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Evaluating the Efficiency of Environmental Impact Assessments (EIAs) in CPEC Infrastructure Development

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ABSTRACT

The China–Pakistan Economic Corridor (CPEC), as a flagship project of the Belt and Road Initiative (BRI), has significantly transformed Pakistan's infrastructure, energy sector, and regional connectivity. However, the large-scale nature of CPEC projects raises critical environmental concerns, making Environmental Impact Assessments (EIAs) a key regulatory and planning tool for sustainable development. This study evaluates the efficiency of EIAs in CPEC infrastructure development by examining regulatory frameworks, implementation practices, mitigation effectiveness, and stakeholder participation. Under Pakistan's Environmental Protection Act (1997), EIAs are mandatory for mega infrastructure projects, aiming to minimize environmental damage and support sustainability goals. Existing

studies indicate mixed outcomes. While EIAs are designed to identify environmental risks and propose mitigation strategies, empirical assessments reveal performance gaps. For instance, research using an EIA Index for CPEC road projects recorded a low performance score (0.47), suggesting weak mitigation planning, monitoring, and environmental management practices. Additionally, concerns related to deforestation, increased carbon emissions from coal-based energy projects, and rising vehicular emissions highlight limitations in environmental oversight. The study argues that although EIAs provide an essential framework for environmental governance in CPEC, their effectiveness is constrained by implementation weaknesses, monitoring gaps, and limited institutional coordination. Strengthening regulatory enforcement, improving technical capacity, enhancing public participation, and integrating strategic environmental assessments can improve EIA efficiency. The research contributes to policy discussions on sustainable infrastructure governance and environmental accountability in transnational mega-development projects.

Keywords: Environmental Impact Assessment (EIA); China–Pakistan Economic Corridor (CPEC); Sustainable Infrastructure; Environmental Governance; Mega Development Projects; Environmental Policy; Pakistan Environmental Protection Act (PEPA); Sustainable Development; Belt and Road Initiative (BRI); Environmental Risk Management.

INTRODUCTION

China-Pakistan Economic Corridor (CPEC) is one of the most expansive projects in the history of the development of infrastructure in Pakistan, the connection of domestic infrastructure plans and China Belt and Road Initiative (BRI). The project includes energy production, transport corridors, port development, and industrial zones, which changes the economic geography of Pakistan and its connection with the rest of the region (Government of Pakistan, 2017). Although CPEC is viewed as an engine of economic change and political stability in the Middle East, the magnitude and rate of construction projects provoke urgent concerns about ecological management and sustainable development.

Environmental governance means like Environmental Impact Assessments (EIAs) are important in balancing the effects of development megaprojects on the environment. EIAs are required by law as in the Pakistan Environmental Protection Act (1997) in section 12 and are aimed at establishing the possible ecological risks, suggest mitigation actions and include the environmental aspects in the decision-making process before a project is implemented (Glasson, Therivel and Chadwick, 2012). The expected regulatory role of EIAs is therefore at the focus of the wider dilemma of economic modernisation and environmental conservation.

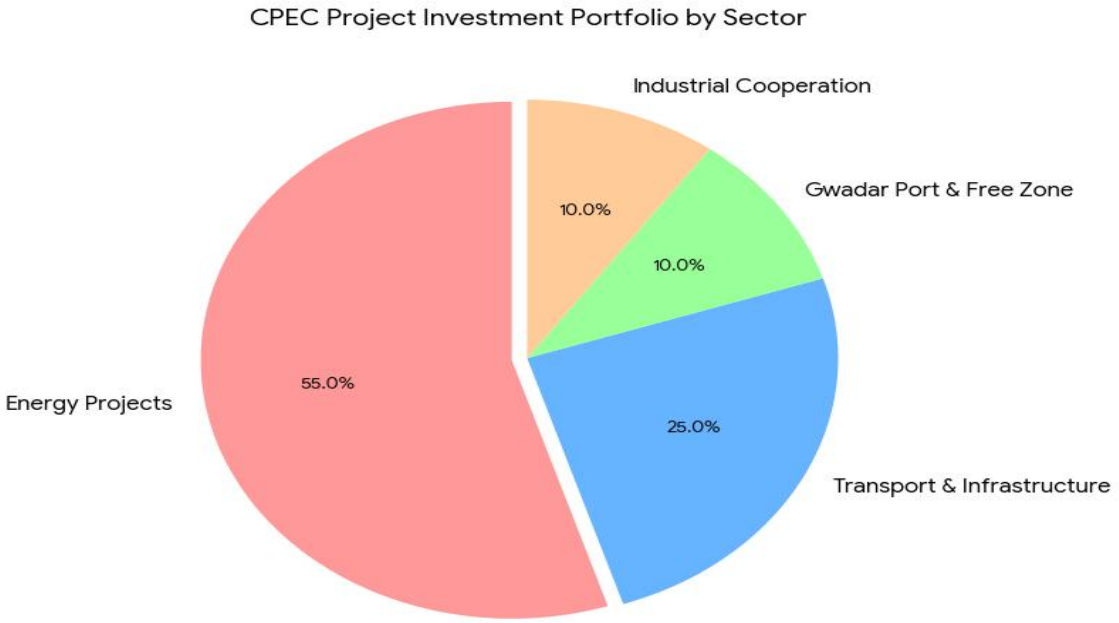
In spite of their legal enforceability, the effectiveness of EIA systems in CPEC has raised questions based on its feasibility. Civil society groups, academics, and policy analysts observe loopholes that exist between statutory design and

enforcement in the field such as accelerated approvals, inadequate public disclosure, ineffective monitoring, and lack of institutional capacity (Hussain, 2019). This has led to a re-evaluation of the question whether or not EIAs are offering meaningful environmental protection or are performing more as a procedural responsibility in order to help fuel projects through its execution process.

The article will assess the efficacy of EIAs in CPEC infrastructure enhancement with special considerations of the institutional implementation, enforcement strategies as well as governance limitations. The research question to be answered by analysis is as follows: How much do EIAs work as tools of environmental risk management in CPEC and what structural factors constrain their performance? The analysis of regulatory processes, institutional strengths as well as the involvement of the people and external political struggles help the study to add to policy relevant discussions on how Pakistan can enhance environmental management in the strategic development initiatives.

LITERATURE REVIEW

Environmental Impact Assessments (EIAs) have become a focal point of control in course of the reduction of ecological and social impacts of the development projects. The emergence of EIAs can be traced to the introduction of environmental governance changes in developed industrial economies in the 1970s especially with the enactment of the United States of America National Environmental Policy Act (NEPA). However, EIAs have since grown into becoming a normity requirement incorporated in national environmental laws across the world (Glasson, Therivel, and Chadwick, 2012).



EIAs as Regulatory Instruments in World Affairs

EIA at the international level is well known as a tool that is to provide environmental accountability, risk reduction, and rationalization of policies before

execution of a project. Safeguard policies formalized by multilateral development institutions, such as the World Bank, International Finance Corporation (IFC), and Asian Development Bank (ADB) necessitate the impact assessment procedures, consultation with the stakeholders, and disclosure (World Bank, 2016). Research indicates that EIAs are best implemented in transparent regulatory frameworks that are backed by independent enforcement authorities, robust scientific capacity and high-level citizen engagement (Morgan, 2012).

Nevertheless, researchers also warn that EIA performance is very diverse in terms of situations. Places where EIAs are most advantageous are the industrialized states that enjoy institutional maturity, judiciary fall back, and a civil society that is strong and healthy (Jay et al., 2007). Conversely, the developing states tend to have formalistic procedures but there is lack of environment protection and this situation is associated with weak state capacity, political pressure and limited technical resources (Momtaz & Kabir, 2013).

Developing Countries EIAs: Task Force and Implementation Problems

There is a literature deficit on how EIAs is practiced in the developing economies. In South and Southeast Asian studies, it is reported that there is a tendency of:

- Quickened projects approvals
- Poorly disclosed by the people
- Little involvement of the affected communities
- Weakpost-approval monitoring (Halvorsen & Nguyen, 2019).

The following trends can be attributed to the challenges of governance that include:

1. Poor technical competence
2. Lack of external regulations bodies
3. Infrastructure development as a political cause
4. Excessive dependence on development by donor or investors

Based on this, scholars think that in instances where political elites and investors control decision-making, EIAs end up being procedure checklists and not processes that influence the environment (Benson and Jordan, 2010).

CPEC Environmental Governance and New Scholarship

The world of academia has been growing its interest in CPEC at an alarming rate, with the main emphasis on geopolitics, regionalization, and Pakistan-China strategic relationships (Small, 2020). The more recent literature touches on the topic of economic growth, energy security, and sociopolitical implications of infrastructure modernization (Shah, 2018). Nevertheless, CPEC environmental governance is not as investigated as compared to the security, economic, and diplomatic aspects.

Current environmental evaluation recognizes environmental externalities of CPEC corridor projects, which are:

- Land-use change
- Hazardous waste discharge

• Coal-fired power plants and air pollution and water pollution.
• Ecological fragmentation from road construction (Hussain, 2019).

A study based on how individual projects are examined like Sahiwal coal power plant or Gwadar Port expansion implies that EIAs are performed but mostly shortcomings are due to insufficient rigor in exhibition and feeble adherence to follow-up (Khan and Khan, 2021). These results support the general criticism of the regulatory infrastructure in Pakistan where followers note uneven enforcement potentials across provinces (Aslam, 2020).

Structural Constraints and Gaps in Governance in Pakistan

The **Pakistan Environmental Protection Act (1997)** and follow-up reforms to devolve regulations by the 18 th Constitutional Amendment constitute the environmental regulatory environment of Pakistan. On the one hand, these reforms increased the accountability of the provinces, but the scholars claim that it resulted in the disintegration of the oversight capacities and the emergence of coordination issues between the federal and provincial governments (Hussain, 2019).

Pakistan Literature has pointed to a number of weaknesses in the environmental governance systems within Pakistan:

• Provincial EPAs that are strapped by resources
• Low laboratory and technical diagnostics
• Incentives that lead to bureaucracy treating projects as an approval as opposed to a scrutiny
• Low institutional autonomy and political interference (Aslam, 2020).

Further, in accordance with the political economy approaches, the strategic and diplomatic importance of CPEC provides a framework where environmental monitoring is subordinated in priority when it is compared to the economic or geopolitical goals (International Crisis Group, 2018).

Gap in the Literature

Although the interest of scholars towards CPEC has increased, the literature has three distinct gaps:

1. Limited cross-project evaluation

The vast majority of the studies are focused on the evaluation of individual sites not on systematic application of EIAs in various sectors.

2. Insufficient focuson institutional capacity

There are not many studies that consider the effect of staffing, funding, coordination, and autonomy on EIA effectiveness.

3. Lack of integrated governance analysis

The politically-oriented people rarely associate environmental performance with political motives, authority levels, and government systems in Pakistan.

This article fills these gaps via a systematic, intersectoral assessment of the practice of EIA under CPEC that is based on environmental governance theory and put in the framework of the institutional limitations existing in Pakistan.

Regulatory Effectiveness and Governance of the Environment

The general environmental governance literature points to the fact that institutional requirements are not adequate to ensure environmental protection. The law, administrative capacity, and political will have a mutually dependent relationship to governance outcomes (Lemos and Agrawal, 2006). It is the opinion of scholars that where regulatory agencies are not independent with decision making powers, there will only be symbolic laws on the environment instead of working laws (Benson and Jordan, 2010). Such a situation is especially pronounced in those states where the level of development has advanced quite swiftly, and ministries favoring development have unequal influence in comparison with the environmental regulators.

Further research in South Asia shows that **bureaucratic path dependence** and elite networks determine the results of governance. In India and Bangladesh, studies indicate that developmental ministries usually consider the environmental protection as a form of bureaucratic barrier instead of developmental resource (Momtaz & Kabir, 2013). As a result, the decision-making process is linked to a low status of environmental regulation in favor of national growth priorities, which leads to the compliance but substantive abandonment of the rule.

Belts and Roads Initiative (BRI) and Green Politics

The literature that discusses environmental aspects of the Belt and Road Initiative in China provides both positive and negative evaluations. On the one hand, since 2014, China has indicated commitment to the principles of Green BRI by means of policy statements, guidelines, as well as domestic environmental reforms (OECD, 2018). According to scholars, the changes of transforming to the ecological modernization that take place within China in China incorporate enhanced emissions regulation, judicial involvement, and the rights to take part (Shapiro, 2020).

Nevertheless, there is some empirical evidence that **BRI projects in foreign countries fail to export the Chinese domestic environmental standards** in a consistent manner. Rather, the investment is predisposed to accordance to the governance in host states (Huang, 2019). The same tendency can be observed in projects in Sub-Saharan Africa, Southeast Asia, and Central Asia, where the quality of the implementation is largely dependent on host-country regulatory strength (Ascensao et al., 2018). This confirms the view that governance of environmental risk in BRI is very contextual.

In Pakistan, this process places the major task of environmental control directly on the shoulders of local agencies and not on Chinese investors (Hussain, 2019). Such development of CPEC in this way is therefore a cause of the sustainability of the development more than the policy preferences of China.

Lessons of the large infrastructural corridors compared

Megaproject research has an important comparative value in terms of environmental assessment performance. In Latin America, the involvement of highway and hydropower megaprojects scholars record that initial EIA report usually is extensive but cannot translate into long-term protection of the

environment because of deficient monitoring mechanisms and the absence of any public accountability mechanisms (João et al., 2011). Equally, the African resource corridors are characterized by diminishing regulatory interactions following the start of construction, which results in discrepancies between anticipated and achieved environmental situations (Diaw & Gellar, 2015).

These fashions coincide with the issues that arise out of CPEC. The institutional environment in Pakistan illustrates institutional barriers to governance such as capacity bottlenecks, centralized decision-making, and poor devolution that pose challenges on EIAs to continue to have a say at the construction and the initial operation phases. The relative work thus supports the idea that CPEC is not distinctive but exists within the trend patterns of environmental management strains in fast-growing economies internationally.

Legal Formulations and Enforcement Formats

Legal literature highlights the need to have credibility of enforcement by the environmental regimes. Importantly, unenforced laws that lack systems of punitive measures do not change the behavior of development (McNeill, 2017). This challenge is reflected in the environmental regime of Pakistan. Although the Pakistan Environmental Protection Act (1997) stipulates EIAs and enables agencies to inflict a penalty, scholars observe that there are few prosecutions and fines because of overlapping bureaucratic mandates, political inclinations, and perceived low prosecutorial capacity (Aslam, 2020).

Additionally, functional ambiguity was brought about by devolution after the 18 th Constitutional Amendment. Writers believe that the transfer of the power of decision making about the environment to provincial governments did not keep pace with the provincial growing capacity but instead agency staffing, labs, and expertise were insufficient to manage the complicated reviews about the environment (Hussain, 2019). Such structural loopholes undermine the performance of EIA despite what the legal foundations may seem to be sound.

Social Legitimacy of Public participation and procedural justice

It is an increasing literature on the democratic role of EIAs. Procedural justice involves public participation in which the affected communities will raise issues, suggest ways to mitigate the impact and will challenge decisions that are not sustainable. Nevertheless, the active engagement in most parts of the developing world is still limited to socioeconomic disparities, political privilege and access constraints on information (Morgan, 2012).

In the case of CPEC, research indicates that there is a little community participation in the decision-making process of the environment. At Gwadar, Thar, and Sahiwal, local populations have also voiced regarding the issue of displacement, air quality, water withdrawal, and fisheries disruption and have limited institutional power (Khan and Khan, 2021). Formal hearings by the public are symbolic, and the EIA documentation, once published, is prepared with technical terms and is available in a form that can neither be understood by the general audience (International Crisis Group, 2018). This compromises the legitimacy of EIA and

destroys confidence of the citizens, and this increases the likelihood of conflicts around the development sites.

Climate Vulnerability, Geo Little, and Pakistan Vulnerability Situation

The other dimension that emerging literature brings under consideration is the increased vulnerability of Pakistan to climate stress. Being among the states, which face one of the significant climate changes, Pakistan faces growing problems, such as drought, flooding, water shortages, and degradation of ecosystems (World Bank, 2022). According to the scholars, development megaprojects must be steered instead by a climate of adaptation argument besides the role of environmental risk avoiding considerations.

EIAs, in this case, play a crucial role in this matter as climate-compatible planning frontline tools. Nevertheless, climate-risk integration in EIAs is still low in Pakistan, and assessments are often not done considering a vulnerability mapping, climate projections, and cumulative impacts (Aslam, 2020). This lack of such integration casts long-term standards of the resilience of the CPEC infrastructure itself in a new light.

Synthesis and New Research Areas

Altogether, the literature predetermines three general findings:

1. **Environmental governance in most countries globally** is stipulated on the basis of EIAs, but the effectiveness of implementing this tool depends on procedural correctness, implementation, and citizen checking.
2. **States in the developing stage such as Pakistan have exhibited systemic weaknesses** in the translation of legal requirements into the substantive environmental protection owing to institutional, political and technical constrictions.
3. **The research on CPEC is still new** and available literature indicates that environmental protection is disproportionate, conditioned by geopolitical urgency, insufficiency of institutions and limited involvement of the population.

As a synthesis of the body of scholarship on the subject on the global level, regionally, and specifically on Pakistan, the present study will add to the current discourse of the body of scholarship on CPEC environmental governance by assessing the extent to which EIAs are effective in terms of practice in one of the most ambitious development projects in Pakistan.

Theoretical and conceptual framework

Construction of Efficiency of Environmental Impact Assessment (EIA) of CPEC Infrastructure Development.

Environmental Impact Assessment EIAs lie between planning development, stewardship of resources and social responsibility. This article uses two bodies of theory that are complementary in order to explain their performance in the CPEC infrastructure program in Pakistan, namely Environmental Governance Theory and the Political Economy of Development.

Environmental Governance Theory

The environmental governance theory offers a conceptual base on the process through which states, institutions, markets and civil society actors confer to save environmental outcomes (Lemos and Agrawal, 2006). The essence is that environmental protection neither requires only whether there are laws or regulations, but also goes to the institutional frameworks and decision making procedures within which the laws will be translated into practical application. In this regard, EIAs are governance tools that are aimed.

1. Incorporate environmental concerns in the development decisions.
2. Devolve decisions among the state, market and community players.
3. Create accountability towards mitigation of ecological risks.

The rule of law, financial transparency, regulatory independence, and citizen input it can be effective to filter environmentally unwise projects within the frames of the governance systems that are firm and robust in terms of their chacterization. However, in contrast, when governance is weak, i.e., when capacity is low, political influence exists, and bureaucratic judgements, then EIAs can degenerate into procedural formalities with no substantive effect (Benson and Jordan, 2010). When applied to CPEC, the environmental governance theory has pointed out that environmental IAs are successful based on:

The fitness of provincial Environmental Protection Agencies

- Governing of federal with provincial institutions.
- The capability of the institution to avoid politics.
- . Respect to ability to track and implement compliance
- The constructive presence of the stakeholders.

Therefore, the failure of any of these dimensions restricts the usefulness of EIAs regardless of the legal requirements.

Economic Policy of Development

The political economy framework, provides a second interpretative lens since the relations of power and incentives together with developmental priorities determine the policy implementation. In this school of thought, infrastructure megaprojects are not apolitical technical projects, but rather, political project entrenched in national economic policies, foreign policy agendas, and elite bargains (Robinson and Acemoglu, 2012).

CPEC political economy is manifested in the strategic reliance of the energy and infrastructure development of Pakistan. The Geopolitics and business of the Belt and Road Initiative in China. Strong domestic interests such as federal ministries, military planners, and the private investors that focus on project schedules and economic payoffs. Disadvantaged community groups of weak bargaining power.

This imbalance creates a regulatory environment whereby developmental needs can form the basis of overlooking the environmental caution. According to academics, these contexts can be termed development-first governance regimes, in which EIAs are subordinate to growth agenda, and not physical environmental protection instruments (Momtaz and Kabir, 2013).

Within this framework, the EIAs are understood as both technical and the political instruments whose rigor can be interpreted as the balance of interests of actors. In situations where strong political groupings prefer fast project completion, EIA processes are limited by time constraints, biased compliance, and limited involvement.

Assimilation of Lenses of Theory

By encompassing a perspective on environmental governance and political economy it is possible to have a comprehensive understanding on the performance of EIA under CPEC:

Environmental governance theory describes what ought to occur transparent decision making, participation, enforcement and stewardship of the environment.

Political economy theory tells what the existence of selective compliance, political prioritization of development, and institutional vulnerability is Collectively, these frameworks shed light on the reason why the EIA system in Pakistan, even in the event of good legal underpinnings, cannot make any meaningful changes in ensuring substantive environmental protection as CPEC expansion goes on.

Conceptual Proposition

According to these theories, this article is undertaken on the conceptual hypothesis that the ability of EIA under CPEC is influenced by the governance capacity that is focused based on the political and institutional drive.

That is, the environmental protection will not become strong unless

- Institutions of control are enhanced
- The process of decision making is made clearer
- Participation is broadened

Political interests are in harmony with the environmental objectives

The two-lens paradigm is used in analysing compliance behaviour, the weaknesses in compliance behaviour, and stakeholder dynamics in the next sections.

METHODOLOGY

Construction of Efficiency of Environmental Impact Assessment (EIA) of CPEC Infrastructure Development. The given study is qualitative and desk-based research based on document analysis and interpretation of secondary data. The methodology is designed in a manner that it assesses the efficacy of the Environmental Impact Assessments (EIA) in infrastructure projects managed by CPEC by comprehensively investigating documentation made accessible, regulatory frameworks, scholarly work and single project assessments that had been posted publicly.

Research Design

Since very few primary data on EIA in Pakistan are available, the paper is supported with the documentary research approach. The use of documentaries is suitable when it comes to assessing the organizational processes and governance systems, which appears to be especially relevant in the cases when the official data is

scattered or revealed selectively (Bowen, 2009). The methodology allows reviewing formal regulatory demands and informal implementation practice.

Data Sources

The sources that are reviewed include four groups of secondary sources:

1. Legal and Policy Frameworks

- Pakistani Environmental Protection Act (1997)
- Provincial regulations of the environment
- National environmental standards of quality
- CPEC infrastructures planning and Long- Term Plan (2017-2030)

2.Assessment of Environmental Impact Documentation

- EIA summaries and Executive Reports publically available
- Environmental No Objection Certificate, where available
- Literature reports on post-construction monitoring

3.Academic and Reviewed Literature

- Scholarly papers on EIAs, CPEC and environmental governance
- Comparative analysis of developing countries
- Environmental governance and political economic theory

4.Civil Society Report/Independent Report

- Special interest groups case studies
- Think-tank studies
- Enforcement of NGO research and environmental advocacy briefs

These sources are strengthened by triangulation, which helps in building up the strength of the analytical work by merging legal requirements and the evidence at practices level.

Case Reference Strategy

In spite of the fact that the study does not involve field-based case studies, the mention of well-documented CPEC projects in order to demonstrate evaluation patterns is made. These include:

- Sahiwal Coal Power Plant
- Gwadar Port and Free Zone
- Karakoram Highway (KKH) upgrades

These projects are selected because they are large-scale, have documentation and are visible in the environmental discussion (Khan and Khan, 2021; Hussain, 2019).

Analytical Framework

The assessment is done using a five-dimensional assessment matrix, which would depict international EIA standards:

Legal Compliance

- Conformity to procedural requirements and PEPA 1997 and provincial requirements
- Disclosure of Information and Openness
- Extent of accessibility of EIA materials, hearings and reporting

Stakeholder Participation

Participation in and worthiness of community consultation

Monitoring and Enforcement

Rigor, independence and frequency of post-approval oversight mechanisms

Long-term Environmental Outcomes

Astute or estimated ecological effects according to reported information. This matrix is consistent with commonly applied criteria of EIA evaluation (Glasson et al., 2012; World Bank, 2016).

Scope and Limitations

The constraints of the analysis

- Limited transparency in the complete documentation of EIA of various CPEC projects
- The unfinished post construction monitoring data
- Different standards of disclosure among provinces

Such limitations are inherent to the research of environmental governance in developing countries and do not indicate other institutional issues with transparency (International Crisis Group, 2018). Nevertheless, the methodological validity is maintained by triangulation and use of trustworthy second hand sources.

Ethical Considerations

The research will be based purely on the publicly available third-party sources and does not require people, interviews, or documents. In this manner, the formal ethical approval was not obligatory.

Methodological Rationale

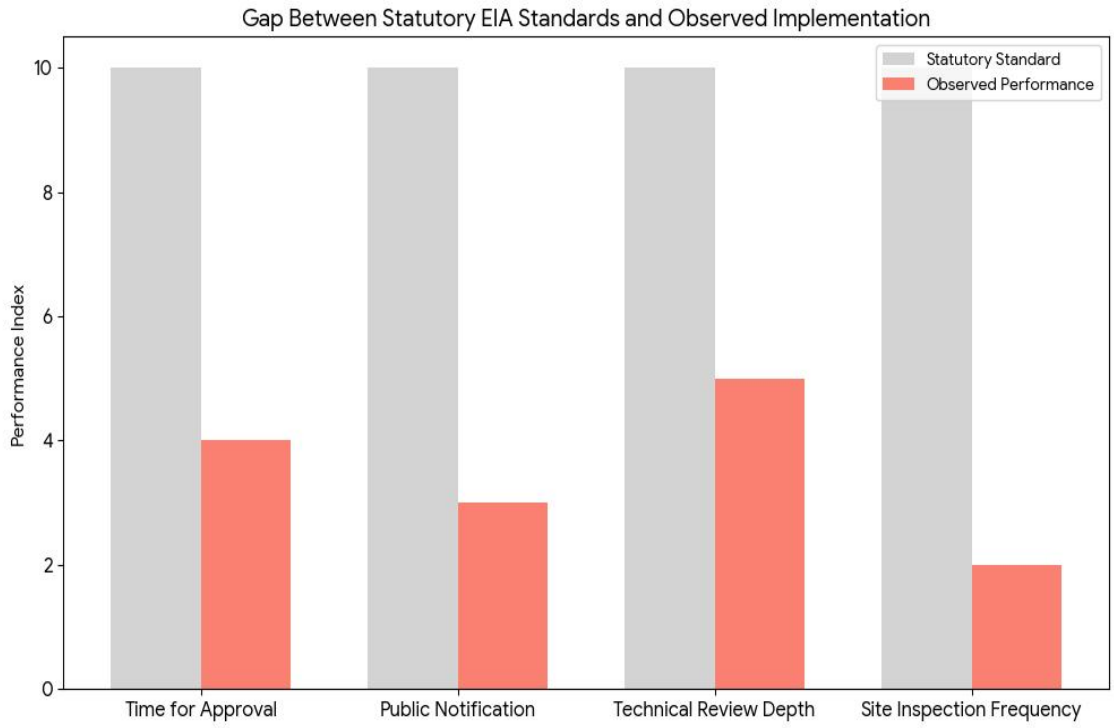
The desk-review methodology is quite appropriate to assess EIA efficiency since:

- EIs are process based tools and most have been written in regulatory and administrative documents. Policy-text analysis can be used to identify institutional strengths and weaknesses
- It is possible to create comparative insights in various sectors of infrastructure without the need to be in the field.

This method will enable the study to pose questions that are aimed at filling the gap between the statements of institutional design and practice in a formal setting; this issue is at the heart of EIA performance issues in CPEC.

ANALYSIS AND FINDINGS

Testing the Effectiveness of the Environmental Impact Assessments (EIA) in CPEC Infrastructure Development. The analytical results below consider the functioning of EIAs in practice in the CPEC program assessed through the notions of regulatory compliance and regulatory monitoring system and transparency, participant participation, and capability of institutions. The following findings are based on documentary evidence, secondary literature as well as project-specific reporting.



1. Procedural Adherence to EIA Requirement

CPEC infrastructure projects are also taken under the protocols of environmental approval at the statutory level, with the EIAs being done and sent as per the provisions of Section 12 of the Pakistan Environmental Protection Act (1997). Formal compliance is guaranteed by the issuance of Environmental No Objection Certificate (NOCs) when it comes to energy, transport, and port development (Government of Pakistan, 2017).

Nevertheless, research studies indicate that this compliance is often procedural and not substantive. EIAs have been done with shortened time schedules, especially on coal and electricity projects which qualify as early harvest agenda (Hussain, 2019). Individually, an example is the Sahiwal Coal Power Project that received a quick clearance on its position next to a farming land and a population center when the alternatives of the location were not studied in depth (Khan and Khan, 2021). Such practices imply an approval culture, where EIAs are mainly intended to meet formal legal pre-assessments other than mentally influence project design.

2. Weaknesses on Monitoring and Enforcement

The weakness of the implementation is the most notable in post-approval monitoring. To be able to regulate the environment properly, the construction and operating stages are to be controlled, but the existing studies denote low rates of compliance checks within CPEC projects (Aslam, 2020).

Three patterns emerge:

1. No standardized provincial schedules of site inspections.
2. Weak technical capabilities especially in air and water surveillance.
3. Poor sanctioning structures such as infrequent imposition of punishment.

In energy projects based on coal, there is no publicly available emissions audit, or effluent report, which indicates that there are still concerns over air quality and wastewater adherence (International Crisis Group, 2018). In the absence of continuous follow-up, the mitigation measures that have been specified in EIAs will be mostly aspirational thus undermining their risk-preventive purpose.

3. Transparency and Disclosure of Information

Public oversight and regulatory accountability requires transparency. Global standards, such as the ones set by the World Bank and the ADB require disclosure of draft EIAs and communal consultation documents (World Bank, 2016). The transparency of the CPEC projects is however inconsistent. Documents on environmental matter are:

- Haphazardly posted on provincial EPA websites
- Frequently provided in form of summaries
- Few regulatory data or compliance news along with it

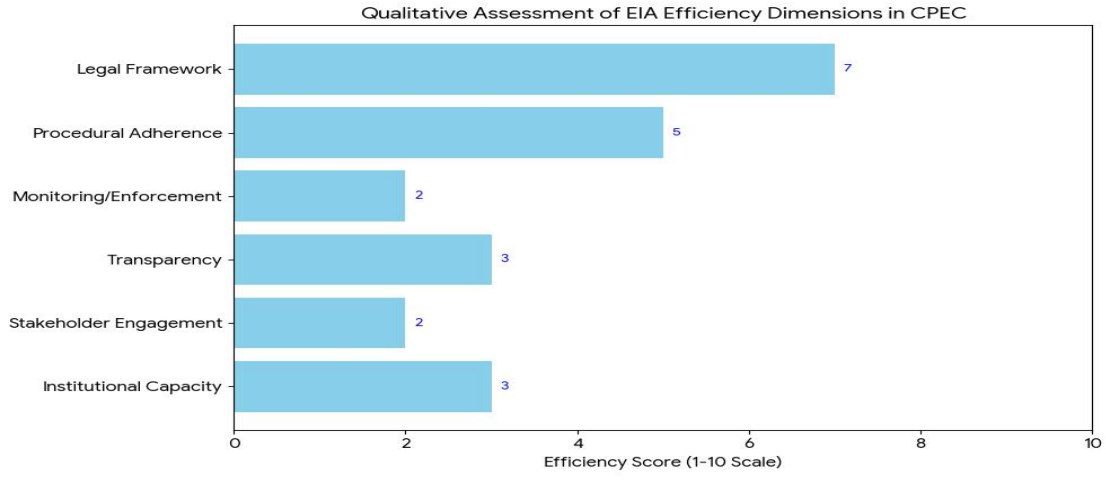
Cases of poor access to or reducing the understanding of project-related environmental info were reported in communities in Gwadar and Sahiwal (Khan and Khan, 2021). This bias in the publication of documentation decreases the sense of transparency and deterrent effect of publicly acquired insight.

4. Stakeholder Partaking and Procedural Fairness

The intent of EIA systems heavily focuses on meaningful community involvement, but the evidence shows that people have low amounts of involvement in CPEC environmental decision-making. The patterns of participation are defined by:

- Tokenistic public hearings
- Limited communication about the time and places of meeting similar to the first point, lack of significant integration of citizen input into the updated EIA (Hussain, 2019)

Disadvantaged communities, including Gwadar fishing families or Sahiwal farmers, face the unequal impact of environmental adversity and have a little say in the results of the procedures (Aslam, 2020). This lead to the democratic deficit that questions the legitimacy of EIA processes and diminishes the credibility of development planning among people



5. Limitations in the institutional Capacity

The provincial Environmental Protection Agencies which have both approval and monitoring responsibilities are faced with structural constraints:

- Lack of adequate manpower and environmentalists
- Lack of adequate laboratory and analysis materials
- Reliance on federal line on technical procedures (Hussain, 2019)

Decentralization had follow-ups to the 18 th Amendment, where institutional responsibility was augmented without matching resource augmentations, training, and operational budgets augmentation (Aslam, 2020). This failure in capacity is the reason why the EIAs are technically acceptable during preparation, but fail to be executed effectively after that.

6. Elite Incentive and Pressures of political economy

Another limiting factor to the implementation of EIA is the political economy of CPEC development. Being a leader project in geopolitical strategies supported by national leadership and military structures, the implementation of CPEC is interconnected with the national growth discourses, the pursuit of energy security, and the regional politics (Small, 2020).

Consequently

- Political elites share projects that have to be delivered in time
- Time wastage by regulation is discouraged

Granted, there is a risk of reputational or economic retaliation against compliance enforcement. Under these types of incentive arrangements, regulators have disincentives to stand up against the interests of the influential proponents of projects, and this institutional structuring of things results in an institutional setting where EIAs are subservient to developmental urgency and are no longer controlling decisions.

7. Accumulated Environmental risks

EIAs should be developed to look at projects one at a time but CPEC involves integrating development nodes i.e. clusters of energy, highway, ports as well as industrial zones. There is common literature that provides a shortcoming of regional or cumulative EIAs, which states: For example, several projects can increase environmental pressure. Local ecosystems can be destroyed and destroyed. Synergetic effects are yet to be studied (Khan and Khan, 2021).

Lack of cumulative assessments enhances probability of increased environmental costs manifesting themselves after the processes are very operational such that remedies are very expensive or irreversible.

8.Synthesis of Findings

In all five dimensions of evaluation, the results confirm a general trend:

- EIAs are mandatory and done on a regular basis
- Their controlling power is limited by organizational shortcomings.Such aspects as monitoring and participation are the weakest, and the transparency comes next political economic relations influence institutional action.

- CPEC environmental governance is defined by the absence of integration between policy creation and execution.

Therefore, the paper concludes that EIAs as applied in CPEC, even with its statutory applications, has not entirely served its purpose of averting or alleviating environmental degradation.

DISCUSSION

Comparing the Effinity of Environmental Impact Assessments (EIAs) in the CPEC Infrastructure Development. The results of this paper show that there is a major gap between the official structure of the EIA regulatory system in Pakistan and its application to the CPEC infrastructure development programs. This gap can only be understood best when it is found within greater governance relations, politics motivation, and priorities of regional development.

Theoretical Acitiationship between Findings and Environmental Governance Theory

The environmental governance theory is of the view that the effectiveness of these regulations does not just rest on the legal requirements, but the institutional capabilities, transparency, accountability, and inclusion (Lemos and Agrawal, 2006). All the presented evidence shows that the EIA system of Pakistan has structural weaknesses in all the above dimensions.

To start with, the results indicate that adherence to EIA processes is highly procedural. The environmental NOCs are secured by projects, but the contents, breadth, and impact of EIAs are scanty. This implies that environmental governance structures are formally existent but empty institutions, which are the features of the regulatory systems with the lack of effective enforcement of legal authority (Benson and Jordan, 2010).

Second, poor monitoring covers bring down the deterrent effect of EIAs. The regulatory system would lack the ability to cause behavioral change amongst the project developers without the performed regulative measures on site, reporting requirements, and enforcement after the approval. The result can be attributed to larger governance limits that are common to the developing regulatory settings.

Political Economy and the Development-First Imperative

The political economy perspective gives governance based observations elucidation. The symbolic and strategic significance of CPEC increases infrastructure provision to the national priority. Federal and provincial political players are encouraged to speed up approvals and to prevent delays in projects, which can endanger diplomatic pledges or inflows of capital (Small, 2020). In this regard, EIAs will be reduced to the status of development rush, which depicts a policy-setting hierarchy in which economic development overshadows environmental consideration.

In this way, the research proves a trend which is well-reported in the developing states: regulation agencies work within the political restrictions which restrict their independence. The EPA employees might not be able to receive the

institutional or political protection they would require to confront the large project developers, particularly when it comes to state-hyped or even state-aligned project developers (Hussain, 2019).

Procedural Party and Social Legitimacy

The fact that few communities affected are included is also a weakness to the EIA effectiveness. Procedural justice and social legitimacy revolve around making decisions that engage the masses; citizens are given an opportunity to express issues related to the ecology, giving options, and challenging the plans that are unfriendly to the environment (Jay et al., 2007). However, it has been demonstrated that the communities around Gwadar, Sahiwal, and other CPEC corridors have been peripheral players with little interest in hearings and documents (Khan and Khan, 2021).

This tendency diminishes local knowledge to influence the decision-making process and creates the shortages of legitimacy that can result in the distrust among the population. More drastically, the lack of participation may lead to social conflict, litigation or protest which slows progress of development- which was the last thing that the policymakers wanted to achieve.

CPEC as a Mirror of the Global EIA Problems

The Pakistan experience is not an exception, as observed relatively. It has been reported that EIA fails in various mega-corridor projects in Latin America, Africa, and Southeast Asia (Ascensao et al., 2018; Joao et al., 2011). All these projects are common in the following aspects:

- Rapid development schedules
- Investor-driven pressure
- Existing inadequate capabilities of environmental supervision
- Weak long term monitoring systems

In that regard, CPEC can be viewed as the world trend, in which the growth in infrastructure is more advanced than regulation-development, resulting in policy overreach and inadequate accountability.

Pakistan Policy and practice implications

Its results suggest that EIA needs institutional, legal, and procedural changes to become more effective and not the enhanced number of the assessments performed. Key implications include:

Capacity Building in Institutions

Ordinarily, EIAs will not have much influence until EPAs are mobilised, staffed and empowered to control compliance without dependability on the political goodwill.

Trade Procedural Evaluations to Substantive Evaluations

The approvals should indicate stringent environmental demands and not box-ticking by the administration.

Enhancing Surveillance Systems

Even technically high-quality EIAs have no operational sense when they are not infused with credible post-construction auditing.

Pure Immersion of Information Sexuality

The impacts of publishing EIAs and monitoring outcomes online could be to bring greater accountability to the project and provide a way to verify the results by a third party.

Improving Community involvement

The empowerment of local voices lowers the conflict potentiality and has the potential to enhance the sustainability outcomes via grounded knowledge.

Contribution to Scholarship and Practice

The research makes contributions to the expanding body of CPEC by uniting: A cross-sectoral analysis of implementation of EIA,

- Application of the governance and political economy theory, and
- Observation informed by empirical evidence on numerous strands of a project.

Placing the failures of EIA in the context of bigger governance ecosystems, the article emphasizes that environmental risk under CPEC is not an outcome of technical inadequacy exclusively, but the limitations to a structural governance.

CONCLUSION

This research was devoted to the assessment of how Environmental Impact Assessment (EIAs) are effective as regulatory tools in China-Pakistan Economic Corridor (CPEC). EIA, though included in the system of government and legally required, is not functioning effectively as seen in the analysis due to limitations inherent in the system of governance, lack of capacity in institutions, limitation in the procedure, and the pressures of the political economy.

The results indicate that EIAs in CPEC are in fact more procedural than substantive measures of project design or implementation, that allows project approval. New regulatory compliance is there in theory but lacks in actual activity. The main weaknesses are inconsistent post-approval monitoring, inadequate visibility of data, the tokenism of involvement of stakeholders, and the system of fines that is hardly used. These shortcomings are indicative of larger governance processes, such as the lack of provincial coordination, the extension of regulatory authorities, and incentive schemes that emphasize the roll-out of infrastructure over environmental due diligence.

Combining the environmental governance theory and the perspectives of the political economy, the research finds that the reasons why the EIA fails to meet its tasks is not the fact that there are no legal frameworks but rather the interplay between the institutional constraints and the political development-first considerations. Being a strategic, nationwide project with geopolitical consequences, CPEC condenses the mass discourse and regulatory restraint, and creates the environment of governance where long-term ecological risk underrating occurs.

To ensure that EIAs achieve their intended objectives, reforms favoring institutional capacity, institutionalizing transparency as the order of the day, and providing real means of participation by people have to be implemented in Pakistan. Some of these recommendations are compulsory disclosure of EIA and monitoring

information, third-party environmental audits, uniform provincial policies, and increased funding to Environmental Protection Agencies. More importantly, environmental protection should be placed back as an inherent part of the economic planning and not as a factor that hinders this planning.

The analysis can be advanced in future research through conducting field-based case studies, interrelating the implementation of CPEC in different provinces, or examining cumulative impacts of the region instead of individual project evaluation. This work would enhance the awareness of the transformations of the ecological landscapes by mega-projects and the development of the environmental institutions to be enhanced corresponding to the extent of national building aspirations.

Comprehensively, the research paper highlights that as much as CPEC offers great prospects of development, there are governance challenges that the development must confront to make sure that Pakistan can experience development that is not only transformative but also sustainable to the environment.

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