



Evaluating Climate Change Consideration in the Pakistani EIA Framework

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Title Evaluating Climate Change Consideration in the Pakistani EIA Framework		
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Abstract (400-500 words) <p>Current literature suggests that climate change impacts and adaptation is neglected in environmental impact assessment (EIA). However, it is one of the areas within EIA research which is becoming increasingly important particularly in the aftermath of the Paris Agreement. Pakistan is one of the most vulnerable countries to climate change and it faces serious consequences as a result. It is critical for a country like Pakistan to consider climate change impacts and adaptation within EIA to look at development decisions with a climate-sensitive lens. This study is attempted to evaluate the consideration of climate change in the EIA process in Pakistan. This was done through a thorough examination of the existing literature both academic and non-academic. An evaluation of the legislative and policy framework for EIA for Pakistan was also conducted in addition to review of a sample of 18 EIA reports for transport development across provinces and administrative areas. The result of this quantitative research showed that climate change impacts are considered to some extent within the EIA reports however this is extremely limited to mentions of international treaties and conventions that Pakistan is a signatory to. There are no details as to how these are applicable in the context of the projects. Climate stressors such as floods have received adequate attention in most of the EIAs. Most of the reviewed EIA reports lacked detail of climate change impacts and mitigation. Whereas concrete steps to ensure mitigation and adaptation post-operation monitoring was found to be non-existent primarily due to absence of mandatory requirements. Overall, there is no political will to address climate change within EIA and it is clearly reflected in the absence of climate change requirements in the EIA framework (legal, policy and guidelines, institutional) in Pakistan. Although, climate change consideration within the EIA procedures is seeing an increasing trend globally, the overall level of consideration has still a long way to go. There is a need to improve the effectiveness climate change consideration in EIA (both impacts and adaptation). This can be achieved by streamlining climate change within the legislative and policy framework and development of extensive guidance on the matter. Behaviour changes in EIA stakeholder particularly EIA practitioners is another important factor for success. Finally, rigorous post-decision monitoring and use of climate change terminology need to be adopted more widely within the EIA system.</p>		
Keywords Climate change, EIA, Pakistan		
Originality statement. I hereby declare that this Master's dissertation is my own original work, does not contain other people's work without this being stated, cited and referenced, has not been submitted elsewhere in fulfilment of the requirements of this or any other award.	Signature	

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1. Introduction

This research project aims at evaluating the integration of climate change impacts and adaptation into the Environmental Impact Assessment (EIA) process Pakistan. The research will analytically reflect on the role played by EIA in addressing climate change in development decisions. The project will also critically look at the planning process, if and how climate change is considered, and what are the practical difficulties in integrating aspects of climate change impacts and subsequent adaptation. Based on the results of the empirical research, and on the identification of best practices, possibilities for incorporating climate adaptation in EIA will be explored by developing a framework for possible entry points.

1.1. Rationale

Climate change has become a serious global challenge to sustainability. Human-induced climate change has resulted in widespread adverse impacts on human and natural systems that is beyond the natural climate variability, pushing them past their ability to adapt (IPCC, 2022). In addition, society's vulnerability to impacts induced by climate change make it a serious economic development threat (Agrawala et al, 2012). The seriousness of the potential impacts has led to many researchers calling for an urgent response. The need to consider climate change and associated impacts in development decisions (including spatial and sectoral policies, plans, programmes and projects) has been recognised widely (Agrawala et al, 2012). In this context, Agrawala et al. (2012) suggested that “the *project level is critical for the consideration of climate change risks and for incorporating suitable adaptation measures*”.

National governments, development co-operations and international financing agencies have developed methodologies and tools to screen projects for climate related risks (e.g., climate proofing). However, most of these tools are used as stand-alone products and lack harmonisation. In this context, both Strategic Environmental Assessment (SEA) and EIA are well-established environmental decision-making support instruments, with legal requirements in many countries. Both EIA and SEA can be a key instrument in addressing climate change issues in a more standardised way (Sok et al. 2011, Agrawala et al. 2012). Jiricka et al. (2016) have referred to several studies that explained impact assessment tool's potential suitability for

integrating climate change impacts and adaptation considerations within existing project, plan and programme modalities (design, approval and implementation).

EIA is defined as ‘the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made’ (IAIA, 1999). Since 1969, EIA has emerged as an important instrument for decision-making globally, recognising human-induced environmental change (Morgan, 2012). Considering implementation, EIA being a systematic and publicly accepted process worldwide, inclusion of climate change impacts and adaptation into existing EIA process can lead to positive change. On the other hand, SEA is defined as a ‘process and a tool for evaluating the effects of proposed policies, plans and programmes on natural resources, social, cultural and economic conditions and the institutional environment in which decisions are made’ (IAIA, 2021). It is, in essence a systematic, proactive, and participative decision-making support instrument with clearly defined objectives to gauge the sustainability of policies, plans and programmes (Fischer et al., 2009). The bibliometric analysis conducted by Li and Zhao (2015) documents a steady growth in literature on SEA over 20 years making it one of the most active research fields in impact assessment.

EIA and SEA’s potential suitability for addressing climate change impacts and adaptation is supported by the available professional literature. In this context, Hands and Hudson (2016) identified the need for further research on “how to consider climate change impacts from existing developments and activities and should evaluate the lessons learnt from integrating climate change into impact assessment”. So far, there has been limited research into the consideration of climate change impacts and adaptation (Larsen, 2014; Hands and Hudson, 2016) particularly in an urban climate context. Therefore, identifying and evaluating the effectiveness of climate change adaptation approaches is an important step towards incorporating climate change impacts and adaptation into EIA practice.

1.2. Research Questions

This study will address the following main research questions:

- 1) To what extent and how is climate change is evaluated, and subsequent adaptation currently considered in EIA practice, focus being practices in the UK and Pakistan?

- 2) What are the practical difficulties in considering the integration of climate impacts and adaptation in the planning process?
- 3) How can climate impacts and adaptation be effectively included in EIA? What role can EIA play in this context?

1.3. Aim and Objectives

This research project aims at evaluating the current practice in considering climate change impacts and subsequent adaptation as part of the EIA process. The study attempted to address the following objectives:

- 1) Evaluate the planning and EIA process/tools for projects in UK and Pakistan (current practices).
- 2) Identify EIA case studies and evaluate the role and effectiveness of EIA tools in consideration of climate change impacts and subsequent adaptation.
- 3) Identify entry points for climate change impacts and most suitable adaptation approaches in EIA (including recommendations for regulatory framework).

1.4. Research Significance

Climate change and subsequent adaptation has now become a central topic of political and scientific discussion. Scientists have called for early action in response to challenges humans and earth systems face as a consequence of changing climate. In this context, impact assessment tools can play an important role as they have emerged as important instruments for sustainability world-wide. Development decisions which do not take environmental considerations into account often have detrimental impact on humans and ecosystems. EIA and SEA are expected not only to assess project level impacts but also to achieve a broader role in achieving sustainable development (see e.g., Arts et al, 2012).

The literature on evaluating climate change integration and adaptation approaches in EIA is scant. This project makes a considerable contribution to the existing literature by identifying successful adaptation approaches for addressing climate change in EIA. Conclusions and recommendations drawn from the study are of particular interest to developing countries with similar contexts. These findings will encourage stakeholders from both developed and developing countries to use the information in their national contexts and commission further studies. In addition, development organizations,

academics, practitioners, and consultants can equally benefit from the findings of the research.

1.5. Report Structure

Chapter 1 gives an overview of the research project, introduces the topic, a brief overview of the problem that the research addresses and the rationale behind, research questions and aims and objectives.

Chapter 2 provides a detailed overview of the existing literature demonstrating how climate change impacts and adaptation is considered in different contexts and geographic locations.

Chapter 3 delivers the methodological framework undertaken to achieve the results of this study – details on the key methods that were followed.

Chapter 4 offers an overview and critique of the planning and EIA framework in Pakistan.

Chapter 5 presents results of the review conducted of 18 EIA case studies from Pakistan and summarises the discussion on key findings from the analysis.

Chapter 6 documents the possible entry points for climate change considerations into the Pakistani EIA framework.

Chapter 7 concludes the findings of the study and gives insights on the limitations.

2. Research Context

Climate change mitigation and adaptation have received increasing attention in recent decades since climate change has emerged as a significant environmental issue globally (IPCC, 2014) ¹. Climate change impacts and their scale on both natural and human environments is well-documented in scientific literature. The Intergovernmental Panel on Climate Change (IPCC) is the international body that assesses climate change related science and presents its findings in Assessment Reports (sixth report in the making). This includes knowledge of the past, present and future of climate change impacts, future risks and options for mitigation and adaptation. The Assessment Reports have highlighted the role urbanisation has played in the exacerbation of climate change impacts and the resulting extreme-weather events in cities. According to IPCC's Summary for Policy Makers (2021), 'cities intensify human-induced warming locally' causing an increase in severity of heatwaves because of more urbanisation in combination with frequent hot extremes. The consequences of urbanisation also lead to an increase in heavy precipitation in cities that leads to runoff intensity and extreme sea level events in coastal cities (IPCC, 2021). Climate-induced events such as such as heatwaves and flash floods have a negative impact on the urban quality of life which not only cause damage to infrastructure but human health as well (Badura et al., 2021).

Adaptation has become the focus of climate negotiations over the past decade (particularly in the context of the UN Framework Convention on Climate Change) as a result of failed attempts to limit GHGs to acceptable level (Khan and Roberts 2013). The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as the "process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects" (IPCC, 2014). According to Adger et. al. (2005), adaptation is a collection of measures taken by individual, groups and governments. It can be motivated by protection of economic well-being and improvement of safety.

¹ Refers to adaptation to potential impacts of extreme weather events, increasing global atmospheric and ocean temperatures resulting in melting of ice and rise in sea levels.

On the other hand, it is manifested through a variety of means, including 'actions of individuals and organisations to meet their individual or collective goals'. Furthermore, Adger et al. (2005) argue that the adaptation is relevant at all scales including local, national and international levels and the success of adaptation strategies or decisions depends on implementation scale and evaluation criteria for each scale.

Given the changing climate, the need for people to adapt is undeniable, making room for adaptation to become a central focus of climate policy (Khan and Roberts 2013). Numerous stand-alone methodologies and screening tools have been developed to identify risks posed by climate change associated with major activities (Hands and Hudson, 2016). However, integrating climate change consideration into existing project modalities such as EIA, in combination with SEA (Fischer et al. 2011), is considered a more effective approach (Agrawala et al. 2012, Jiricka et al. 2016).

Countries world-wide are implementing measures to achieve CO₂ emission reductions, in an attempt to meet the universally agreed target of 'holding the increase in the global average temperature to well below 2 °C above pre-industrial levels' (Paris Agreement, 2015). However, there is growing concern that the national targets are not reflected in regional or state-level plans as these are not considered in SEAs conducted as part of the planning process (for example in sectors such as housing, transport, agriculture, energy) (Wende et al., 2012). There has been attempts by states (UK, Australia, the Netherlands, Canada, Ireland), international organisations (IEMA, The Environment Agency with Natural England???, UNDP), and academic literature in highlighting the role SEA can play in incorporating climate change consideration into spatial and sectoral planning (Yang et al., 2021). At the project level, a systematic process to assess the environmental impacts of development actions in advance (Glasson et al. 2005), EIA is practiced in nearly all close to 200 countries and is enforced legally in over a hundred countries (Fischer and Nadeem, 2014). Where a legal requirement for EIA is absent, it is practiced voluntarily or through financing requirements such as those by development banks e.g. the World Bank, and Asian Development Bank (Fischer and Nadeem, 2014). Hence, EIA's global acceptance has rendered it one of the more successful policy innovations (Sadler 1996).

The potential of integrating climate change (both mitigation and adaptation) into EIA has received much attention recently (Larsen 2014). The EU Directive 2014/52/EU on EIA recognised climate change as an important new challenge. A number of

researchers have looked into the possibility of addressing climate change issues through EIA and SEA and proposed methods for doing so (Byer and Yeomans, 2007; Wende et al., 2011; Agrawala et al., 2012; Sok et al., 2012; Larsen et al., 2013; Ohsawa and Duinker, 2014; Larsen, 2014; Jiricka et al., 2016; Hands and Hudson, 2016). Byer and Yeomans (2007) reviewed environmental assessments in Canada and concluded that climate change received inadequate coverage and proponents faced major problems in effectively addressing the uncertainty of changing climate into the assessment. The outcome of a study conducted by Agrawala et al. (2012) highlighted several challenges such as gaps between the intent to incorporate climate change adaptation in EIA and actual practice and the availability and uncertainty linked with climate change data at project scale. However, the study also demonstrated the potential success of incorporating climate change impacts and adaptation within existing project modalities such as EIA. Yi and Hacking (2011) suggested that including requirements for GHG emissions assessment in EIA will encourage low carbon developments and meet the Sustainable Development Goals.

Ohsawa and Duinker (2014) proposed that reviewing previous EIAs can play an important role in understanding the challenges of estimating GHG emissions from individual projects and the associated uncertainties, therefore the review may help identify practical approaches to GHG emissions at project level. The research examined 12 EIAs conducted in Canada under national legislation to see how GHG emissions were dealt with. It is common practice within the Canadian EIA system to assess GHG emissions from projects and propose suitable mitigation to offset the negative impact. The study concluded that large emitters proposed concrete measures, typically in the form of new technology for emission reduction. However, other measured proposed are marked with ambiguity and determining the actual impact of these measures proves to be difficult in terms of real effects. Another challenge identified was the ambiguity and/or inconsistency with respect to the definitions and significance of GHG emission levels.

Similarly, Jiricka et al. (2016) explored the inclusion of climate change into the existing EIA practice in Austria and Germany, two EU member countries where consideration of climate change in regional and urban/local planning has been suggested in various instances. Various EIA stakeholders have found that dealing with climate change in a specific local context is a challenge and this study attempted at tackling the existing

“science-policy-practice-divide” with regard to climate change consideration in EIA in Austria and Germany. The study concluded that both the Austrian and German EIA practice shows that climate change is addressed to a limited extent only. Throughout the cases reviewed, climate change was considered at explicit steps in the EIA and not throughout the EIA process as a whole. Several concrete links were made in EIAs of both countries to meteorological phenomena that could be affected (climate change stressors), potentially leading to climate change impacts. As for climate change adaptation, any direct reference to adaptation within the EIAs is still quite limited. The results deduced qualitatively demonstrate occasional consideration of climate induced impacts which receive an occasional mention (1-2 times) without being mentioned in every chapter of the impact statements therefore not integrated through EIA process in its entirety.

Underwood et al. (2021) reviewed current practices in considering greenhouse gas emissions in SEA and EIA in Scotland, UK. As part of the project, 10 EIAs and SEAs each were reviewed across a wide range of projects to ascertain a) methodologies used to assess GHG emissions impacts; b) level of details included in EIA and SEA; and c) reporting and further communication on these GHG emissions. The review of EIA case studies (2009-2019) showed that majority of the EIA studies did not include GHG emissions baseline data. Two studies only included GHG emissions data for the national, drawing more on wider impact rather than project-specific impacts. Of the 10 case studies evaluated, six incorporated some level operational GHG emissions quantitatively. As for details on the GHG emissions - direct, indirect, and embodied emissions, only four cases provided these details. The study demonstrated an indication of good practice where quantification of GHG gases in EIA is concerned. It is a noteworthy finding given the fact that the requirement for incorporating GHG emissions in EIA was formalised in 2017 only. As this is fairly recent, the study also indicated that EIA practitioners are invested in advancement of their experience in GHG emissions impacts assessment.

The current professional literature calls for more action in terms of research into integrating climate change consideration within the EIA framework. The integration of considerations of climate change impacts and subsequent adaptation within EIA framework is a complex endeavour and poses fresh logistical and theoretical problems. For instance, Yi and Hacking (2012) pointed at the gap between scientific

climate change knowledge and decision making at project level. Also, there is a need to be able to assess the impacts of a changing climate on development projects in addition to the impacts of these projects (Ohsawa and Duinker, 2014).

3. Methodology

This chapter presents an outline of the Methodological Framework used to provide responses to the research questions and meet the research objectives. The project entailed an extensive review of available literature to familiarise with the planning processes in Pakistan and UK (for best practice), climate change adaptation approaches and how these can be integrated into the EIA system.

The next step of the analysis comprised of a detailed study of EIA reports for selected projects from Pakistan and UK. A simple review checklist was developed for these reports to gauge the extent of climate change impact and adaptation coverage. Review checklists are commonly used in impact assessment. Finally, key issues were identified from literature and expert interviews. Six semi-structured interviews with relevant EIA stakeholders (for example, project developers in the applicable sectors, impact assessment authorities, practitioners and consultants) were conducted. The data was analysed qualitatively (for example, as in Jiricka et al., 2016).

Once the analysis phase was successfully completed and several potential solutions were identified, possible approaches and entry points for climate change assessment and subsequent adaptation were put together for integration into the EIA processes. A detailed review of the of the regulatory framework (including obligations under international and national agreements to address climate change) and practice (EIA reports) was conducted to identify gaps within the legislation and recommendations were made to address these gaps. Based on this information, entry points were identified for inclusion of climate change impacts and adaptation approaches.

3.1. Key Method: Systemic Literature Review

As mentioned above, systemic review of published literature was conducted for published work between 1990 and 2022. This included a mix of academic and non-academic publications in the form of research papers, legislation, guidance documents and reports prepared by industry for best practice. For academic literature, four key research journals were accessed for articles related to topics such as EIA and climate change; EIA practices; stakeholder perceptions on EIA and climate change integration; and role of legislation in EIA and how climate change can be integrated – for both UK and Pakistan. The research journals are:

- Environmental Impact Assessment Review,
- Impact Assessment and Project Appraisal (IAPA),
- Journal of Environmental Assessment Policy and Management (JEAPM), and
- Journal of Environmental Planning and Management (JEPM)

As for non-academic publications, guidance documents and reports from the following organisations were reviewed:

- Institute of Environmental Management & Assessment (IEMA)
- International Association for Impact Assessment (IAIA)
- UK Environmental Agency and Pakistan Environmental Protection Agency
- Netherlands Commission for Environmental Assessment
- Canadian Agency for Environmental Assessment

The review identified 32 articles, 15 guidance documents, 23 legislative pieces. The systematic literature review conducted for this study and the findings have informed the results and discussions presented in the following chapters.

3.2. Key Method: Analysis of EIA Documents

A simple review checklist was developed based on the checklists commonly used to determine the quality of environmental assessment reports (Baker and Wood 1999; McGrath and Bond 1997; Sandham and Pretorius 2008) as specific checklists for evaluating the integration of climate change into EIA have not been established yet.

The criteria were also developed drawing on publicly available guidance relating to EIA and climate change impacts available from:

- IEMA²
- England and Wales Environmental Agency
- UK Department of Communities and Local Government
- Netherlands Commission for Environmental Assessment

In order to determine how and to what extent climate change is evaluated and subsequent adaptation currently considered in EIA practice in the UK and Pakistan, a comprehensive review of EIA reports was conducted. The evaluation of EIA reports

² IEMA:
Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2015, revised 2020)
Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017)

was conducted through a comprehensive list of search terms developed by Jiricka et al (2016).

3.1.1. EIA Sample

A total of 18 EIAs were evaluated from Pakistan and 17 Technical Summaries the UK. The type of reports reviewed included documents from the project approval stage and were part of the following:

- EIA reports (Pakistan)
- Technical Summaries (UK)
- Technical Documents
- Statements from authorities

An attempt to review the final notifications of decisions was also made which proved to be quite difficult as these were not readily available online.

3.1.1. Content Analysis

The content analysis was a two-stage process as adopted by Jiricka et al. (2016). First, all the EIA documents were searched for direct reference of climate change. This was done to determine the relevance of these terms to climate change and EIA. These terms included:

- Climate change
- Climatic change
- Climate change impacts
- Climate change adaptation
- Vulnerability
- Scenario (connected with climate change)

In addition to direct reference of climate change, an analysis of climate stressors was also performed. These include meteorological phenomena that are known to be exacerbated by climate change for example heavy precipitation or storms and the associated impacts both at present and those that could have an impact in the future as well. Climate stressors were identified based on national (IEMA and EPA) and international climate change adaptation strategies (EU Commission, 2013 b and c), outcomes of previous research projects and literature review (Dalhammer et al., 2015; Jiricka et al., 2016; Balla et al., 2017).

3.1.2. Classification of Relevance

Once the content analysis was completed, a critical review of the results was conducted as per the classification given below (Jiricka et al., 2016):

Classification of relevance in ex-post evaluation.

Classification of relevance	Criteria for classification
No relevance	Mentioning of term, however, having a different meaning (e.g. species or place names) and not being impact relevant
Low relevance	Mentioning of a phenomenon or CC impacts without relevance for the specific EIA context
Relevance	Mentioning of a phenomenon or CC impacts in the specific EIA context; mentioning of an additional search term related to CC in the specific EIA context
High relevance	Combined mentioning of meteorological phenomenon and associated CC impacts in a shared EIA context, mentioning of a phenomenon or CC impacts with direct reference to CC (and impacts) in the same text passage

The following table from Jiricka et al. (2016) gives an overview of the information collected through data analysis per each hit of a search term. This list was adapted for UK and Pakistan while conducting the analysis as not every item from the list was relevant in the context of Pakistan and/or UK.

Content of analysis matrix.

Contents of the analysis matrix:

- the quote from the document in which the search term occurred (approx. 100 words)
- its relevance
- summary of the topic addressed in the quote
- possible comments on the quotes
- the meteorological phenomenon addressed, provided this is evident from the quote
- the climate change impact or climate change-relative aspect addressed, provided this is evident from the quote
- the section of the EID (EIS) in which the search term occurred (e.g. assessment of current-state, project impact on environmental issues, measures)
- project type (road, rail, high-voltage power transmission)
- project title
- search term category (pre-check, combination search or search for additional terms)
- document type (general EID report, technical report, specialist report, addendum/amendment, statement, expert opinion on environmental impact, approval notice)
- year in which the respective document was released
- office/institution that released the document
- page number of the quote within the document
- continuous quote number as a unique identifier
- team member processing the quote
- internal file number of the project (in Austria)
- and a link to the respective file.

3.3. Key Method: Stakeholder Engagement

Stakeholder engagement is an important aspect of this study as it helps canvas views of experts in the field. The main objective of stakeholder engagement was to understand:

- The challenges and limitations associated with current approaches to collecting data and reporting on CC impacts particularly GHG emissions in EIA.
- Any good practice EIA examples, particularly in terms of format and detail.

Semi-structured interviews were conducted with stakeholders to understand their perspective on potential integration of climate change impacts and adaptation into the EIA framework and what issues and challenges they anticipate. The interviews were conducted to primarily get expert views on the following questions based on their experience with impact assessment tools:

- Has climate change and associated impacts been considered in project planning and IA tools?
- If yes, what stages of the planning process and EIA are these impacts considered and how?
- What type of data is collected throughout the planning and assessment process to gather relevant information re climate change impacts?
- For future consideration, what kind of necessary support will be required to consider impacts of climate change in EIA?
- At what stages of EIA is it important to include assessment of climate change impacts and associated adaptation?
- What are the practical difficulties in integrating climate change impacts and adaptation in EIA?
- What aspects of the planning process needs to change in order to allow for integration of climate change impacts and adaptation?

3.4. Sources of Data

This thesis is produced based on the following sources of data:

- Published work – Academic and non-academic
- IEMA
- Environmental Agencies (UK and Pakistan)
- Consultants/Academics
- Stakeholder engagement

4. EIA Framework in Pakistan

This section outlines the EIA framework in Pakistan: legislation, institutions, and practice.

4.1 Legal Framework for EIA in Pakistan

Environmental management and development of related legislation has gradually gained importance since the 1970s. Pakistan was among the first countries to regulate development decisions through introduction of EIA in the country (Fischer, 2014). In terms of national regulations, EIA was initially recognised in the Pakistan Environmental Protection Ordinance, 1983, which was also the first piece of environmental legislation in Pakistan. The next step came in the form of establishment of the Pakistan Environmental Protection Agency (Pak-EPA), the central government institution responsible for managing environmental issues. This was followed by establishment of provincial environmental protection agencies and associated departments. The Pakistan Environmental Protection Act (1997) was the most important and quintessential piece of legislation promulgated to ensure environmental protection in the country. The Act further legitimised the Ordinance and the agencies and established rules and regulations.

The subject of environment is now predominantly assigned to the provincial governments as a consequence of the 18th Amendment to the Constitution of Pakistan that came into force in 2010³. All provinces were required to promulgate laws that are applicable to their specific provincial jurisdiction.⁴ The legislative process across country was supported by The National Impact Assessment Programme (NIAP) that ran from 2009 until 2014 and implemented by International Union for Conservation of Nature - Pakistan. This project was funded by the Netherlands Embassy in Pakistan and technical support was provided by the Netherlands Commission for Environmental

³ Act No. X of 2010 dated 19 April 2010. The National Assembly passed the Constitution (Eighteen Amendment) Bill 2010 on 8 April 2010 and by the Senate on 15 April 2010. It received the assent of the President on 19 April 2010.

⁴ Pakistan has six administrative jurisdictions: Islamabad Capital Territory, Punjab, Khyber Pukhtunkhwa, Sindh, Balochistan, Gilgit-Baltistan. Azad Jammu and Kashmir is considered autonomous; therefore, it was not impacted by the 18th Amendment thus is not considered (Khan et al., 2022)

Assessment (NCEA, 2019). The list of environmental legislating in each of the corresponding jurisdictions is given in **Table 4-1**.

4.1.1 The Pakistan Environmental Protection Act (1997)

The Act identified two types of environmental assessments for development projects: EIAs and Initial Environmental Examinations (IEEs). EIAs are carried out for projects that have potentially ‘significant’ environmental impact, and IEEs are conducted for relatively smaller projects with a relatively less significant impact.⁵ This differentiation between the two types of projects is made based on the scale of potential of harm that they can cause to the surrounding environment. EIA and IEE are defined as:

“EIA means an environmental study comprising collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigatory and compensatory measures, formulation of environmental management and training plans and monitoring arrangements, and framing of recommendations and such other components as may be prescribed” – Section 2 (xi)

“IEE means preliminary environmental review of the reasonably foreseeable qualitative and quantitative impacts on the environment of a proposed project to determine whether it is likely to cause an adverse environmental effect for requiring preparation of an environmental impact assessment” – Section 2(xxiv)

The requirement for conducting an environmental assessment is stipulated Section 12 (1) of the Act which states:

“No proponent of a project shall commence construction or operation unless he has files with the Federal Agency an initial environmental examination or, where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval in respect thereof;”

⁵ Pakistan Environmental Protection Act, 1997

Table 4-1: Legal Framework for EIA in Pakistan Across Jurisdictions

Jurisdiction/ Province	Act	Regulations/Rules	EPA	Applicability
Islamabad Capital Territory	Pakistan Environmental Protection Act 1997 (Amended 2012)	IEE-EIA Regulations 2000	Pakistan Environmental Protection Agency	Islamabad Capital Territory
Punjab	Punjab Environmental Protection Act 2012	IEE-EIA Regulations 2000	Punjab EPA	Punjab
Sindh	Sindh Environmental Protection Act 2014	IEE-EIA Regulations 2014	Sindh EPA	Sindh
Baluchistan	Baluchistan Environmental Protection Act 2014	IEE-EIA Regulations 2020	Baluchistan EPA	Baluchistan
Khyber Pakhtunkhwa (KPK)	KPK Environmental Protection Act 2014	Environmental Assessment Rules 2021	KPK EPA	KPK
Gilgit Baltistan (GB)	GB Environmental Protection Act 2014	IEE-EIA Regulations 2000	GB EPA	GB

The EIA review and subsequent approval process is outlined in **Figure 4-1**. This is applicable to all jurisdictions in Pakistan with slight variations in timelines for different steps in accordance with the provincial laws, where it may be different. The environmental assessment reports are directly submitted to the respective environmental protection agencies where the project is located. In case of a transboundary project such as that in the case of roads for example, the EIA/IEE report is submitted to every environmental protection agency of the province through which the province traverses. The transboundary nature of projects is accounted for in two of the provincial acts – the Sindh Environmental Protection Act 2014 and The Balochistan Environmental Protection Act 2012. Whereas the Sindh Act acknowledges the transboundary nature of environmental issues, the Balochistan Act has laid out mechanisms for resolving any such issues or disputes that are transboundary in nature.

Public participation is made a mandatory requirement in the Act, where it states:

“Every review of an environmental impact assessment shall be carried out with public participation...” – Section 12 (3)

Once the EIA report is submitted and a basic scrutiny is completed, the EPAs with support from the proponents make arrangements for a Public Hearing to be conducted before a formal decision is made on the project to canvas the views of all stakeholders. It is important to note that public consultation and Public Hearing are considered as two separate exercises. While both are statutory requirements (only in EIA and not IEE), public consultation is conducted by the consultants on behalf of the project proponents during preparation of the EIA report, whereas a Public Hearing is held once the EIA report is submitted to the respective EPA and is conducted as part of the review and decision step by the EPAs.

4.1.2 IEE-EIA Regulations 2000

Further details on project categorisation were laid out in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations (IEE-EIA Regulations) 2000. The regulations lay out necessary details on the preparation, submission, and review of IEE and EIA reports.⁶ The IEE-EIA Regulations 2000 stipulate a list of projects requiring an IEE in Schedule I and projects requiring EIA in Schedule II – mostly based on size or cost of project. For example, a thermal power generation project with a total capacity of less than 200 megawatts will require an IEE, whereas one larger than that will require an EIA. Schedules I and II are attached as **Annex A**.

Further legislation that supports the EIA implementation involves the National Environmental Quality Standards (NEQS), that prescribe effluent and emission limits for drinking water, wastewater, air, and noise, industrial, municipal and liquid effluents. The NEQS were first notified in 1993 and later amended twice, in 1995 and in 2000. The NEQS are applied to all projects that go through the environmental assessment processes as basic environmental design criteria across all project phases, that is design, construction, and operation, to ensure environmental compliance.⁷

4.1.3 Guidelines and Best Practice

Environmental acts, rules and regulations provide all the prerequisites necessary for ensuring adequate environmental protection from development decisions. However,

⁶ Review of Initial Environmental Examination-Environmental Impact Assessment Regulations, 2000

⁷ Pakistan Environmental Protection Agency

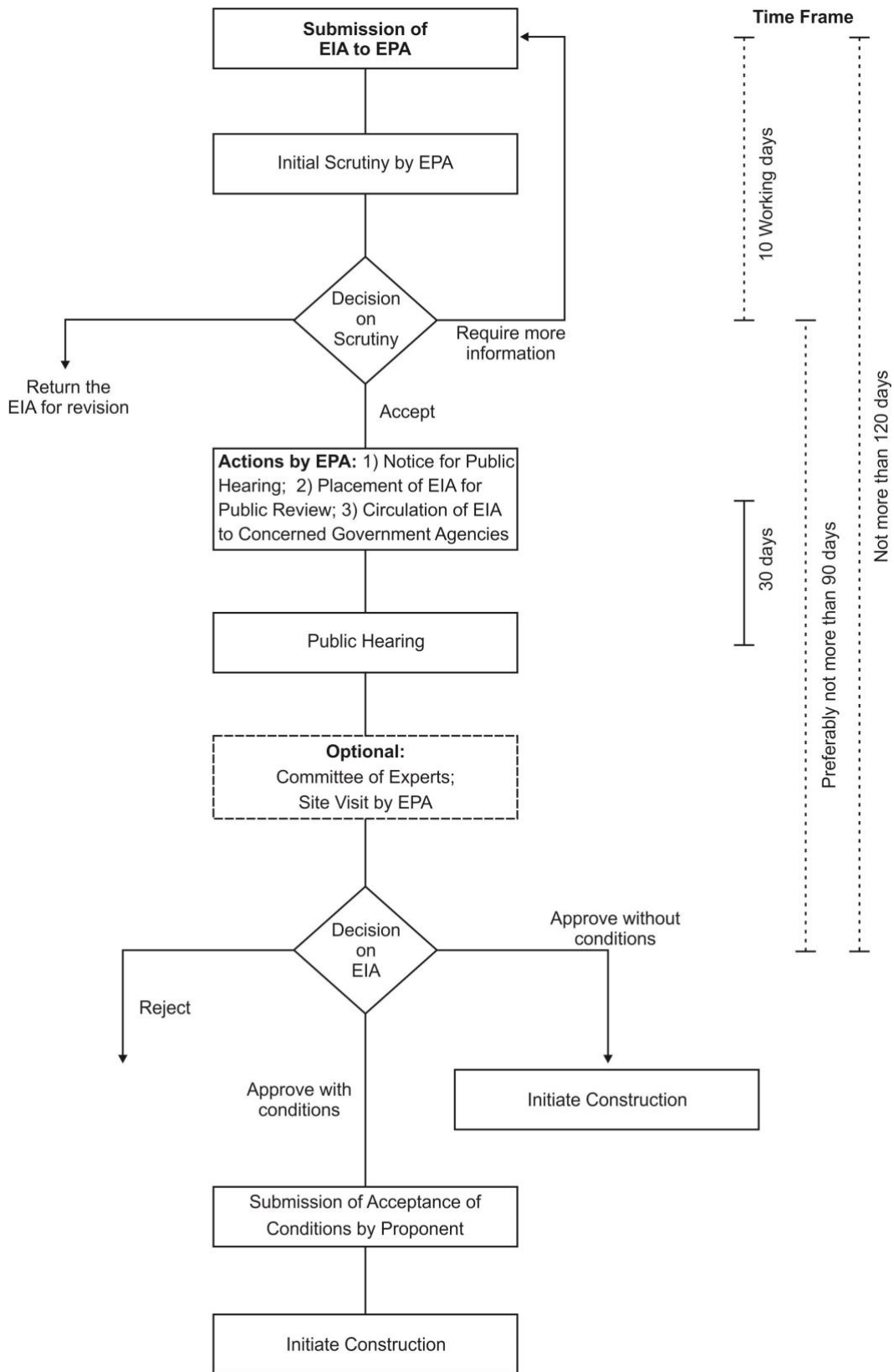
these do not provide the essential details on how the environmental assessment studies need to be conducted, prepared and successively evaluated (Khan et al., 2022). Therefore, Pak-EPA issued a set of guidelines that help the proponents and consultants in preparation and submission of the environmental assessment studies and regulatory authorities in review and approval of EIA and IEE reports. For example: the Guidelines for Public consultations, Guidelines for Sensitive and Critical Areas, Guidelines for the Preparation and Review of Environmental Reports, Sectoral Guidelines for Environmental Reports (roads, thermal power plants, oil and gas exploration, chemical and manufacturing plants, industrial estates, and housing schemes).

4.2 Institutional Framework for EIA in Pakistan

The Ministry of Climate Change (MoCC) at the Federal government level is the highest authority on environmental management in the country. Although the mandate is focused on the environmental matters at the Federal level (this includes handling all matters related to international multilateral and bi-lateral environmental agreements applicable to Pakistan), the Ministry also looks at the inter-provincial environmental matters. Where EIA is concerned, the EPAs are principally responsible for implementing environmental legislation and the EIA processes in their respective provinces/administrative areas. The EPAs serve as policy-making and regulatory institutions in charge of the overall environment in their respective jurisdictions. Their role is to regulate, coordinate, monitor and enforce environmental laws. The EPAs follow a review and approval process (**Fig 4-1**) for all EIA reports submitted. The review and approval procedures are similar across the country, the difference lies in the time allowed to the agencies for review and communicating the final decision to the project proponents.

Pre-decentralisation because of the 18th Amendment, a Ministry of Environment was established in 2002, headed by a Federal Minister, and was responsible for overseeing environmental matters in the country pertaining to environmental legislation, policies, and overall environmental management related issues (Saeed et al., 2012).

Figure 4-1: EIA Review and Approval Process in Pakistan



Source: Hagler Bailly Pakistan

However, post decentralisation, the ministry was abolished in 2011-12 and replaced by the MoCC (Khayam and Iftikhar, 2020).

4.3 EIA Practice in Pakistan

Pakistan's legislative framework for environmental protection in general, and EIA in particular, is considered reasonable with the legal basis consisting of laws, rules and regulations, policies, guidelines. However, looking at the available evidence, the implementation of EIA is far from adequate (Nadeem and Hameed, 2008; Khan et al, 2020a). This is primarily attributed to a range of problems, such as a lack of proper implementing mechanisms and poor demonstration of the legislation in practice (Amir, 2015). The principal responsibility for overseeing EIA processes in Pakistan lies with the respective environmental protection agencies in various jurisdictions, which are faced with severe financial, administrative, and technical constraints (Khayam and Ahmad, 2020, Amir, 2015, Nadeem and Hameed, 2008).

Given the vast diversity of Pakistan's geographical, land use and population aspects, it is natural that each of the province/administrative areas face unique set of environmental problems and priorities. For example, Gilgit Baltistan and KPK are tourism intensive, prone to natural disasters and its fragile mountain ecosystem are home to rich biodiversity. On the other hand, Punjab is characterised by plains (and is agriculture intensive), highest population in the country and has the highest contribution to the national GDP (Khan et al., 2022). Whereas Sindh has a rich coastal belt that is home to mangrove forests, Pakistan's largest seaport and industrial hub (Karachi), Balochistan is rich in mineral resources and a coastline with large untapped potential for development. The decentralisation post 18th Amendment was seen as a welcome change for provinces/administrative areas with the potential to promulgate specific laws and policies. However, unfortunately even after a decade has passed, the provinces/administrative areas are yet to exercise their legislative powers to introduce environmental legislation that is intrinsic to that province/administrative area (Khan et al., 2022).

Most of the provinces/administrative areas have stuck with the Pakistan Environmental Protection Act of 1997 with slight changes in environmental provisions (KPK, Baluchistan, Sindh and Gilgit Baltistan). Islamabad Capital Territory and Punjab EPAs adopted the Act as it is with no changes at all. The main EIA provisions remain the same whereas changes were made to the time available to EPAs for review and

the penalties were modified in some cases. As for IEE-EIA Regulations 2000, these were also adopted by the provinces/administrative areas without any change. Only two provinces updated the Regulations: Baluchistan revised regulations in 2020 whereas KPK updated the regulations in 2021. Moreover, the guidelines for EIA have also not been updated and all EPAs are using the same set of guidelines issues in 1997 until this date. Baluchistan and KPK EPAs have added adopted guidelines for specific sectors such as stone crushing, poultry and dairy farms, abattoirs, water supply and sanitation schemes. Even though EPAs have struggled with financial, administrative and technical capacity issues, there is also a clear lack of will that drives the legislative process.

Political influence has dominated the development scenario in Pakistan for decades. This influence is evident in government run organisations and has trickled down to the EPAs as well. The EPAs are headed by a Director General (DG), and they work under the Environment Secretary – appointed by the Ministry of Environment of respective provinces/administrative areas thus making them political appointments (Khan and Chaudhry, 2021). An example of political influence with regards to EIA can be seen from the fact that public sector projects often bypass the EIA approvals, and a project will start before an environmental No Objection Certificate (NOC) has been obtained, as was the case with the Orange Line Train Project (Khan et al., 2018) and the Rawalpindi Metro Project in Punjab.

Finally, one of the biggest challenges in EIA practice is the lack of coordination between the provinces and with MoCC. Where the MoCC is responsible for dealing with Multilateral Environmental Agreements, it is dependent on individual provinces/administrative areas to provide the necessary data required to prepare national status reports. According to Khan et al. (2022), MoCC finds this as a challenge, where post decentralisation the provinces/administrative areas have more autonomy in environmental matters, there is a lack of cooperation in sharing the relevant data with MoCC. This can be a real challenge in terms of addressing more national environmental issues such as addressing climate change across the country.

5. Climate Change Consideration in Pakistani EIA

This section documents the results and discussion on the analysis of EIA reports conducted to ascertain the level of current integration of climate change impacts and subsequent adaptation into the EIA framework in Pakistan.

A total of 18 EIA reports for road projects across different provinces/administrative areas were analysed. The evaluation of EIA reports showed a very low number of hits with regards to direct reference of climate change within the text of the reports. Whereas direct reference to adaptation is almost non-existent. There is more discussion related to climate stressors – meteorological phenomena that are more likely influenced by climate change at present or have a future potential. Keeping decentralisation in mind, results and discussion of EIA report analysis for the provinces/administrative areas are summarised individually. This is to establish difference in practices and how this impacts the possible integration of climate change and subsequent adaptation across provinces/administrative areas and eventually at a national level.

5.1. Sindh

Sindh is the southmost province of Pakistan and is home to the most important economic hub and seaport (Arabian Sea) of the country – Karachi. Four EIA reports from Sindh were analysed. The results of the analysis present an interesting difference with regard to how climate change is addressed or not in the EIA reports. Two of the EIA reports were prepared for an international multilateral financing institution - the Asian Development Bank (ADB). Which means that the proponent was required to follow ADB's environmental and social safeguards as a pre-requisite for financing, in addition to the provincial and national legislation. Therefore, climate change is dealt with differently as compared to the reports that are prepared locally, following only provincial and national environmental legislation. The reason being that organisations like ADB adhere to more stringent requirements for environmental protection as part of financing projects, these safeguards are considered as international best practice and are referenced widely outside of the organisation as well.

This can be seen in the case of the two EIAs (1) Shikarpur-Kashmore EIA and (2) Dualization of Petaro-Sehwan which demonstrates this difference very distinctly. Both

the projects are part of Pakistan's National Indus Highway 55 (N-55), one of Pakistan's major road sections that not only provides north-south connectivity nationally, but also is a regional connection to neighbouring countries including Afghanistan, Central Asia, and China. The main purpose is to connect these landlocked countries to Pakistan's seaports located at Karachi and Gawadar on the Arabian Sea. The Shikarpur-Kashmore EIA has a section on 'Climate Smart Development' in the Executive Summary section of the report that highlights two types of climate change impacts:

- Effect of climate change on the project: This is with relevance to climate stressors and the resultant meteorological phenomena (extreme weather events) that can be exacerbated because of climate change. The list includes "temperature change, flood risks, creation of water ponds and wetlands".
- Project's impact towards climate change: The impact is attributed to greenhouse gas (GHG) emissions as a result of construction activities on site and processes at related facilities. An estimation of the GHG emissions is provided. According to the report, the project is expected to produce a total of 176268 (792x222=176268) CO₂ tons equivalent.

A list of mitigation measures is provided stating that these 'should be adopted' to make the project climate smart. These include resource conservation, energy efficiency and use of emission controlling devices, enforcement of NEQS and installation of green infrastructure (example provided: eye lands, tree plantations and landscaping).

The next direct reference of climate change appears in the 'Anticipated Environmental Impacts and Mitigation Measures' section of the report with focus on GHG emissions and highlights the scale of impact of such emissions on a regional and global scale. Mitigation measures are the same as the ones mentioned in the executive summary. An additional mitigation is provided in terms of project design (pavement design, material selection and drainage) so it can withstand climate change and associated impacts (reference to extreme flooding).

Analysis of the Dualization of Petaro-Sehwan EIA returned zero hits on direct reference of climate change. The report only provides a general description of the climate in the study area which is a standard for all EIA reports produced in Pakistan. It is interesting to note that the "Scope of Study" section of the report and includes the following scope for climate change impact assessment and mitigation:

"Study climate change data, trends and assess future climatic impacts"

"Identify factors that may be incorporated in the design to make the road dualization resilient to climate change"

However, that is the only mention of climate change throughout the report. There is no clear signposting as to how this has been incorporated in the EIA process for the project or the EIA report.

Both these reports were prepared by the same consultant for the same client. The difference in how climate change is addressed is primarily because of involvement of ADB which has more requirements for climate change impacts to be considered compared to provincial and national legislation in Pakistan. Although the Shikarpur-Kashmore EIA can be considered a good example of climate change discussion within the EIA framework in Sindh and Pakistan, it is important to characterise the depth and quality of how climate change is addressed in the report. It is safe to say that the discussion is more of a generic nature and lacks details on concrete actionable steps to ensure climate change is addressed adequately. The report was the only one (out of 18) that provided GHG emissions calculations of some sorts. However, there is no detail as to how this number was calculated, what the sources taken into account are, which phase of the project it applies to and a discussion on what this actually means in terms of overall GHG emissions from the transport sector and what is the impact contribution of these emissions at a regional and national scale given the project has a wider regional connectivity, thus the impact should be considered to scale.

Looking at the provincial and national legislation, the analysis of the EIA reports highlighted a lack of consistency in how climate change related legislative framework is presented. **Table 5-1** provides a summary of climate change related policy and legislation in each of the EIA report reviewed. None of the reports elaborate on specific aspects of policy, legislation or international conventions with regards to climate change and how are these applicable to the respective projects. This can be seen from the Karachi Bus Rapid Transit Project (KBRT) EIA report which states the applicability of the climate protocols but does not provide any further details:

"With the exception of international labour standards and climate protocols, none is likely to have a direct repercussion on the conduct of the KBRT Project."

Table 5-1: Climate Change Related Policy and Legislation in EIA Reports (Sindh)

EIA Report	Funding	Climate Change Policy and Legislation
Shikarpur-Kashmore	ADB Funding	<ul style="list-style-type: none"> • National Environmental Policy 2005 • United Nations Framework Convention on Climate Change (UNFCCC)
Sukkur Flyover	Sindh Government	<ul style="list-style-type: none"> • Reference to National Environmental Policy 2005 but does not mention climate change.
Dualization of Petaro - Sehwan	Sindh Government	<ul style="list-style-type: none"> • Reference to National Environmental Policy 2005 but does not mention climate change. • ADB Safeguard Policy 2009 is explained in detail however no reference to climate change or relevance of the Policy to this project where no ADB funding is involved.
Karachi Bus Rapid Transit Project	ADB Funding	<ul style="list-style-type: none"> • A national level snapshot of which international treaties and conventions are applicable and a very brief description. <ul style="list-style-type: none"> ○ UNFCCC: Stabilization of greenhouse gas concentrations. ○ Kyoto Protocol: Mitigation of climate change and carbon sequestration. ○ Paris Agreement: Voluntary accords to mitigate climate change.

Another noteworthy comparison is how consultants interpret and incorporate climate change related requirements while preparing EIA reports for the same funding agency. This can be seen in the case of two road projects in Sindh. Both Shikarpur-Kashmore and Karachi Bus Rapid Transit Project EIA reports were prepared by different consultants for ADB funding requirements laid down in ADB's Safeguard Policy Statement 2009 which states "assess potential transboundary and global impacts, including climate change".

The Karachi Bus Rapid Transit Project EIA report is more descriptive with its handling of climate change as compared to Shikarpur-Kashmore, as can be seen below.

- 'Section 5: Description of the Environment' has a sub-section on 'Climate Change and Effects', but it mostly refers to other studies that have been conducted for Karachi in the past, and how climate change impacts have

affected Karachi's urban infrastructure systems and services negatively. There is no direct reference of these impacts on the project and how KBRT will be impacted. It does flag to a unique issue with regards to climate change and governance, which is that of Karachi being a city of migrants from throughout the country and that poses a challenge for climate governance. Again, this is referenced to another study and lacks details as to how this is relevant in the context of KBRT. Section 5 also discusses "Climate Vulnerability—Flooding" – the only report (out of 18) that addresses climate vulnerability and flooding being the primary factor for Karachi is discussed as drainage has been a problem in the city historically.

- A climate risk screening was conducted for the project and is mentioned in 'Section 6: Anticipated Environmental Impacts and Mitigation Measures' of the report. Climate change was considered during the scoping phase of the EIA as mentioned in the EIA methodology - "*categories of potentially affected environmental values that were identified through scoping include: ...mitigation and adaptation aspects of climate change*". Whereas the section also highlights screening of potential climate change impacts using a checklist provided by ADB (not provided in the report or related appendices). The result of this exercise is summarised below however no details are provided:

"In addition, climate risk screening has led to a scoring of "Not Likely" across all aspects, considered a low-risk project in respect to climate risk."

- 'Greenhouse Gases and Climate Change' gives an account of displaced emissions and the positive impact of KBRT in terms of offsetting GHG emissions as the case with urban transport projects that provide public transport options. A detailed GHG emissions study was conducted separately and is provided as a supplementary document to the EIA report where different fuel options were considered for KBRT and the GHG emissions impact is calculated over the lifetime of the project. This is the only report (out of 18) that provides details of the calculations methodology and results.
- The section on 'Vulnerability and Adaptation' acknowledges the project's vulnerability to climate change and this has been discussed in the previous section as well. Although the section title mentions adaptation, there is no

description as to how the project incorporates climate change adaption and what steps are necessary to ensure the project adapts to changing climate. The assumption here is that this information is scattered without clear signposting to adaptation. For example, environmental protection measures accounted for during design phase such as “*sufficient capacity of drainage system to account for increases in rainfall due to climate change*”.

Looking at the example of Shikarpur-Kashmore and KBRT EIAs, it is evident that there are discrepancies in addressing climate change despite the involvement of multilateral financing institutions such as ADB with their firmer requirements around climate change. Consultants preparing these EIA reports have a different approach to each of the project and how they follow the requirements is based on their interpretation, which is subjective to say the least. There can be several factors for this such as level of expertise of the EIA team, lack of information, time available to complete the study and financial resources to name a few which was also highlighted by a consultant during the interview conducted for this study:

“We have limited amount of time and resources (both human and financial) to complete EIA studies, and it is not the norm to focus on things that do not fall under legal obligations or have limited requirement even in the case of financial institutions. We usually work on multiple projects at the same time, and it is humanly not possible to go above and beyond the minimum requirements. And this is unfortunate. Climate change is not a priority to the extent it should be and there is clearly a need for more interest from the consultants also who have better understanding of the climate challenge and can do more irrespective of what is required under legislation. We talk about lack of political will and intuitions’ disinterest. I think we also need to hold consultants accountable for the role they play in quality of EIA studies and more importantly – addressing (or rather not) of climate change impacts.” - [EIA Consultant]

5.2. Punjab

Punjab is considered the most developed amongst all provinces/administrative areas, generates a major portion of the country's Gross Domestic Product (GDP), given the agricultural activities. Punjab EPA receives the highest number of EIAs annually compared to other EPAs in the country (Khan et al., 2018). Four EIA reports for road projects were analysed and of these only one was prepared for ADB (Gojra-Shorkot-Khanewal). A noteworthy finding for Punjab that no major change was identified in how climate change is dealt with in reports produced locally and for ADB. A brief overview of climate change consideration for each EIA report is summarised below:

- The Sui to Guddu Interchange EIA report provides a more generic discussion on climate change impacts related to flooding in the Indus River. It highlights two types of impacts. The first is the impact on river flows as the rising temperatures are resulting in melting glaciers on the Tibetan Plateau which will result in an overall decrease in river flows. Second is intense monsoons that can cause peak flows in the Indus River. The report states that "*the district (where project is located) is witnessing visible climate change impacts as its flood severity and frequency of occurrence has become unpredictable*". The report also gives an overview of the GHG emissions in general and how it contributes to global warming. However, no GHG calculations were reported for the project and mitigation measures such as carbon sequestration through tree plantation and ban on smoke generating vehicles on the highway are recommended. The report concludes that "*CO₂ emissions from the proposed project will be considerably less as it is expected that there will be shifting of traffic from the nearby roads towards proposed Highway so overall emissions will be with limited increase*" without any quantitative evidence to support this statement.
- The Lahore-Narowal EIA report is prepared by the same consultant who prepared Sui to Guddu Interchange EIA. It presents the same discussion re GHG emissions and mitigation measures as proposed for the Sui-Guddu Interchange EIA report. Apart from that, there is no reference to climate change impacts or adaptation throughout the report.
- The Defence Chowk EIA returned zero hits on climate change. There is no mention of anything relevant to climate change either directly or through climate stressors.

- Lastly, the Gojra-Shorkot-Khanewal EIA report which was prepared for ADB financing mentions the requirement to consider climate change under ADB's Safeguard Policy Statement 2009. In addition, there is a brief description of 'Global Climate Change' which states Pakistan's responsibility under international treaties and conventions to reduce impacts from climate change and partake in efforts to mitigate and adapt to the effects of changing climate. It is the only report (out of 18) that acknowledges Pakistan's transport sector as a major contributor towards GHG emissions from fuel combustion (diesel, motor gasoline, and compressed natural gas). As the case with other reports, the EIA report concludes that "*the cumulative impact will be negligible as the reduction in emissions as a result of the Proposed Action, compared to increase due to traffic growth is likely to be very small*". However, there is no quantitative analysis of GHG emissions calculations to support this statement and is rather a more general statement.

Table 5-2 provides a summary of climate change related policy and legislation in each of the EIA report reviewed. None of the reports elaborate on specific aspects of policy, legislation or international conventions with regards to climate change and how are these applicable to the respective projects. Most of the reports for Punjab have not mentioned the international conventions and Pakistan's obligation under them.

Table 5-2: Climate Change Related Policy and Legislation in EIA Reports (Punjab)

EIA Report	Funding	Climate Change Policy and Legislation
Sui-Guddu Interchange	Punjab Government	<ul style="list-style-type: none"> • National Environmental Policy, 2005 - Sectoral Policy and mention of climate change.
Lahore-Narowal	Punjab Government	<ul style="list-style-type: none"> • National Environmental Policy, 2005 - Sectoral Policy and mention of climate change.
Defense Chowk	Punjab Government	<ul style="list-style-type: none"> • Reference to National Environmental Policy 2005 but does not mention climate change.
Gojra-Shorkot-Khanewal	ADB Funding	<ul style="list-style-type: none"> • ADB's Safeguard Policy Statement (2009): Assess potential trans-boundary and global impacts, including climate change. • Reference to Pakistan's obligation under international treaties and conventions on climate change but no reference to their applicability to the project.

5.3. Gilgit Baltistan

Gilgit Baltistan is the northmost administrative area of the country, sparsely populated and spread over three mountain systems: Himalaya, Karakorum, and Hindukush. It is a popular tourist destination (glaciers, meadows, and world's second highest mountain peak K-2), but also highly susceptible to climate change impacts. Two EIA reports were analysed for road projects in Gilgit Baltistan: Gilgit-Shandoor and Skardu-Jaglot. An overview of climate change consideration for each EIA report is summarised below:

- The Gilgit-Shandoor EIA report acknowledges that “*emission of greenhouse gases causes global warming and other climatic changes on regional and global scale*”. This is highlighted in a brief section titled ‘Green House Gas (GHG) Abatement’ which highlights main sources of GHG emissions (stationary and mobile) during construction phase of the project and goes on to provide basic mitigation measures to manage the impacts from these emissions. It is important to note that the report does not go into any details on GHG emissions calculations and project impacts from operation phase. Furthermore, the report details on climate hazards given the project is located in a mountainous terrain where climate stressors pose a significant threat. This includes glacier melts and flooding as two major threats. The report proposes collaboration with the Disaster Management Authority for early warnings.
- The Skardu-Jaglot EIA report tackles climate change in one instance only – wetland protection. As the project area is home to a large number of major wetland systems, the report highlights the importance of these wetlands (ecology, biodiversity and eco-tourism) and the effect climate change can have. Again, the discussion is short and generic merely mentioning the correlation between increasing temperature and retreating glaciers thus affecting the flows in the Indus River System which are fed by these glaciers. The EIA report does flag an important negligence on behalf of the institutions concerning the Ramsar Convention on Wetlands to which Pakistan is a signatory stating that none of the wetlands in Gilgit Baltistan have been declared as a Ramsar Site despite being clearly eligible. This is an indication for climate change to be considered in any decision, it needs to be a legal obligation rather than best practice left to proponents and consultants as highlighted in one of the interviews conducted for this study:

“For a developing country like Pakistan, it is too much to ask for climate change to be considered in development decisions on a voluntary basis. We need to understand that it is not a priority no matter where Pakistan stands on the Climate Vulnerability Index and despite the fact that it is not even close to being a major contributor. These numbers will mean nothing in practice unless there are laws. There is a need to weave climate change into the legislative framework for it to be taken into account. That is the only way to ensure climate change impacts, mitigation and adaptation are considered.” [International EIA Expert]

Table 5-3 provides a summary of climate change related policy and legislation in each of the EIA report reviewed. None of the reports elaborate on specific aspects of policy, legislation or international conventions with regards to climate change.

Table 5-3: Climate Change Related Policy and Legislation in EIA Reports (Gilgit Baltistan)

EIA Report	Funding	Climate Change Policy and Legislation
Gilgit-Shandoor	Gilgit Baltistan Government	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change.
Skardu-Jaglot	Gilgit Baltistan Government	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change. Reference to Ramsar Convention on Wetlands and identifies a gap for Gilgit Baltistan having no designated Ramsar Site.

Given the ecological richness and sensitivity of Gilgit Baltistan and its extreme vulnerability to climate change impacts, it is alarming to see how climate change is not considered. The EIA reports lack baseline details on climate change impacts and mitigation whereas for a region that critically needs to adapt to the changing climate, there is no mention of adaption strategies.

5.4. Balochistan

Balochistan is the southwestern province with the largest land area and smallest population spread over an extensive plateau of rough terrain. It is home to the second largest seaport (Gawadar) and some of the most exquisite beaches of the country. However, the province is severely underdeveloped despite being rich in mineral resources, access to seaports and trade connectivity to Central Asia, Gulf states and

other neighbouring countries. Despite challenges, Balochistan EPA is considered one of the active ones. Five EIA reports were analysed to assess the level of climate change integration into the EIA system in Balochistan. The findings of the analysis are summarised below:

- The Quetta Western Bypass EIA report returned zero hits on climate change. The report only provides a general description of the climate in the study area which is a standard for all EIA reports produced in Pakistan. As for climate stressors, the report mentions flooding along the road alignment although the potential impact is “*considered to be negative with minor magnitude and low sensitivity therefore not significant*”.
- The Khoshab-Awaran-Khuzdar EIA report highlights the National Climate Change Policy (2012) and highlights the requirements laid down in the policy to ‘*to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development*’. However, that is the only mention with regards to climate change throughout the report. The EIA is silent on how the policy applies to the project or what measures need to be taken to ensure the requirements of the policy are fulfilled for this project in the context of climate change consideration.
- The Khuzdar-Chamman EIA report returned zero hits on climate change. It only provides a general description of the climate in the study area which is a standard for all EIA reports produced in Pakistan.
- The Kuchlac-Zhob EIA report provides details on a number of policies and international treaties and conventions and is the only report (out of 18) that has commented on the relevance and applicability of each of these to the project. Further details are provided in **Table 5-4**. The report has a brief section titled ‘Green House Gas (GHG) Abatement’ which emphasises on the main GHG emissions sources both stationary and mobile during the construction phase of the project and provides basic mitigation measures to manage the impacts from these emissions. The report does not specify GHG emissions calculations and project impacts from the operation phase.
- The Wadh-Khuzdar EIA report gives an overview of the GHG emissions in general and how they contribute to global warming, referencing UNFCCC and the Kyoto Protocol. However, no GHG calculations were reported for the project and

mitigation measures such as carbon sequestration through tree plantation and ban on smoke generating vehicles on the highway are recommended.

Table 5-4 provides a summary of climate change related policy and legislation in each of the EIA report reviewed. None of the reports elaborate on specific aspects of policy, legislation or international conventions with regards to climate change.

Table 5-4: Climate Change Related Policy and Legislation in EIA Reports (Balochistan)

EIA Report	Funding	Climate Change Policy and Legislation
Quetta Western Bypass	National	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change.
Hoshaba-Awaran-Khuzdar	National	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change. National Climate Change Policy 2012 Rio Declaration 1992 (UNFCCC not mentioned here just the declaration, no reference to climate change). Ramsar Convention on Wetlands 1971.
Khuzdar-Chamman	National	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change.
Kuchlac-Zhob	National	<ul style="list-style-type: none"> National Forest Policy 2012 – relevant in terms of implementation of international treaties and conventions related to forestry, wetlands, biodiversity and climate change. Operational Strategy for Clean Development Mechanism (CDM) – the relevance to the project is unclear as this is at a national level and related to ‘Pakistan’s Initial Communication on Climate Change’. UNFCCC and Kyoto Protocol. Paris Agreement 2015.
Wadh-Khuzdar	National	<ul style="list-style-type: none"> National Environmental Policy, 2005 - Sectoral guidelines on climate change.

5.5. Khyber Pakhtunkhwa (KPK)

KPK is located in the north-western region of Pakistan and considered the tourism hub of the country given the lush mountainous regions and river systems. Development-wise the province fares well and has seen steady growth in the recent years. In terms of climate change impacts, it is one of the most adversely affected provinces (2010 floods). Three EIA reports were analysed: Dir Motorway, Old Bannu Road, Hakla-DI Khan, and the results show negligible climate change consideration in development

decisions. All three reports returned zero hits for direct reference to climate change. Interestingly two out of the three reports (Old Bannu and Hakla-DI Khan) have listed GHG in the abbreviations list, however, there is no mention of GHG emissions and associated impact in the main report. This can be considered a typing error.

Table 5-5 provides a summary of climate change related policy and legislation in each of the EIA report reviewed. None of the reports elaborate on specific aspects of policy, legislation or international conventions with regards to climate change.

Table 5-5: Climate Change Related Policy and Legislation in EIA Reports (KPK)

EIA Report	Funding	Climate Change Policy and Legislation
Dir Motorway	National	<ul style="list-style-type: none"> National Climate Change Policy 2012.
Old Bannu Road	National	<ul style="list-style-type: none"> Reference to National Environmental Policy 2005 but does not mention climate change.
Hakla-DI Khan	National	<ul style="list-style-type: none"> UNFCC

The analysis of EIA reports in Pakistan shows that climate change has been considered to a very limited extent in EIA legislation and practice. There are inconsistencies within and across provinces/administrative areas and inclusion of climate change is only limited to mentions of policies and international treaties and conventions to which Pakistan is a signatory. The EIA reports provide no details on how these policies and conventions are applicable to the projects and what the implications for non-compliance are. Only one report from Balochistan (Kuchlac-Zhob) refers to project applicability for each of the conventions listed. Similarly, Climate change adaptation is non-existent in the Pakistani EIA system.

GHG emissions appear to be a recurrent theme in EIA reports. However, except for one project in Sindh (Karachi Bus Rapid Transit) which commissioned a study on GHG emissions calculations, none of the reports have presented GHG emissions calculations for projects but list down mitigation measures. As road projects, where GHG emissions are mentioned, there is a statement on negligible impact from the project emissions. Moreover, the reports claim a net positive impact on GHG emissions as a result of the road project as it shifts traffic from smaller roads to the highways thus a decrease in emissions is expected. There is no qualitative evidence to support these statements and are mere generic references to a positive impact.

Although the existing consideration of climate change impacts and subsequent adaptation presents a bleak picture. It can be considered as an excellent opportunity to look at possible entry points for climate change impacts and adaptation into the Pakistani EIA framework. This study has attempted to propose such entry points and the discussion is summarised in the next chapter of this report.

6. Possible Entry Points for Climate Change Consideration

Results pertaining to direct referencing of climate change impacts and subsequent adaptation in Pakistan are not encouraging. There is emphasis on climate stressors, mainly flooding, which has received adequate attention in assessing potential impacts and mitigation measures. Flooding has been the focus in these EIA reports, as it is a major concern across the country. Pakistan is currently experiencing the worst flood in its history where one third of the country is submerged in flood water, resulting in 1300+ lives (as of 5th September 2022), displacing 482k people, affecting 33 million people, and leading to an estimated loss of USD 10 billion so far in property and agricultural damage (Government of Pakistan, 2022). Therefore, it is encouraging to see that climate-induced hazards such as floods are taken into consideration in the EIA process.

With regards to climate change impacts and associated issues, the analysis revealed several thematic entry points that can be contemplated for Pakistan. There is a significant challenge of ensuring that recommendations and implementation are standardised in various provinces/administrative areas post decentralisation. In light of this challenge, this study attempts to present framework recommendations for possible entry points for climate change considerations at a national level, while keeping in mind the disparities in different provinces/administrative areas. It is important to note that although provinces/administrative areas are autonomous in handling all environmental matters including legislation, the subject of climate change is handled by the Ministry of Climate Change that operates at the Federal level. The ministry is also responsible for handling Pakistan's commitment and obligation towards addressing climate change under various international multilateral treaties and conventions. As the EIA process is fairly uniform, the recommended framework will be applicable across Pakistan.

The framework recommendations are based on best practice examples from countries that have experience in successful climate change integration into the EIA systems. This included best practices in Canada, UK, Netherlands, and European Union. In particular, the English planning and EIA system was reviewed and how climate change is considered within it. This included review of the legislative and policy framework for climate change in EIA and 17 Technical Summaries of EIS prepared for road projects

between 2018 and 2022. Overall, climate change integration is still in its early stages and is characterised by inconsistencies that call for thorough systematic and scientific interventions (Matemilola, 2019).

The results of EIA report analysis show a major gap in climate change consideration within the legal framework for Pakistan. So far, none of the environmental protection legislation calls for action on climate change within legal texts (acts and regulations) in any of the provinces/administrative areas. This calls for mainstreaming climate change within the legal framework. A recurrent theme in the interviews conducted with EIA stakeholders also revealed the need for climate change to be accounted for within the legislative and policy framework, as that is the best possible way to ensure incorporation of climate change impacts and adaptation into development decisions.

“Climate change is a challenge for Pakistan. And how we address it within the environmental legislation is even a bigger challenge, but it is the only way. It is high time that the legislation is made clear on evaluating climate change impacts in EIAs and GHG emissions calculations can be a good starting point” [EIA Consultant]

“Pakistan has a long way to go [in addressing climate change] and more so within the EIA processes. We think it’s enough to say that Pakistan is a signatory of so and so convention, but what does it actually mean for the project? Same goes for policies. Policies are guidelines which need to be translated into legislation for implementation to happen. The 18th Amendment feels like such a missed opportunity for most provinces who failed to realise the potential with new province-specific legislation” [EIA Expert]

An important provision regarding climate change impacts can be made within the legal texts. Every project requiring an EIA must be carried out with an evaluation of climate change impacts, both in terms of the impact the project can have on climate change (such as GHG emissions during construction and operation), and regarding the vulnerability of the project to climate change (climate stressors/extreme weather events).

In this regard, one possible solution is accounting for the GHG emissions from projects throughout its lifecycle. GHG emissions calculations should be made mandatory as

part of the EIA preparation, starting with sectors that have a higher proportion of GHG emissions nationally (for example in Pakistan's case the top three are agriculture, manufacturing and construction and transportation). This should be an embedded requirement in the IEE-EIA Regulations, where a third Schedule can be added for projects requiring mandatory GHG emissions calculations and subsequent mitigation and adaptation strategies. Further to legislation there is a need to establish guidelines that specifically address climate change within EIA, with further sectoral guidelines for example for transportation projects – roads. KPK and Balochistan EPAs have prepared sectoral guidelines including those for roads. These guidelines however were produced in 1997 and need to be updated (Khan et al., 2022).

The Institute of Environmental Management and Assessment (IEMA) produced the following two guidance documents on climate change, which can be a good starting point for Pakistan: Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2015, revised 2020) and Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017). It will also be helpful to look at tools used to calculate carbon emissions such as the Carbon Management System Project Tool, developed by Transport Scotland which is used to quantify embodied carbon within construction material and waste (Underwood et al., 2021).

Results pertaining to meteorological phenomena and potential climate change impacts showed that 'flooding' is the most common recurrent theme as far as climate stressors are concerned. Despite the differences in topographic conditions across Pakistan, flooding is a very important factor that affects most of the country. Therefore, it has received most attention in EIA in all provinces/administrative areas. However, there is a need to consider other relevant climate change impacts such 'glacier melt', 'human health', 'flora/fauna/habitat' which have been rarely considered so far. Guideline documents framing practice and specific planning systems such as river basin management plans, biodiversity management plans etc.) can be important entry points (Jiricka et al., 2016).

With regards to mitigation and compensation measures, development of methodological entry points can play an important role in supporting adaptation post project operation. The EIA report analysis showed that there are several common mitigation measures that can be adapted (for example the selection of more heat and

drought resistant tree species, Jiricka et al., 2016). Whereas there is a need to identify potential climate change impacts and subsequent new strategies for mitigation of those impacts which are project and site specific.

It is important for guidelines to highlight where and how climate change impacts and adaptation can be integrated at each step of the EIA process. This starts at project screening and scoping, assessment of alternatives, baseline, impact assessment and mitigation measures and finally cumulative impact assessment. Cumulative impact assessment is generally missing in the Pakistani EIA reports, unless it is specifically required under some financing obligation or is required by a proponent. Each EIA report should be accompanied by a simple review checklist for assessing climate change impacts and risks. With further guidance available on assessing the identified impacts and proposing adequate mitigation, the integration of climate change in Pakistani EIA can be successful.

7. Conclusions

Although Pakistan is not major emitter as it's national GHG emissions account for less than 1% of the global GHG emissions but it faces serious consequences because of climate change. Pakistan stands amongst the top 10 most vulnerable countries to climate change risks. This makes it imperative for Pakistan to streamline climate change impacts and subsequent adaptation into development decisions. This study attempted at investigating as to where Pakistan stands in terms of how it considers climate change within the EIA framework. EIA is a decision-making support tool that identifies environmental and socioeconomic impacts from projects that may have a significant impact on the environment and proposes management solutions to mitigate and monitor the negative impacts and enhance the positive impacts. Methods included literature review of existing literature (academic and non-academic), review and analysis of EIA reports and stakeholder engagement.

Analysis of EIA reports provided an overview of the state of climate change consideration in Pakistan taking examples from the transportation sector – road projects EIAs. It is an important sector to look at for Pakistan as it's the third largest in terms of GHG emissions after agriculture and manufacturing and construction (Ministry of Climate Change, 2021). The analysis showed a significant gap in climate change consideration in terms of both impacts and ensuing adaptation. However, it also presents an opportunity for Pakistan to make efforts towards incorporating climate change impacts and adaptation into development decisions across provinces/administrative areas. One of the challenges in considering climate change has been the lack of consideration within the legislative and policy framework of EIA.

With decentralisation of environmental matters where each of the provinces/administrative areas is required to make their own laws, climate change remains a challenge as Ministry of Climate Change responsible for all matters climate change related only operates at the federal level and has no jurisdiction in the rest of the country. Although decentralisation has given provinces/administrative areas the autonomy to promulgate environmental protection legislation and policies including those pertaining to climate change. The potential to harness this opportunity remains largely underused amongst all provinces/administrative areas even a decade later. Another major challenge is the lack of coordination amongst the

provinces/administrative areas and Ministry of Climate Change. This was highlighted in the interviews as well. Stakeholders mentioned that issues like climate change are best handled centrally to ensure uniform implementation across the country. There will be issues that are province-specific, and those can be handled internally by each province but there is a need for a national framework for climate change integration within EIA. Transboundary impacts are also important in this regard (particularly for road projects traversing through different provinces), which needs extensive communication and coordination which is largely lacking at present.

There are differences across provinces/administrative areas as to how they deal with climate change impacts. As for direct references to climate change, the integration is merely limited to references to specific policies and international conventions ratified by Pakistan. There is no explanation on how these treaties and conventions are relevant in the project's context or what are the obligations that the project needs to consider. In some instances, the reports have mentioned GHG emissions, although it is more in the context of how road projects will have a negligible impact because of GHG emissions abatement thus creating a net positive impact. There is no qualitative evidence to support these statements and are mere generic references to a positive impact. Only one project provided GHG emissions calculations while selecting the optimum options for a rapid transit project and GHG emissions from the project operation. SAs for climate change adaptation, it is practically non-existent in the Pakistani EIA system.

Although the existing consideration of climate change impacts and subsequent adaptation presents a bleak picture. It can be considered as an excellent opportunity to look at possible entry points for climate change impacts and adaptation into the Pakistani EIA framework. It is critical for implementation that climate change impacts and adaptation are embedded within the legal texts. Every project requiring an EIA must be carried out with an evaluation of climate change impacts, both in terms of the impact the project can have on climate change (such as GHG emissions during construction and operation), and vulnerability of the project to climate change (climate stressors/extreme weather events). Furthermore, there is a need for producing specific guidelines (including sectoral guidelines such as for road project) that deal with climate change impacts and adaptation within EIA.

Results pertaining to meteorological phenomena and potential climate change impacts showed that ‘flooding’ is the most common recurrent theme as far as climate stressors are concerned. Despite the differences in topographic conditions across Pakistan, flooding is a very important factor that affects most of the country. Therefore, it has received most attention in EIA in all provinces/administrative areas. However, there is a need to consider other relevant climate change impacts such ‘glacier melt’, ‘human health’, ‘flora/fauna/habitat’ which have been rarely considered so far. Guideline documents framing practice and specific planning systems such as river basin management plans, biodiversity management plans etc.) can be important entry points.

It is important for guidelines to highlight where and how climate change impacts and adaptation can be integrated at each step of the EIA process. This starts at project screening and scoping, assessment of alternatives, baseline, impact assessment and mitigation measures and finally cumulative impact assessment.

7.1. Limitations

- Obtaining EIA reports for this study proved to be a major challenge both in case of Pakistan and UK. For Pakistan, getting the EIA reports from the EPAs was difficult as the reports are not available online. Similarly for UK, EIS reports are not available online therefore IEMA was approached for Technical Summaries instead.
- Getting access to EIA decisions was difficult again primarily because these documents are not available online.
- Another challenge was getting stakeholder interviews in Pakistan. People were mostly reluctant to speak about the topic, particularly EPA officials as they were concerned about their names being mentioned. Another reason was the

7.2. Further Studies

There is a much wider scope to climate change integration within the EIA framework. This study has highlighted some challenges in the Pakistani context which need to be further investigated. There is further needed to investigate the obligations under climate change related international multilateral treaties and conventions and how these translate to projects and EIAs. A closer look at scientific knowledge is necessary to devise climate change related guidance and best practice from other countries which have achieved some level of success.

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