or not assessed. The ESF fully meets 15 criteria, partially meets one (climate change), and one criterion (costs and benefits) could not be assessed. Morocco's framework fully meets 11 criteria, partially meets three, does not meet two, and the costs–benefits criterion could not be assessed. Convergence is observed in core project-level requirements, including the legal basis, scope, standardized reporting, review, mitigation, impact monitoring, and consultation. Remaining gaps in Morocco are concentrated in operational and system-level instruments, notably screening, implementation of strategic assessments, system monitoring, and explicit treatment of ecosystem services; climate change adaptation is also not operationalized in either system. The findings highlight practical implications for both frameworks, while identifying prioritized implementation directions for Morocco, particularly regulatory operationalization and institutional strengthening, to improve alignment with contemporary assessment standards.

Keywords environmental impact assessment, Morocco, World Bank, environmental regulation, governance, performance criteria, comparative analysis

JEL Classification Q58, Q56, K30, K32

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Zakaria Tih, Ph.D. Student, Laboratory of Applied Modeling in Economics and Management, Hassan II University of Casablanca, Morocco. (Corresponding author)

Asmaâ Ait Boubkr, Ph.D., Laboratory of Applied Modeling in Economics and Management, Hassan II University of Casablanca, Morocco.

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INTRODUCTION

Over the past decades, public projects, particularly large infrastructure investments, have become increasingly complex, both technically and institutionally (Olander & Landin, 2005; Osipova & Eriksson, 2013; Tang et al., 2006). The growing diversity of stakeholders, the multiplication of territorial constraints, and the scale of financial commitments have gradually made governance a central prerequisite for ensuring the coherence, legitimacy, and long-term sustainability of decision-making (Guo et al., 2014). A distinctive feature of infrastructure projects is the high level of social and environmental expectations they generate (Guo et al., 2014). From this perspective, project requirements extend beyond economic and operational performance to include broader demands for transparency, participation, and accountability in relation to sustainability objectives.

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Within this evolving context, environmental and social considerations have become a key lever in the governance of large-scale projects, particularly those supported by international donors (Fuller, 1999; Wood, 1995). The World Bank's Environmental and Social Framework (ESF) requires borrower-financed projects to undergo an environmental and social assessment that integrates sustainability from early design through implementation. Since the 1980s, this framework has positioned the World Bank as a reference institution in the environmental and social appraisal of major public projects, supported by continuous strengthening of its technical and legal expertise (Dann & Riegner, 2019). Its standards have also influenced the practices of other financing institutions and shaped national regulatory systems (Gilardi, 2013). In Morocco, the national Environmental Impact Assessment (EIA) system has undergone substantial evolution, shifting from a largely voluntary phase, especially between 1994 and 2003, to a binding legal framework with the adoption of Law 12-03 in 2003, followed by its reform in 2020 through Law 49-17 (Benfadil, 2016). Consequently, large infrastructure projects co-financed by international donors are often subject simultaneously to the national EIA framework and the World Bank's ESF. The degree of alignment between these two systems, therefore, becomes a critical issue for project preparation and implementation.

In practice, the coexistence of national EIA rules and donor frameworks, such as the ESF, raises concerns about the consistency and adequacy of the environmental and social requirements imposed on project sponsors. Misalignment may lead to duplicated assessments, conflicting expectations, delays in appraisal, and, ultimately, uncertainty regarding the actual level of protection afforded to communities and ecosystems. This issue is particularly salient in Morocco, where an increasing share of public infrastructure is co-financed by donors applying the ESF, while project authorizations remain anchored in national EIA legislation.

To date, no criteria-based comparison has systematically assessed Morocco's EIA framework against the World Bank's ESF, nor mapped its convergence and divergence across key performance criteria. As a result, the extent of substantive alignment with this international benchmark remains unclear, as do the main regulatory gaps or blind spots. This absence of a structured diagnosis constitutes the core scientific problem addressed in this study. It limits the ability of policymakers and practitioners to prioritize legal and institutional reforms and to anticipate the safeguards that will effectively apply to donor-financed infrastructure projects.

1. LITERATURE REVIEW

Historically, Environmental Impact Assessment (EIA) has been progressively adopted worldwide as a central decision-making tool for project planning and implementation to mitigate adverse environmental effects and promote beneficial outcomes (Bhatt, 2023). Its institutional and normative evolution began in the late 1960s and 1970s, notably with the adoption of the National Environmental Policy Act (NEPA) in the United States in 1969, which established the requirement to assess the impacts of public projects (Karkkainen, 2002). This momentum was amplified at the global level through several milestones, including the Stockholm Conference of 1972 (Bhatt, 2023), the United Nations Framework Convention on Climate Change of 1992 (Bodansky, 1993), and the Convention on Biological Diversity in 1992 (Glowka et al., 1994). Together, these developments illustrate how EIA evolved from a legal obligation into a performance-oriented management instrument.

While much of the international literature distinguishes between EIA, mainly concerned with biophysical impacts, and Social Impact Assessment (SIA), which focuses on the social consequences of projects, more recent research, particularly in relation to international funding agencies, has moved toward an integrated approach referred to as Environmental and Social Impact Assessment (ESIA) (Dendena & Corsi, 2015). In this perspective, ESIA is increasingly seen as essential (Hanna et al., 2014), as it reflects the growing interdependence between environmental and societal sys-

tems (Vanclay, 2020). This integrated view highlights the need to consider both environmental and social dimensions when assessing the performance of impact-assessment frameworks.

Beyond project-level instruments such as EIA and ESIA, many countries have also introduced Strategic Environmental Assessment (SEA) for policies, plans, and programs, in order to embed environmental and social considerations at earlier stages of decision-making (Noble & Nwanekezie, 2017; Ronchi et al., 2025). In Africa, SEA is likewise increasingly adopted to mainstream environmental and social concerns into public strategies (Hipondoka et al., 2016; Tshibangu, 2018). However, evidence from several developing-country contexts indicates that SEA legal provisions are often not matched by adequate operational tools or implementation capacities, which limit their practical effectiveness (Mubanga & Kwarteng, 2020; Tshibangu, 2018).

The regulatory framework governing EIA defines the rules that structure the entire assessment process (Bhatt, 2023; Kolhoff et al., 2009). The performance of an impact-assessment system rests on several complementary dimensions. Mubanga and Kwarteng (2020) distinguish between procedural performance and substantive performance. Procedural performance refers to compliance with legal and regulatory requirements, whereas substantive performance concerns the system's ability to achieve its objectives in terms of environmental protection and social outcomes. Both dimensions, however, depend fundamentally on the quality of the regulatory framework. As several authors argue, an effective, well-structured legal framework aligned with international standards and best practices is a prerequisite for sound procedural implementation and tangible environmental results (Kolhoff et al., 2009; Mubanga & Kwarteng, 2020). Accordingly, the literature often conceptualizes EIA performance as an interaction between regulatory provisions and institutional capacities in practice (Berg, 2015; Kolhoff et al., 2009). In the broader field of major public investment projects, governance studies similarly underline that robust assessment and decision-making frameworks are essential for aligning projects with long-term sustainability objectives and enhancing strategic success (Klakegg & Haavaldsen, 2011).

Comparing EIA frameworks requires an explicit benchmarking approach that translates legal and procedural requirements into a consistent set of assessment criteria. Such a criteria-based method improves transparency and enables systematic cross-system comparison when rating rules are clearly defined. In this context, structured quality-criteria models provide a practical basis for assessing EIA systems at the level of regulatory and standard-setting provisions. Accordingly, evaluating EIA system performance remains difficult without a recognized model that specifies such criteria. Wood's (1995) framework, consisting of 14 criteria spanning the full EIA process, has been widely applied and validated in subsequent research, such as Bhatt (2023), Gibson et al. (2015), Greig and Duinker (2011), Sinclair and Diduck (2017), and Joseph et al. (2015). Building on this foundation, Mubanga and Kwarteng (2020) added three criteria reflecting emerging expectations under contemporary international pressures: ecosystem services, social impact assessment, and climate change. These additions are consistent with the Sustainable Development Goals (SDGs), which emphasize the need to incorporate such issues into modern environmental assessment practice (Baker et al., 2013). In parallel, climate-policy literature and international reviews of EIA legislation stress that effective climate responses require combining mitigation through reducing greenhouse-gas emissions, and adaptation by enhancing the resilience of societies and infrastructures to climate impacts (Stern, 2007; UNEP, 2018).

A critical synthesis of the literature reveals three dominant, interrelated trends shaping modern impact assessment. First, there is a clear normative evolution from a narrow, biophysical EIA toward integrated frameworks (ESIA) and upstream strategic tools (SEA), driven by international policy and recognition of socio-ecological interdependence (Noble & Nwanekezie, 2017; Vanclay, 2020). Second, the performance of these systems is understood as a function of both robust procedural rules and substantive outcomes, hinging on the quality of the underlying regulatory framework and institutional capacity (Kolhoff et al., 2009; Mubanga & Kwarteng, 2020). Third, in response, the academic and practitioner community has developed evaluation models, with Wood's (1995) criteria serving as a foundational and adaptable

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benchmark for systematic analysis. Its extension to include climate change, ecosystem services, and social impacts (Mubanga & Kwarteng, 2020) reflects the ongoing effort to align assessment frameworks with contemporary global challenges, such as the SDGs.

Consequently, the extended 17-criterion model provides a robust instrument for benchmarking impact assessment frameworks. The evaluation procedure and criteria are described in the Methods section (see Table 1).

2. METHODS

Evaluative research was used in this study, as it involves assessing existing regulatory frameworks against an analytical model of an effective EIA system, identifying gaps, and proposing improvement priorities. In line with classic definitions (Patton, 2000; Rossi et al., 2004; Scriven, 2003), evaluation is understood here as an analytical process for judging the relevance and effectiveness of a regulatory framework to improve the systems examined. Mubanga and Kwarteng (2020), in their comparative study of South Africa and Zambia, similarly describe evaluation as the identification of discrepancies between existing EIA legislation and an ideal EIA-system model. Although a larger number of cases could have provided a broader view, a two-case comparative design remains methodologically justified and consistent with previous evaluative studies (Eyong, 2010; Mubanga & Kwarteng, 2020).

An in-depth literature review and document analysis were conducted in two stages. First, academic work on EIA/EIS/ESIA tools, the role of regulatory frameworks, and models for assessing system quality was reviewed, with particular attention to Wood's (1995) criteria and their adaptation by Mubanga and Kwarteng (2020). Second, a systematic analysis of the two frameworks was carried out based on binding legal and guidance texts (the World Bank ESF and Morocco's laws, regulations, and official guidance). Additional documents, such as the constitutive texts of Morocco's National Council on the Environment (NCE) and materials documenting the World Bank's transition from safeguard policies to the ESF, were examined to assess cross-cutting criteria such as system monitoring.

In this study, the extended 17-criterion model (Table 1) provides a robust and comprehensive instrument for dissecting and benchmarking the regulatory architecture of impact assessment frameworks. It enables a move from general commentary to a structured diagnosis of systemic strengths and weaknesses.

Building on this analytical foundation, this study applies the 17-criterion model to conduct a structured, comparative evaluation of Morocco's EIA regulatory framework and the World Bank's Environmental and Social Framework (ESF). The purpose of this comparison is to:

- Systematically diagnose the configuration and coverage of each system against established good-practice criteria.
- Precisely identify the points of convergence and divergence between the two frameworks.
- Draw lessons to guide priority actions for regulatory coherence and reform, thereby improving the effectiveness and predictability of impact assessments for major infrastructure projects.

NVivo software was used to code the corpus according to the 17 performance criteria. This coding produced a comparative grid in which each criterion was rated as met, partially met, or not met. "Met" refers to explicit, binding provisions with clearly stated procedures and responsibilities; "partially met" indicates that coverage exists but remains limited or incomplete; and "not met" indicates the absence of explicit provisions. NVivo ensured traceability, reduced interpretation bias, and supported systematic synthesis. Results are documented in Appendix A through a detailed evidence matrix providing criterion-by-criterion justifications for each alignment status.

A key limitation is the exclusive focus on regulatory provisions without direct assessment of field implementation. However, the regulatory framework remains a critical first step in shaping EIA effectiveness, and the approach provides robust results

Table 1. The 17 criteria used in this study

	Criteria	
Wood's (1995) criteria	Legal basis	Assesses whether the EIA system rests on a clear, detailed, and binding legal basis
	Impact coverage	Assesses whether the system requires identification and analysis of all significant environmental (and social) impacts
	Alternatives	Requires comparison of reasonable project alternatives, including the "no-project" option, before approval
	Screening	Determines which projects are subject to EIA using an explicit list and/or risk-based criteria (size, nature, location, sensitivity)
	Scoping	Defines the key issues, boundaries, and level of detail of the EIA, usually through formal Terms of Reference
	Content	Ensures that EIA reports follow standardized content requirements and include all essential information
	Review	Assesses the quality of EIA review through technical appraisal by competent authorities and/or public scrutiny
	Decision-making	Requires that EIA findings and feedback effectively inform project approval or rejection decisions
	Monitoring	Requires monitoring of predicted impacts and compliance with commitments during and after project implementation
	Mitigation	Requires identification of measures to avoid, reduce, or compensate for adverse impacts and enhance positive effects
	Consultation and Participation	Ensures timely and meaningful stakeholder participation throughout the EIA process
	System monitoring	Assesses whether the overall EIA system is periodically evaluated and updated to improve effectiveness
	Costs and benefits	Assesses whether the benefits of the EIA system justify its costs and time requirements (efficiency)
	Strategic Environmental Assessment (SEA)	Assesses whether the system extends assessment to policies, plans, and programs with significant environmental and social implications
Criteria added by Mubanga and Kwarteng (2020)	Climate change	Requires integration of climate-change mitigation and adaptation considerations within EIA
	Ecosystem services	Requires assessing how ecosystem changes affect the services and benefits provided to people, society, and the economy
	Social impacts	Requires explicit assessment of project-related social effects on people, communities, health, livelihoods, and well-being

while offering the first structured performance-based assessment of the Moroccan EIA system.

This study relied solely on publicly available documents and did not involve human participants. Ethical considerations related to consent, anonymity, or recruitment were therefore not applicable.

3. RESULTS AND DISCUSSION

3.1. The World Bank's Environmental and Social Framework (ESF) and the Moroccan EIA framework

Introduced in 2018, the World Bank's revised Environmental and Social Framework (ESF) replaced the former safeguard policy system. The ESF comprises a Vision for Sustainable Development, an Environmental and Social Policy, and ten Environmental and Social Standards (ESS) that are binding on borrowing countries. ESS1, the most cross-cutting standard, sets the core requirements for identifying, assessing, and managing environmental and social risks and impacts. It places Environmental and Social Impact Assessment (ESIA) at the center of the framework, alongside complementary instruments such as environmental audits, risk assessments, and cumulative-impact analysis.

In Morocco, the obligation to conduct impact assessments was established by 2003 Law 12-03, which marked a major step in the country's environmental assessment system. The law adopts a broad understanding of the environment, encompassing social, economic, and cultural dimensions. In 2020, Law 49-17 strengthened this framework by expanding the range of assessment instruments. Beyond classic project-level EIA, it introduced Strategic Environmental Assessment (SEA) for policies, plans, and programs, as well as environmental audits and environmental opinions, thereby moving the Moroccan system closer to

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internationally recognized standards, particularly those applied by development partners.

3.2. Global alignment results

Figure 1 and Table 2 summarize the overall alignment of the two frameworks against the 17 performance criteria. The World Bank ESF meets 15 criteria, with one partially met (climate change) and one not assessed (costs and benefits). Morocco's EIA framework meets 11 criteria, with three partially met and two not met, while the costs–benefits criterion also remains not assessed. To clarify the logic of interpretation, Table 2 reorganizes the 17 criteria into four analytically meaningful groups:

(i) criteria fully met in both frameworks (baseline convergence);

(ii) criteria where both frameworks underperform (shared limitation);

(iii) criteria where Morocco underperforms while the ESF performs better (structural gaps); and

(iv) the criterion not assessed.

The paper adopts this grouping to examine each group successively, while the full criterion-to-provision evidence is reported in Appendix A.

3.3. Areas of convergence between the ESF and Morocco's EIA framework

Figure 1 and Table 2 indicate strong baseline convergence between the World Bank ESF and Morocco's EIA framework on core procedural and project-level EIA requirements. In both systems, assessments are grounded in clear legal provisions, apply a comprehensive impact-coverage logic that includes environmental and social dimensions, and require a structured scoping phase to define the assessment perimeter and key issues. They also impose standardized EIA report content subject to technical and public review, and link project approval to assessment findings, defined mitigation commitments, and mandatory follow-up monitoring.

Building on this already robust baseline, recent reforms under Law 49-17 introduced targeted improvements. In particular, they made the consider-

Table 2. Grouped comparative results highlighting baseline convergence and structural gap

Evaluation of criteria	Criteria
Criteria fully met in both frameworks	(11) Legal Basis; Impact Coverage; Alternatives; Scoping; Content; Review; Decision-making; Monitoring; Mitigation; Consultation and Participation; Social impacts
Criteria where both frameworks underperform	(01) Climate change
Criteria where Morocco underperforms and ESF outperforms	(4) Screening; System Monitoring; Strategic Environmental Assessment; Ecosystem services
Criterion not assessed	(01) Costs and benefits

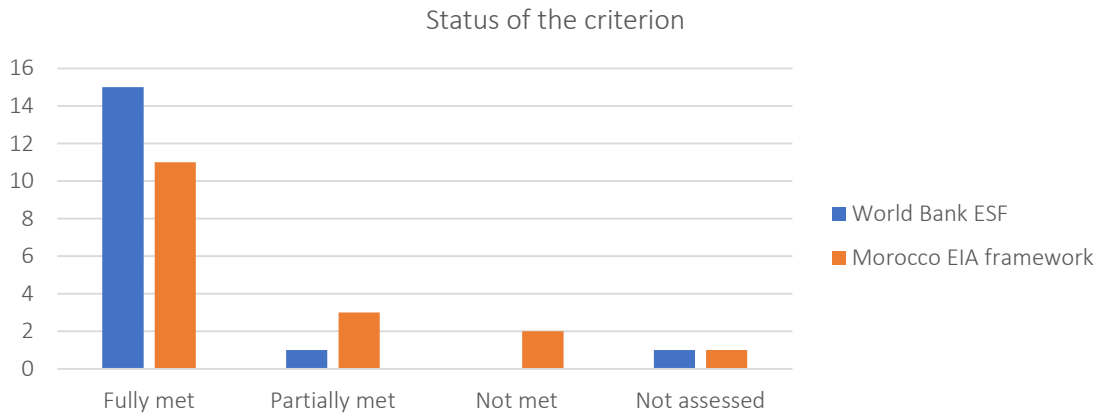

Figure 1. Overall alignment of the World Bank ESF and Morocco's EIA framework across the 17 performance criteria

ation of alternatives explicit, bringing this dimension fully in line with international standards. The reform also introduced SEA as a strategic instrument in Morocco; however, because its operationalization remains incomplete, its performance is discussed later among the remaining alignment gaps.

In addition to these areas of full convergence, only one criterion is partially met in both frameworks: climate change. This finding does not explain differences between the ESF and the Moroccan system, but rather points to a shared limitation. In the ESF, climate considerations are acknowledged in the Vision for Sustainable Development and operationalized mainly through mitigation requirements under Environmental and Social Standard 3 (ESS3), including the identification, quantification, and reduction of greenhouse-gas emissions; however, binding adaptation provisions are not specified. Similarly, Morocco's EIA laws (12-03 and 49-17) require the description and quantification of emissions, providing an entry point for mitigation, but they do not prescribe systematic climate-adaptation or resilience measures.

3.4. Criteria where Morocco underperforms (structural gaps)

Two criteria are only partially met in Morocco. First, system monitoring remains a weak point, as Morocco has no institution explicitly mandated to oversee EIA-system performance and to ensure system-level learning and updating. The National Council on the Environment (NCE) performs cross-cutting environmental functions but has no specific mandate for EIA-system monitoring, which explains the partial rating.

Second, SEA, although formally introduced under Law 49-17, remains only partially met. The law establishes SEA for policies, plans, and programs, but its preparation, review, and implementation modalities are left to secondary regulations that have not yet been issued; the absence of implementing decrees and guidelines therefore limits practical application.

Two other criteria are not met. First, screening is not operational in Morocco. Under the former Law 12-03, screening relied on a fixed regulatory list of projects subject to EIA. Law 49-17 (Art. 4) repealed that list and stipulates that a new list must be established by regulation; however, the implementing text has still not been issued nearly five years after the law entered into force, resulting in a clear legal vacuum. This weakens the EIA system at its entry point, as projects cannot be consistently filtered ex ante according to their likely significance. In contrast to the ESF, where screening is operationalized through mandatory risk categorization guiding ESIA depth and supervision, Morocco currently lacks a functional mechanism to determine when and how EIA should be triggered.

Second, the ecosystem-services criterion is not met in Morocco. Although both the old and new EIA laws require assessing impacts on ecological components (air, soil, fauna, flora, water, etc.), they do not explicitly require evaluating the benefits these components provide to individuals, society, or the economy.

3.5. Criteria not assessed

One criterion could not be assessed in this study, the costs–benefits criterion for EIA, due to the lack of empirical data from implemented projects. This criterion cannot be evaluated on a purely normative basis and requires evidence from concrete implementation experience. This limitation is consistent with Wood (2002), who argues that substantive ESIA performance – actual costs, timelines, and on-the-ground environmental and social benefits – cannot be reliably measured without project-level data. Future research should therefore complement regulatory comparison with applied, case-based evaluation.

3.6. Interpreting the patterns: implications for the World Bank and Morocco

The comparative results indicate broad convergence between the World Bank's ESF and Morocco's EIA framework on core impact-assessment requirements, suggesting that both systems share a common procedural backbone for project-level appraisal. Within this shared baseline, Morocco's EIA framework fully addresses social impacts, showing that assessment requirements are not limited to biophysical or ecological effects. This is important because the World Bank explicitly frames the instrument as an Environmental

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and Social Impact Assessment (ESIA). In contrast, Morocco's legal framework refers to an Environmental Impact Assessment (EIA) without explicitly naming the social dimension in the instrument's title, even though social impacts are explicitly addressed in the framework's legal and procedural requirements. This observation is consistent with the integrated understanding of EIA in the literature, which treats social dimensions as an inherent component of contemporary impact assessment (Dendena & Corsi, 2015; Hanna et al., 2014; Vanclay, 2020).

At the same time, the results show that, in both frameworks, climate change provisions are framed predominantly through mitigation, while adaptation is not translated into explicit operational requirements. This pattern is inconsistent with guidance recommending that EIA systems integrate climate adaptation with mitigation to support resilience-oriented decision-making (Stern, 2007; UNEP, 2018). In light of these recommendations, the absence of operational adaptation provisions may limit how much EIAs address climate risks and long-term vulnerability in project design and follow-up.

Beyond these convergences, Morocco's lower scores appear to reflect gaps in operationalization and oversight, particularly the absence of implementing regulations for screening and SEA and the lack of a clearly assigned mandate for system monitoring, rather than a lack of general environmental principles. Similar situations, in which an environmental body exists but lacks a formal EIA oversight mandate, have been reported in other contexts (Mubanga & Kwarteng, 2020; Wood, 1999). Regarding SEA, comparable implementation gaps have also been observed in developing-country settings where SEA is legally adopted but remains weakly operationalized (Mubanga & Kwarteng, 2020; Tshibangu, 2018). This means that environmental and social considerations are less likely to be systematically integrated into upstream decision-making at the program and strategy level. Consequently, they are more likely to be addressed later, during project evaluation, once the main options have been defined.

Finally, the absence of an operational screening instrument and the lack of explicit ecosystem-services requirements may reduce the system's capacity to prioritize significant impacts and to capture human well-being dependencies on ecosystems – limitations also noted in comparative assessments of African EIA systems (Mubanga & Kwarteng, 2020).

Building on these patterns, the comparative analysis yields practical implications for both frameworks. For the World Bank, the ESF's near-comprehensive coverage of the assessment criteria supports a consistently robust environmental and social appraisal process across key dimensions, including scoping, disclosure, consultation, mitigation planning, and follow-up. This degree of procedural and substantive alignment may strengthen the perceived credibility and acceptability of Bank-financed projects among borrowers and affected communities, thereby supporting long-term sustainability objectives. This interpretation resonates with Klakegg and Haavaldsen's (2011) argument that the success of major public investment projects depends, among other factors, on embedding sustainability and legitimacy within governance arrangements.

For Morocco, the key reform challenge lies in translating legal provisions into operational instruments and enforceable responsibilities. Priorities, therefore, include accelerating the adoption of implementing regulations (notably for SEA and screening) and clarifying institutional accountability for system monitoring and periodic performance review. In this respect, strengthening the formal mandate of the National Council on the Environment (NCE), or designating an equivalent body with explicit coordination, oversight, and evaluation functions, could provide a concrete lever for system-level learning and updating.

CONCLUSION

This study aimed to conduct a structured, comparative evaluation of Morocco's EIA regulatory framework and the World Bank's Environmental and Social Framework (ESF), using the 17-criterion performance model to identify key alignments, gaps, and priorities for regulatory reform.

The novelty of this study lies in providing the first systematic, criteria-based diagnosis of Morocco's EIA framework against the World Bank's ESF across key performance criteria. By combining explicit rating rules with an evidence-based justification matrix, the analysis moves beyond general commentary and offers a structured performance-based assessment that clarifies where alignment exists and where regulatory blind spots persist.

The results reveal broad convergence between the two frameworks on core project-level requirements. However, the World Bank ESF outperforms the Moroccan framework, particularly in the operationalization of screening, Strategic Environmental Assessment (SEA), system monitoring, and the explicit inclusion of ecosystem services considerations. Overall, these results suggest that the Moroccan EIA framework's main weakness is not a lack of foundational principles, but a gap in regulatory operationalization and systemic oversight.

In practice, the results of this study can serve as an operational checklist for policymakers, regulators, and project sponsors to anticipate compliance requirements and reduce uncertainty in donor-financed infrastructure projects. The results also identify the most concrete priorities, namely the operationalization of screening and EIA through the implementation of regulations, and the allocation of a clear institutional mandate for monitoring the EIA system (for example, through a designated body such as the National Council on the Environment).

Future research should complement this normative benchmarking with project-level case studies to assess whether informal rules and practices can bridge the gaps identified in Morocco's formal EIA framework, and to test the extent to which EIA findings actually influence project decision-making, particularly when economic and political considerations dominate.

AUTHOR CONTRIBUTIONS

Conceptualization: Zakaria Tih, Asmaâ Ait Boubkr.
Data curation: Zakaria Tih.
Formal analysis: Zakaria Tih.
Methodology: Zakaria Tih, Asmaâ Ait Boubkr.
Project administration: Zakaria Tih, Asmaâ Ait Boubkr.
Supervision: Asmaâ Ait Boubkr.
Validation: Asmaâ Ait Boubkr.
Visualization: Zakaria Tih.
Writing – original draft: Zakaria Tih.
Writing – review & editing: Asmaâ Ait Boubkr.

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APPENDIX A

Table A1. Criterion-by-criterion evidence matrix for comparing the World Bank ESF and the Moroccan EIA framework

Criteria	World Bank ESF	Criterion met?	EIA Moroccan framework	Criterion met?
Legal Basis				
Is the EIA system based on clear and precise legal provisions?	2018 ESF provides a binding environmental and social policy and ten Environmental and Social Standards (ESS), with ESS1 establishing ESIA as the core legal and operational requirement.	Criterion met	EIA requirement established by Law 12-03 and currently governed by Law 49-17 on environmental assessment. Implementation and review procedures framed by Decrees 2-04-563 (review committees) and 2-04-564 (public inquiry), supported by national methodological guidance.	Criterion met
Impact Coverage				
Should the relevant environmental impacts of all significant actions be assessed?	ESS1 requires the assessment of all relevant environmental and social risks and impacts of the project, including direct, indirect, and cumulative effects, and integrates them into the Environmental and Social Management Plan (ESMP). The thematic ESS (e.g., ESS3–ESS8) specify requirements for specific types of impact: Pollution and Resource Efficiency and Pollution Prevention and Management (ESS 3), Community Health and Safety (ESS 4), Land Acquisition, Restrictions on Land Use and Involuntary Resettlement (ESS 5), etc.	Criterion met	Law 12-03 (Arts. 5 & 6) requires assessment of direct and indirect, temporary and permanent impacts on biological, physical, human, and cultural environments. Law 49-17 (Arts. 1 & 7) confirms comprehensive coverage of short-, medium-, and long-term impacts and nuisances (waste, emissions, biodiversity, heritage, health, etc.). The national methodological guide structures impact analysis across physical, biological, and socio-economic components.	Criterion met
Alternatives				
Does the project owner have to demonstrate in the EIA that they have examined the environmental impacts of other possible options?	ESS1 (Section D. Indicative Description of the ESIA) requires an analysis of feasible project alternatives (including location/technology/design/operation and the no-project/zero option), comparing their environmental and social implications within the ESIA.	Criterion met	Under Law 12-03, the legal obligation to compare alternatives was not explicit; references to alternatives appeared mainly in methodological guidance. Law 49-17 (Art. 7) now explicitly requires the EIA to include alternative solutions to mitigate negative effects and enhance positive impacts.	Criterion met (a new feature of Law 49-17)
Screening				
Is it necessary to verify, in advance, whether a project is likely to have significant environmental impacts?	The Bank's environmental and social policy for investment financing (the second component of the ESF) requires all financed projects to undergo environmental and social assessment and to be screened ex ante through mandatory risk categorization (high/substantial/moderate/low), which determines the depth of ESIA and supervision.	Criterion met	Law 12-03 relied on a fixed regulatory list of projects subject to EIA. Law 49-17 repealed that list (Art. 32) and stipulates that a new list must be established by decree (Art. 5); however, this implementing decree has not yet been issued, creating a clear legal vacuum for screening.	Criterion not met
Scoping				
Should the environmental impacts of actions be assessed, and should specific guidelines be developed?	A mandatory framework, detailed in Annex 1 of the first standard (ESS1), requires a structured scoping process that defines the assessment perimeter based on potential risks and impacts, with early stakeholder input; the level of detail must be proportional to project risk.	Criterion met	Law 12-03 (Art. 6) and Law 49-17 (Art. 7) require terms of reference that frame the EIA's scope, as detailed in the national methodological guide. Scoping is designed as a participatory step involving review committee members, relevant authorities, the applicant, and local stakeholders.	Criterion met

Table A1 (cont.). Criterion-by-criterion evidence matrix for comparing the World Bank ESF and the Moroccan EIA framework

Criteria	World Bank ESF	Criterion met?	EIA Moroccan framework	Criterion met?
Content				
Do EIA reports have to meet prescribed content requirements?	ESS1 (Annex 1, Section D) requires ESIA reports to follow a standardized structure, including: executive summary; legal and institutional framework; project description; baseline conditions; assessment of environmental and social risks and impacts; mitigation and management measures; alternatives analysis; project design considerations; Environmental and Social Engagement Plan (ESEP) measures; and annexes.	Criterion met	Law 12-03 (Art. 6) and Law 49-17 (Art. 7) require a structured EIA report including: legal and institutional framework; project description; assessment of environmental and social effects; mitigation measures; monitoring program; an executive summary; and a simplified public summary.	Criterion met
Review				
Do EIA reports need to be technically and publicly reviewed?	Under the Environmental and Social Policy (Section C: Due Diligence), the Bank conducts a technical review of the borrower's ESIA, may request further information, and ensures alignment with ESS requirements. The Policy (Section F: Information) together with ESS10 requires public disclosure of ESIA risks and impacts in an accessible and timely manner, enabling stakeholder review and comments.	Criterion met	Technical review is undertaken by the National Impact Assessment Committee for high-stakes projects or by Regional Committees for smaller and single-region projects. A draft EIA report is subject to a 20-day public inquiry; affected and interested parties submit comments, and the proponent must respond before final submission.	Criterion met
Decision-making				
Should the findings of the EIA report and its review be a central element in the decision to approve or reject a project?	Under ESS1 and the Environmental and Social Policy, the borrower must complete the ESIA and define risk-mitigation measures before any project activities start. Financing approval is conditional on these ESIA results and agreed measures.	Criterion met	Project authorization requires a prior environmental acceptability decision issued after review of the EIA report; if impacts are unacceptable and cannot be mitigated, the acceptability decision is denied, and the project is refused (Law 12-03, Art. 7; Law 49-17, Art. 8).	Criterion met
Monitoring				
Should monitoring of the impacts of actions be undertaken, and is this linked to the early stages of the EIA process?	ESS1 requires the borrower to define monitoring measures within the ESIA and to formalize them through the Environmental and Social Engagement Plan (ESEP), with periodic reporting to the Bank on implementation and monitoring results during project execution.	Criterion met	Monitoring measures are a mandatory component of the EIA report under Law 12-03 (Art. 6) and Law 49-17 (Art. 7), through an environmental monitoring program. National EIA guidelines (including the Review Procedure Manual) provide a standard monitoring-program model and require corrective measures when unforeseen impacts occur.	Criterion met
Mitigation				
Should mitigation of the impacts of actions be considered at different stages of the EIA process?	ESS1 requires an Environmental and Social Management Plan (ESMP) as part of the ESIA. The ESMP specifies mitigation measures following the mitigation hierarchy (avoid, minimize, restore, compensate) to address identified environmental and social risks and impacts.	Criterion met	Law 12-03 (Art. 6) and Law 49-17 (Art. 7) require EIA reports to include measures to eliminate, reduce, or compensate negative project impacts on the environment and population health, while promoting positive effects.	Criterion met

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Table A1 (cont.). Criterion-by-criterion evidence matrix for comparing the World Bank ESF and the Moroccan EIA framework

Criteria	World Bank ESF	Criterion met?	EIA Moroccan framework	Criterion met?
Consultation and Participation				
Should consultation and participation take place before and after the publication of the EIA report?	ESS10 requires continuous stakeholder engagement throughout the project lifecycle, starting early, to support decisions and risk management. Borrowers must prepare and disclose a Stakeholder Engagement Plan (SEP) and establish a grievance mechanism to ensure transparent and accessible consultation.	Criterion met	Laws 12-03 (Art. 9) and 49-17 (Art. 9) require a public inquiry enabling citizens to review a non-technical summary and submit comments. Decree 2-04-564 frames the inquiry modalities, including its duration (20 days), and requires an official public register for collecting observations. National methodological guidance stipulates that scoping must include public participation (authorities, applicants, experts, and affected populations).	Criterion met
System Monitoring				
Should the EIA system be monitored and, if necessary, modified to incorporate feedback?	The ESF is subject to system-level oversight through the Independent Evaluation Group (IEG), which conducts objective evaluations of Bank policies and operations, including ESF performance, and reports directly to the Board of Executive Directors. The IEG was tasked with evaluating the safeguard policies, highlighting several shortcomings that led to their revision and gave rise to the current new ESF.	Criterion met	Neither Law 12-03 nor Law 49-17 designates a body explicitly mandated to monitor EIA-system performance and generate system-level feedback. The National Council on the Environment (NCE) performs cross-cutting consultation and environmental monitoring roles, but its constitutive decree does not explicitly assign EIA-system monitoring; this provides only an indirect and non-formalized basis for system follow-up.	Criterion partially met
Costs and Benefits				
Are the financial costs and time required for EIA systems acceptable to stakeholders, and are they considered offset by discernible environmental benefits?	The cost–benefit performance of EIA systems cannot be evaluated solely on the basis of legal and procedural documents; project-level empirical data would be needed for both frameworks.	Outside the scope of the study	The cost–benefit performance of EIA systems cannot be evaluated solely on the basis of legal and procedural documents; project-level empirical data would be needed for both frameworks.	Outside the scope of the study
Strategic Environmental Assessment (SEA)				
Does the EIA system apply to major programs, plans, policies?	ESS1 requires the use of a Strategic Environmental and Social Assessment (SESA) for policies, programs, or plans, not only for individual projects.	Criterion met	Law 49-17 (Chapter 2) introduces SEA for evaluating policies and programs, marking a formal regulatory advance. However, implementation remains limited because preparation, review, and approval modalities are left to secondary regulations and guidelines that have not yet been issued.	Criterion partially met (a new feature of Law 49-17)
Ecosystem services				
Do EIA laws and regulations consider impacts on Ecosystem services?	The ESF explicitly requires consideration of ecosystem services within ESIA, notably through ESS3 and ESS6, which frame impacts on ecological assets in relation to the benefits they provide to affected communities.	Criterion met	Laws 12-03 (Art. 5) and 49-17 (Art. 5) require assessment of impacts on ecological components (air, soil, fauna, flora, water, etc.) but do not require linking these impacts to the benefits ecosystems provide to individuals, society, or the economy (service-based approach).	Criterion not met

Table A1 (cont.). Criterion-by-criterion evidence matrix for comparing the World Bank ESF and the Moroccan EIA framework

Criteria	World Bank ESF	Criterion met?	EIA Moroccan framework	Criterion met?
Social impacts				
Do EIA laws and regulations consider social impacts?	Social impacts are explicitly required under the ESF as part of the ESIA process. Several ESS specify mandatory assessment of key social-risk domains, such as labor and working conditions, community health and safety, land acquisition and resettlement, and impacts on Indigenous Peoples and local communities, thereby ensuring that social dimensions are systematically integrated into ESIA practice.	Criterion met	Although the term "social" is not in the title of the instrument, both laws require assessing impacts on people and communities (health, safety, hygiene, human environment), confirming inclusion of social dimensions within EIA scope.	Criterion met
Climate Change				
Do EIA laws and regulations incorporate the impacts of climate change?	Climate considerations are included through ESS3 and related requirements, emphasizing mitigation (quantification and reduction of emissions and pollution sources). However, explicit, binding adaptation and resilience assessment requirements are not clearly specified.	Criterion partially met	Laws 12-03 and 49-17 require description and quantification of emissions and pollution sources, providing an entry point for mitigation. No explicit requirement for climate-adaptation or resilience measures is prescribed in the laws or guidelines.	Criterion partially met

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