STRATEGIC ENVIRONMENTAL ASSESSMENT OF CHINA PAKISTAN ECONOMIC CORRIDOR PLAN 2017-2030

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Pakistan

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Strategic environmental
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A thesis submitted to the Department of Environmental Science, Faculty of Sciences in partial fulfillment of requirements for the award of degree of Doctor of Philosophy of International Islamic University, Islamabad

Research work completed under a Commonwealth Split-site Scholarship Award at University of Liverpool

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DEDICATION

I dedicate

my work to

My Beloved Daughters

Areeba, Rafiah and Hadia

DECLARATION

I *Abdul Waheed*, PhD candidate in the Department of Environmental Science enrolled under registration No. 28-FBAS/PHDES/S17, hereby declare that the knowledge contributed by analyses of data collected and results derived to draw the conclusion presented in this thesis titled " *Strategic Environmental Assessment of China Pakistan Economic Corridor Plan 2017-2030*" is my own original work and has not been submitted as research work or thesis in any form in any other university or institute in Pakistan or abroad for the award of any degree. However, one research paper from this research work titled "Climate change policy coherence across policies, plans, and strategies in Pakistan-implications for the China-Pakistan economic corridor plan" has been published in volume 67 (5): 793-810 of *Environmental Management*.

Dated: _

(Abdul Waheed)

ABSTRACT

A tool to support planning for integrated and sustainable development is critical for addressing environmental concerns including climate change (CC). Strategic Environmental Assessment (SEA) is a systematic procedure to assess environmental impact linked with planning tiers above the project level and is considered as a tool that integrates environmental and socio-economic challenges into policies, plans and programmes (PPPs) for sustainable development. Environmental degradation, pollution and CC are phenomena interlinked with development. In this PhD dissertation, an attempt to assess the environmental impacts associated with implementation of long-term China-Pakistan Economic Corridor Plan (CPEC) 2017-2030 in the context of principles of SEA. This study also attempted to assess the adequacy of measures to integrate environment and CC concerns in Pakistan's planning tiers of policies, plans and programmes. Hence, analysis of CC policy coherence (PC) across sectoral development policies and plans was carried out first; then coherence of CC policy with CPEC Plan and Disaster Risk Management Plan was analyzed. Secondly, SWOT analysis of CPEC Plan considering the governance system for environmental assessment (EA) and management in Pakistan was also performed to identify internal weaknesses and anticipated external threats that may affect the development under CPEC and also what are internal strengths that may bring more opportunities. A mixed-method approach was applied, including document content analysis; expert opinions; semi-structured interviews of key informants; questionnaire-based data collection. The data were analyzed using Multi-Criteria Decision Analysis; Best Worst Method linear programming as well as a SWOT analysis. The analyses of data indicate a better PC at federal level than provincial. Climate change policies are more coherent with water and agriculture policies than energy policies. Disaster risk reduction (DRR) and EA are integrated in federal and provincial environmental protection acts and most of the provincial disaster management plans. However, currently, EA is not considered in disaster management policies and plans. In the context of Pakistan's current environmental governance and CPEC development, the experts identified transparency, monitoring & evaluation of CPEC projects, stakeholders' input in planning and cooperation in implantation; and timely dispute resolution mechanism, as the best criteria for assessment of sustainability of CPEC. Whereas, the expert considered lack of access to information, effective mechanisms to resolve conflicts between EPAs; effective enforcement of environmental laws, consequences of not granting approval by EPAs, lack of real public participation in the development of EA reports for CPEC projects, as the worst criteria for sustainability assessment CPEC. The results of SWOT analysis indicate that the best performance criteria related to CPEC internal strengths are increased employment; followed by improved energy supply; economic growth, trade cooperation; political commitment and leadership; geostrategic position and enhance foreign investment. Internal weaknesses identified include technological inefficiencies and lack of good governance in general followed by CC and global environmental concerns; lack of good environmental governance, and delays in

revision/update of policy documents. With regards to opportunities, the best performance criteria included increased job opportunities; followed by regional connectivity and industrial development, advancement in technology, overcoming energy crises, economic boosts, and entrepreneurship. Similarly, key external threats, in view of the experts are exploitation of the natural resources, followed by climate induced disaster concerns (e.g., potential threat to ecosystem, biodiversity and glacial melting), environmental impacts, inconsistencies in environmental governance, law and order situation in Balochistan Province, and mistrusted inter-Provincial and Federal harmony in CPEC plan implementation. With respect to consistency, opportunities are seem to be more consistent than weaknesses, threats and strengths. In the context of PC and CPEC development, the environment and CC policy documents lack consideration of comprehensive accountability and transparency-related policy measures. Similarly, sectoral policies related to energy, agriculture, industrial sector policies, and environmental policies do not mention the CPEC plan. Finally, it is concluded that there are numerous policy implications with regards to CC, like PC, environmental policy integration (EPI) in the decision-making process, Environmental Assessment system and sustainability of CPEC if considered for achieving the 2030 agenda of SDGs,

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(Abdul Waheed)

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LIST OF ABBREVIATIONS

AD	Annual Development
AJ&K	Azad Jammu and Kashmir
BWM	Best West Method
BRI	Belt Road Initiative
BAU	Business as Usual
BIO	Board of Investment
CPEC	China Pakistan Economic Corridor
CC	Climate Change
CCP	Climate Change Policy
C	Criteria
CDA	Content Document Analysis
CA	Content Analysis
CoE	Center of Excellence
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRA	Disaster Risk Assessment
DM	Disaster Management
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EPA	Environmental Protection Agency
EPAs	Environmental Protection Agencies
EP	Environmental Protection
EOC	External Opportunities Criteria
EPI	Environmental Policy Integration
EG	Environmental Governance
ETC	External Threat Criteria
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GHG	Green House Gas

GoP	Government of Pakistan
GB	Gilgit- Baltustan
HFA	Hyogo Framework for Action
IEE	Initial Environmental Examination
IUCN	International Union for Conservation of Nature
IWC	Internal Weakness Criteria
ISC	Internal Strength Criteria
JCC	Joint Cooperation Committee
JWGs	Joint Working Groups
KKH	Karakoram Highway
KP	Khyber Pakhtunkhwa
MMT	Million Metric Tons
MCDM	Multi Criteria Decision Making
NDRC	National Development and Reform Commission
MoPD&SI	Ministry of Planning Development and Special Initiatives
MoCC	Ministry of Climate Change
MoE	Ministry of Environment
NCCP	National Climate Change Policy
NDRRP	National Disaster Risk Reduction Policy
NEP	National Environmental Policy
NEQS	National Environmental Quality Standards
NDCs	Nationally Determined Contributions
NDMA	National Disaster Management Authority
PIDE	Pakistan Institute of Development Economics
PEPC	Pakistan Environmental Protection Council
PEPD	Provincial Environment Protection Department
PPPs	Policies, plans and programmes
PC	Policy Coherence
PC	Planning Commission
P&D	Planning and Development
PEPA	Pakistan Environmental Protection Act
SWOT	Strengths, Weaknesses, Opportunities, and Threats

SDGs	Sustainable Development Goals
SD	Sustainable Development
SEZs	Special Economic Zones
SEA	Strategic Environmental Assessment
WWF	World Wildlife Fund

Chapter-1

1. INTRODUCTION

This PhD research revolves around exploring how to bridge the gap between theory and practice of SEA by obtaining research-based input for integrating ecological and CC concerns into development policies and plans for social and environmental safeguard and sustainability of the China-Pakistan Economic Corridor plan (2017-2030).

This chapter explores importance of SEA in the development planning process (1.1). Furthermore, a brief introduction to the CPEC plan (1.2) is provided followed by a problem statement (1.3) highlighting CC and environmental concerns associated with CPEC's long-term development plan (2017-2030). Furthermore, research questions (1.4) and research objectives (1.5) are developed to achieve the aim of PhD research. The significance of study and limitations of the PhD dissertation are described (1.6 and 1.7, respectively). Finally, thesis organization is depicted at the end of this chapter.

1.1. Strategic environmental assessment and better development planning

The rapid economic transformation from an agrarian to an urbanized and industrialized economy is upcoming with numerous challenges for environmental sustainability (Ahmed et al., 2022). Environmental degradation, biodiversity loss, and CC pose serious threats to the planet (Humboldt-Dachroeden et al., 2019) and are obstacles to sustainable economic development (Tauseef Hassan et al., 2021). In the face of global ecological change, decision-makers need effective environmental assessment (EA) tools that help to shape policies and plans for sustainable development (SD) (Baresi et al., 2020). Pakistan's rapidly growing economy, rapid urban and population growth, unplanned development, and ineffective natural resource management are negatively impacting the country's socio-economic and environmental fabric (Alshuwaikhat, 2005, Nadeem and Hameed, 2008). Similarly, foreign direct investment (FDI) and urbanization reveal a positive and statistically significant impact in terms of CO_2 emissions, demonstrating an environmental degradation driving impact on the country (Ahmed et al., 2022). Furthermore, trade openness, fossil fuel consumption, population growth (Yousaf et al., 2022), trade liberalization, rapid industrialization and agricultural activities (Alam et al., 2011) are the leading factors of environmental degradation and are a big hurdle to SD in Pakistan.

EA is a tool to identify, predict, evaluate, and mitigate potential ecological impacts of developmental initiatives (Hanna, 2009) and to facilitate environmental consideration in planning and decision-making processes to reach environmentally sustainable (Noble, 2009) decisions. Environmental impact assessment (EIA) is about the evaluation of project proposals from an environmental perspective to reduce

development impacts on the environment and to ensure environmental sustainability (Saeed et al., 2012). EIA is a process introduced in reaction to proposed developments acknowledging potential adverse ecological effects, providing prospect to avoid or mitigate these adverse effects and thereby contribute to SD (Jenkins, 2022).
The SEA, as the EA of PPPs, first emerged in the late 1980s (Fischer, 1999) to integrate ecological concerns into the decision-making processes of PPPs making (Partidário, 1996, Sadler and Dalal-Clayton, 2005, Fischer, 2007, Ahmed and Sánchez-Triana, 2008). The need for EA above the project level was discussed and stressed much earlier; e.g, by (O'Riordan and Sewell, 1981). SEA is increasingly approached as a "framework" rather than just a process (Jansson, 1999, Fischer, 1999) and SEA is also a multi-faceted and multi-dimensional assessment process that aims at enabling transitions toward sustainability (Noble and Nwanekezie, 2017). Environmentally SD is the main substantive objective of SEA (Fischer and Retief, 2021), supporting more sustainable PPPs making (Fischer, 2022). Critical aspects for an effective SEA application include the consideration of appropriate alternatives and questions addressed at different tiers (i.e. at PPPs levels), as well as other contextual and institutional aspects (e.g. capacity, transparency, and participatory arrangements (Fischer and Retief, 2021, Thérivel and González, 2021). Additionally, from a governance perspective SEA aim of achieving compatibility of aims and objectives in PPPs, as well as consistency in ensuing action and implementation (Fischer et al., 2021).

SEA has become widely applied worldwide and there are more than sixty countries with some formal SEA requirements (Fischer and González, 2021). Since 1995, worldwide, 37 SEAs are known to have been performed to support strategic planning and decision-making in the hydropower sector, mainly in low and middle-income countries, predominantly in Asia (David Annandale et al., 2021) including Pakistan. More recently, SEA has been presented as a tool to attain sustainable development goals (SDGs) (Partidario, 2015, Morrison-Saunders et al., 2020, Fischer, 2020, Del Campo et al., 2020). In Pakistan, the Khyber Pakhtunkhwa (KP) Environmental Protection (EP) Act 2014 stated tbat "SEA means an analysis or series of analyses that are systematic, overall and participatory to ensure that the principle of SD is the basis for and is integrated into the development of a policy, plan or programme"(GOKP, 2014b, p. 10).

1.2. An overview of China-Pakistan Economic Corridor Plan 2017-2030

CPEC is a pilot program of China Belt and Road Initiative (BRI) (Nation, 2021,p.12) worth US $62 B (Awan, 2020), making China's major BRI infrastructure investment anywhere in the world (Korybko and Morozov, 2020). The CPEC long-term plan (2017-2030) states that:
"*CPEC is a growth axis and a development belt featuring complementary advantages, collaboration, mutual benefits, and common prosperity. With the comprehensive transportation corridor and industrial cooperation between China and Pakistan as the*

main axis, and with concrete economic and trade cooperation, and people-to-people exchange and cultural communications as the engine, CPEC is based on major collaborative projects for infrastructure construction, industrial development, and livelihood improvement, aimed at socio-economic development, prosperity and security in regions along with it"(GoP, 2017a, p. 8).

The CPEC is not just a road network infrastructure development in the country. It is an umbrella of various development strategies and programs (Khan, 2017). The main key cooperative areas of CPEC plan (2017-2030) are connectivity (infrastructure development), integrated transport setup, energy sector, trade, industrial parks development, agriculture, tourism, financial cooperation, Gwadar development, and people's livelihood improvement along the CPEC route (GoP, 2017a). CPEC (2017-2030) comprises of 3,000 km network of transport infrastructure that connects Gwadar Pakistan to the North-Western region of China's Xinjiang province (Ali, 2015) (see Fig 1.1). Gwadar port is the origin and starting point of the CPEC development. It has five operational zones from north to south i.e.,

i. Xinjiang foreign economic zone,
ii. Northern border trade logistics and business corridor & ecological reserve,
iii. Eastern and central plain economic zone,
iv. Western logistics corridor business zone, and
v. Southern coastal logistics business zone.

Most of the node cities, transportation corridors and industrial clusters are concentrated in them (GoP, 2017a). Associated investments made China the number one foreign direct investor in Pakistan. It is expected to speed up Pakistan's gross domestic product (GDP) growth at 7.5% from 2015 to 2030 (Mirza et al., 2019). It is hoped that over 2.3 million jobs will be created between 2015 and 2030 (Times, 2021). In this context, US$62bn investment under the CPEC portfolio US $34 B will be spent on energy schemes (Husain, 2018, Khan, 2017) to generate 17,045 MW (Authority, 2019) to overcome the energy crises in Pakistan. Another US $28 B is said to go into infrastructure development (Shah, 2015), and the estimated cost of Gwadar port development alone is US$ M 1377.32 (MoPD&SI, 2015) and US$11 billion is estimated to be spent on transportation network modernization (Times, 2021).

Game changer CPEC development is not only for Pakistan but also for the regional and global trade market. It will improve the infrastructure, economy, and energy sector of Pakistan while giving trade route access to the Middle East, Africa, and the rest of the World including three continents, sixty-eight 68 countries, and one-third of the world's GDP, and sixty-two percent of the worldwide population (GoP, 2022a), because of the geographical location of Pakistan (Irshad, 2015). Therefore, considering the importance of CPEC connectivity, other countries e, g. US and Kuwait are interested to finance in the agriculture, food, and energy sectors (Hanif, 2020). The governments of Pakistan and Saudi Arabia have also signed up an investment agreement of $ 9 B for Petrochemical's development at Gwadar (APP, 2021b). Similarly, Pakistanis living

overseas are keen to invest US $ 10M in special economic zones (SEZs) of CPEC development (APP, 2021b). To date, the environmental and CC impacts of CPEC development have been ignored in place of political and profit-seeking interests (Khan, 2021b, OUSRS, 2021).

1.3. Problem statement

Potential environmental impacts are the main challenges of implementation of CPEC plan in Pakistan, which will substantially increase the emission of carbon dioxide by increased traffic. Energy projects under CPEC are expected to result in increase in greenhouse gas (GHGs) emissions emission as majority of the energy projects are coal based with severe environmental and potential social impacts. Northern Pakistan, a gateway to CPEC has highly vulnerable and sensitive ecosystems that are also threatened by construction of highways. The glaciers covering an area of 5,218 km^2 are sources of a number of important rivers and have local and global climate regulating functions. Also, environmental impacts of urbanization due to CPEC developments are expected to grow substantially in years to come. The main investment under CPEC (2017-2030) will be in energy and infrastructure projects that are expected to accelerate GDP growth but environmental impacts are also expected.

1.4. Research questions

On the basis of literature review, following research questions were framed to explore in this study:

1) Whether environmental and climate change policies are coherent with policies, plans and strategies in Pakistan, particularly across key cooperative areas of CPEC?
2) What is the current focus of disaster management framework in Pakistan and to what extent projects under CPEC Plan are vulnerable to disasters, and disaster risks are assessed in EIA studies of projects?
3) Whether environment and disaster management are integrated in CPEC Plan to ensure sustainability?
4) Whether Pakistan has an effective policy and legal framework for environmental safeguards and stakeholders' engagement during implementation of CPEC Plan and concerned institutions have the capacity for effective implementation of policies and regulatory enforcement to ensure sustainability of CPEC Plan? If not, then what are the reasons?
5) What are Strengths, Weaknesses, Opportunities and Threats of implementing CPEC Plan and its sustainability?

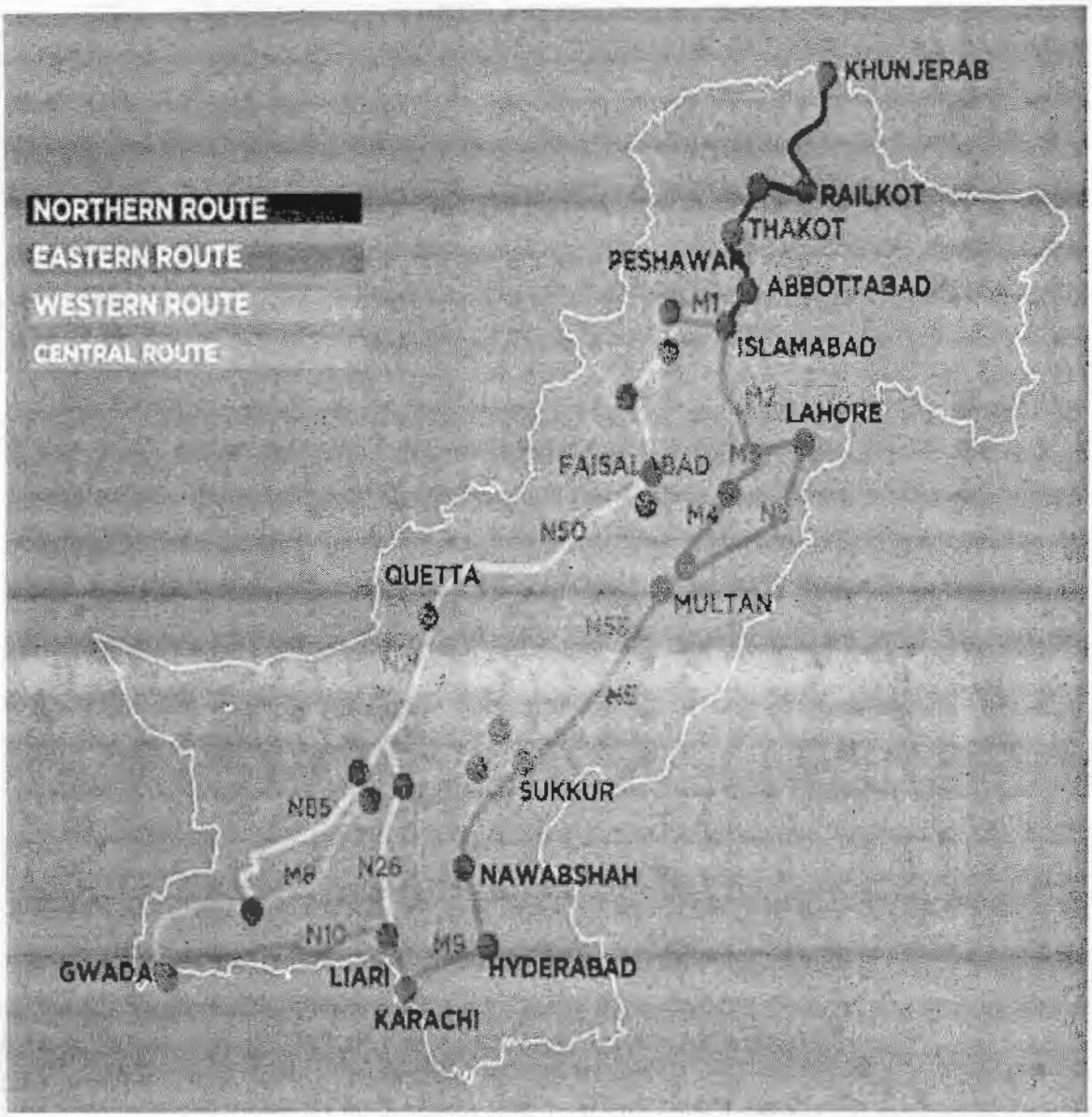

Figure 1.1: CPEC routes, national highways and motorways alignment. Ministry of Planning, Development and Special Initiatives. https://www.pc.gov.pk/web/cpec

1.5. Aim and objectives

This study aimed at carrying out strategic environmental assessment of CPEC Plan (2017-2030) and generating knowledge that may be used for integrating environmental considerations into policy and decision-making processes for sustainability of the CPEC Plan (2017-30). The specific objectives were to:

1. analyze and evaluate climate change policy coherence across Pakistan's water, food, agriculture, and energy sector policies, strategies, development plans and disaster risk management plans;
2. analyze coherence of key sectoral development policies for CPEC Plan with

policy and legal instruments related to environment, climate change and disaster management; and

3. evaluate environmental policy integration across national disaster management policy and plans, and CEPC sustainability;
4. analyze and evaluate stakeholders' perceptions of current environmental governance in Pakistan in the context of CPEC Plan;
5. analyze strengths, weaknesses, opportunities, and threats - SWOT of implementation CPEC plan and its sustainability.

1.6. Significance of the study

CPEC (2017-2030) is an ambitious strategic plan of China's One Belt One Road Initiative helping to shift Pakistan's approach from geo-politics to geo-economics. Pakistan is blessed with diverse natural resources. Various research studies highlight that CPEC development is a great threat to the county's natural resources and may enhance environmental degradation and CC concerns. Climate governance has been a subject of Pakistan's international diplomacy and Federal Governance (Khayam and Ahmad, 2020). However, post the 18th Constitution amendment, neither environmental pollution nor CC is enumerated in the Federal Legislative List (Khayam and Ahmad, 2020). Pakistan's Federal Government holds a lead in the CPEC development plan. However, after the 18th Constitutional Amendment, CPEC development areas such as Agriculture and Tourism are Provincial Jurisdiction. There needs to be coherent planning regarding green and climate resilient CPEC development.

The SEA provided a forum for Government and relevant stakeholders to discuss cumulative sectoral and transboundary development impacts (Kobayashi et al., 2012), such as potential ecological and socio-economic impacts across corridor, and to develop alternatives and mitigation options (Ramachandran and Linde, 2011). In addition to this, SEA can play a vital role in avoiding conflict over scarce resources by strengthening local participatory governance structures (Molenaar and Nooteboom, 2020). Therefore, SEA is required to address conflict resolution among federal and provincial goverments about CPEC development, environmental degradation concerns, and CC related issues.

As SEA introduction in Pakistan (NIAP/IUCN, 2013) would enable better planning, not only by integrating ecological potential impacts into development and decision-making but also through improved coordination between authorities involved in planning. In addition to this, SEA also facilitates dialogue, negotiation, and agreements among multiple stakeholders on environmental sustainability (Bank, 2012a), proactive strategic thinking to ecosystem function conservation and enabling transitions toward sustainability (Hassanali and Mahon, 2022).

1.7. Limitations of research

This research work is limited to analysis of policy and legal instruments in Pakistan. The same in the China part is not included in this study. Similarly, policy instruments related to CPEC's geo-strategic and defense nature are not included because of unavailability and access to data about issues of strategic nature.

1.8. Organization of thesis

Following this Chapter-1 on Introduction, Chapter-2 provides a literature review for each research objective that includes SEA, CPEC Plan (2017-2030), PC, environmental policy integration (EPI) in disaster management (DM), Pakistan environmental governance (EG) system and sustainability of CPEC Plan (2017-2030). Chapter- 3 is about detailed methods and approaches used for meeting each research objective, followed by Chapter 4 pertaining to objective-1 CC PC across Policies, Plans, and Strategies in Pakistan, and objective -2 coherence analysis of CPEC Plan with environmental and development policies. Chapter 5 is related to objective 3 on integration of environment and DM in CPEC plan for sustainability. Similarly, Chapter 6 is about objective -4 on EG and sustainability of CPEC Plan which is followed by Chapter- 7 related to objective 5 on sustainability assessment of CPEC Plan. Results of data analysis have been discussed in each chapter. However, overall results and discussion, followed by conclusion have been presented in Chapter-8, including review of main lessons and observations derived from each chapter and also considering the broader implications of implementation of CPEC Plan. Furthermore, findings of this research have been discussed in broader context of BRI a way forward for future research and policy implications are included in this chapter.

Chapter-2

2. REVIEW OF LITERATURE

2.1. Introduction

This chapter offers background knowledge acquired " SEA of CPEC plan (2017-2030)" (2.2) followed by five sections. Section i and ii includes); CPEC plan 2017-2030 and CC followed by SEA, PC and CPEC sustainability (**Chapter 4; Research Objective-1& 2**); iii) environmental integration in DM policy instruments of Pakistan and sustainability of CPEC plan (**Chapter 5; Research Objective-3**); iv) Environmental governance of Pakistan and CPEC sustainability (**Chapter 6; Research Objective-4**); and lastly sustainability assessment of CPEC plan (**Chapter 7; Research Objective-5**). This literature review chapter provides background knowledge for each research objective. It helped to identify study gap, developing relevant methods, tools and techniques used for this study. Additionally, it provides backbone for setting assessment criteria, collection of quantitative primary data through "key informant interviews" questionnaire-based surveys and subsequently generating analytical discussion and drawing conclusions against results and research questions of the study.

2.2. Climate change and environmental concerns of CPEC Plan (2017- 2030) and strategic environmental assessment

Globally Pakistan is known as a highly vulnerable country to CC (Shahzad et al., 2021). The current Germanwatch Global Climate Risk Index report for 2021 placed Pakistan in the top ten most affected CC countries list (Eckstein et al., 2021, SAEED, 2021). Population growth, environmental impacts, and urbanization require smart & sustainable infrastructure solutions (GoP, 2022a). According to the Global Climate Index report, in 2020 the country has suffered $3.8B worth of economic losses from 1998 to 2018 (Abubakar, 2019) due to CC. The CC and environmental degradation has become the main challenge to SD (Zubedi et al., 2018) and CPEC plan (2017-2030).
The CPEC development might boost CC vulnerabilities and environmental risks for Pakistan (Kouser et al., 2020). The majority of energy projects under CPEC are coal-based, which will increase GHGs emissions, and worsen CC and environmental degradation concerns (Ahmed, 2018, Ali, 2018b). Pakistan may also lose foreign investment in diverse sectors if it doesn't articulate its commitment to deal with the challenges of CC (Saeed, 2013) and environmental concerns. The ecological degradation cost in 2015 was said to be 9% of GDP equivalent (up from 6% of GDP in 2006) (GoP, 2017b, Bank, 2006). Environmental experts believe that the annual environmental degradation cost has reached about US $5.2 B in financial losses (Saeed, 2013). Pakistan is said to be spending 5.8–7.6 percent of total federal expenditures on

CC-related damages, which is about 11 percent combined on adaptation and mitigation, according to a United Nations Development Programme (UNDP) study in 2015 (GoP, 2021f). The whole projected GHG emissions by 2030 are 1603 Mt CO_2-equivalent (GoP, 2016b, Janjua et al., 2018a). Out of these total emissions, about 370.72 MT CO_2-equivalent are expected to result from CPEC development (Janjua et al., 2018a, Zubedi et al., 2022).

The CPEC development related increase in CO_2 emission would prevent Pakistan to achieve the Nationally Determined Contributions (NDCs) and SDGs (Malik et al., 2020). Pakistan expects to cut its anticipated GHG emissions by up to 20 percent (equivalent to 1603 Mt CO_2) by 2030, subject to financing (GoP, 2016b, Hussain et al., 2019). Similarly, according to Pakistan NDCs 2021, the Government intends to set a collective aspiring aim of conditional and voluntary contributions of an overall 50 percent reduction of its projected emissions by 2030, with a 15% drop below BAU from the country's own resources, and an additional 35 percent drop below BAU subject to international financial support (GoP, 2021f). This amounts to US$ 40B at 2016 prices and climate adaptation costs are projected to be US$ 7–14B/annum (GoP, 2016b). Similarly, CC mitigation costs for Pakistan range between $8 and $17 B by 2050 (Khan et al., 2016). It is estimated that 70 percent of this amount was mainly due to infrastructural costs (GoP, 2021f).

It is anticipated that CPEC investment will overcome Pakistan's energy crises, provide employment opportunities, boost the country's economy (Dadwal and Purushothaman, 2017), trade opportunities, minimize poverty, and improve the social well-being of Pakistan (Ali et al., 2017b) and other engaged countries too (Ebrahim, 2016). On the other side, CPEC development is a tsunami for the glacier's resources, environmental , and Pakistan's biodiversity (Nabi et al., 2018). The northern Pakistan (Gilgit Baltistan) is entrance of CPEC development. The region is at a very high risk of groundwater pollution along the CPEC route (Maqsoom et al., 2020). Similarly, water-energy and food system is critical along CPEC route (Cao et al., 2022). The region (Gilgit Baltistan) is blessed with the world's largest glacier resources. These glaciers are melting speedily at the rate of 0.66 m/year (Kääb et al., 2012) on account of numerous human activities and global warming (Gilany and Iqbal, 2016). The transport sector of Pakistan is a major contributor to the total of 342 MMT of CO_2 as projected by word bank in 2012 (Rasool, 2019). In this context, the transport sector is the leading factor in deteriorating environmental and climatic conditions. For example, it accounts for 43% of the airborne emissions in the country (GoP, 2019e).

The biggest threat is massive deforestation to construct CPEC road networks (Kouser et al., 2020) and traffic emissions moving through the CPEC route (Sadruddin, 2018). For example, it has been estimated that because of CPEC development, about 7,000 trucks per day will go through the ecologically sensitive area of Gilgit-Baltistan (GB) and emit up to 36.5B tons of CO_2 emissions (Qazilbash, 2017). This emission may cause the melting of the northern region's glaciers, and negatively impact the water, food, and agriculture security of the region (Qazilbash, 2017). Such emissions will brutally shrink glaciers and are likely to result in extreme flooding (Laghari, 2013). The heavily trafficked CPEC highways will not only deteriorate glaciers, the natural

environment, and local biodiversity (Nabi et al., 2017) but also greatly affect the marine biodiversity of the region. Similarly, massive industrial development along CPEC routes will damage the ecological system and scenic beauty of the region (Sadruddin, 2018). CPEC passes through almost all provinces of Pakistan (Li et al., 2019). The mountainous, cold, and arid area, diverse climate, frequent extreme weather and natural disasters, fragile eco-environment of the CPEC route, and current serious water scarcity (Nabi et al., 2018) restrict the smooth development CPEC plan.

Similarly, (Li et al., 2019) concluded that land degradation, water scarcity, and mountain geohazards are the big challenges of CPEC development. Hence environmental degradation and CC concerns have become a serious challenge to economic growth and CPEC development. The CPEC development plan can contribute to CC and environmental degradation and be impacted by CC and environmental disasters. Therefore, CC and environmental concerns need to be assessed in the country's development planning process and CPEC plan (2017-2030). Pakistan has legal provisions for EA (Nadeem and Fischer, 2011). Worldwide, various tools are in practice to conduct an impact assessment of PPPs, and projects.

In Pakistan, initial environmental examination (IEE), and EIA are legal requirements for assessing potential environmental impacts of proposed development projects of varying ranges under the Pakistan Environmental Protection Act (PEPA) (GoP, 1997a), Provincial EP Acts (GOKP, 2014b, GOPB, 2012, GOSD, 2014a, GoGB, 2014, GoBA, 2012) and Azad Jammu and Kashmir EP Act (GOAJK, 2000). EIA is executed in Pakistan that deals with projects and does not cover PPPs impacts. The Country's (Pakistan) existing EIA regulations are ineffective to deal with environmental and CC concerns. Pakistan is facing continual ecological decline due to dearth of strategic approaches to environmental conservation and development.

Khan and Chaudhry (2021) concluded that with the struggling economy, and speeding up development due to CPEC, the EIA structure is not the best in terms of accomplishing its objectives. Examining the cumulative impacts of many projects requires the application of SEA (Annandale and Ltd., 2014). The CPEC plan comprised of multiple interlinked development projects e.g. energy- agriculture and transport infrastructure development. The significant adverse effects of individual projects and the cumulative effects of minor adverse impacts of multiple developments can lead to ecological limits zgo beyond (Jenkins, 2022). The EIA tool gives limited considerations to cumulative impacts (Vu, 2022). Similarly, traditional EA instruments, such as EIA mainly for project management and planning are less successful once used to PPPs (OECD, 2012). EA is considered as a reactive and constrained assessment approach for individual development projects, and a project-based decision-making tool (Partidário, 2000), hence reducing its ability to effectively manage the cumulative development impacts, that typically occur at a regional scale (Harriman et al., 2008, Duinker and Greig, 2007). In this context, SEA is a proactive and strategic approach mainly focused on assessing potential ecological impacts of proposed PPPs and pursues to integrate ecological considerations into the development policies and higher level of environmental planning and decision-making processes. After 18th Constitutional amendment, EP Acts were promulgated at the Provincial level. In addition to IEE &

EIA as a legal requirement at the Provincial level, Provinces namely Sindh (GOSD, 2014a), Baluchistan (GoBA, 2012), KP (GOKP, 2014b), and GB (GoGB, 2014), has made provision to carry out SEA of PPPs as a mandatory requirement.

The SEA has become an effective planning tool in many world countries, including Asian countries. In context of Pakistan, a concern with SEA application is that it should be carried out for federal including provincial level policies and programmes. This in turn means federal legislation will be required (Pastakia, 2014). SEA is still an emerging tool in planning procedures of developing countries like Pakistan. The National Conservation Strategy (1992), National Environmental Policy (NEP) (2005), and National SD Strategy (2017) of Pakistan identify ecological integration in development of PPPs. However, in practice, planning procedures lack SEA consideration and integration. Pakistan's 18th constitutional amendment has offered opportunities to strengthen environmental legislation by incorporating legal obligations for SEA execution (Hameed, 2017) in the country. The SEA is an EA tool above the project level (Gunn and Noble, 2009), to integrate environmental considerations in PPPs development (Noble, 2003, Fischer, 2007, Fischer and Noble, 2015) for ecologically SD (Fischer and Retief, 2021), to facilitate proactive strategic thinking (Hassanali and Mahon, 2022), and green infrastructure planning and designing (Chanchitpricha and Fischer, 2022). SEA promotes the system to incorporate environmental considerations into PPPs (Victor and Agamuthu, 2014) and has been created as an alternative to EIA as a potential EPI planning instrument. The *Balochistan Environmental Protection Act, 2012 defines SEA as* " a system of incorporating environmental considerations into PPPs, and strategies (GoBA, 2012 p.6).

The long-term CPEC plan (2017-2030) is a pilot program (Nation, 2021,p.12) for multiple projects, that need to undergo SEA to incorporate environmental consideration in the CPEC plan for sustainability of CPEC development. In this context, a panel discussion of the International Union for Conservation of Nature (IUCN) Pakistan Institute of Development Economic (PIDE) on mainstreaming the environment in *CPEC* emphasized the environmental concerns of CPEC development. An expert highlighted that "development and environment should not be considered separately, and CPEC is a package of several projects, however, separate EIAs will not serve the purpose as the impact will be multiplied due to various projects and their impact will be multiplied" (Times, 2016). SEA has the function of value judgment, and prediction on the possible impact of strategic planning (Yang et al., 2021). SEA is an established planning technique to assess ecological impacts linked with PPPs (Nautiyal and Goel, 2021). Climate Change, environmental concerns, and development are cross-cutting (Vincent and Colenbrander, 2018, Sequeira and Reis, 2019, Weaver and Miller, 2019) that need to be dealt with in integrated planning, (Barker and Turner, 2011, Liu, 2016) for example, through SEA of PPPs (Fischer, 2007, Kirchhoff et al., 2011) to tackle CC, promote SD Yang et al. (2021) and drive green infrastructure planning and design (Chanchitpricha and Fischer, 2022).

EIA is also a globally used decision-making policy tool to evaluate and mitigate adverse environmental impacts at the project level. In the case of Pakistan EIA is not an effective planning tool to protect environmental and socio-economic sectors of country

(Saeed, 2004, Aslam, 2006, Shahbaz et al., 2015). In this context, (Kouser et al., 2020, Ashraf, 2022) argue that EIA has been ignored in CPEC project formulation. However, experts also consider EIA insufficient to deal with cumulative environmental and CC concerns of CPEC development and suggest conducting SEA for cumulative environmental and CC impacts of CPEC plan.

Keeping in view the social and ecological concerns of BRI related large scale infrastructure development. World Bank and the IUCN have called for Strategic Environmental and Social Assessments (Ascensão et al., 2018, Li et al., 2021a). In this context, in a CPEC roundtable conference policymakers, researchers, academics, CC experts, practitioners, implementers, and scholars recommended (Janjua and Asif, 2017a, Janjua and Asif, 2017b) to carry out SEA to address CC and EA of the CPEC plan. Experts concluded that "SEA should be carried out for analytical, participatory approach to integrate socio-economic and environmental considerations into CPEC projects (Janjua and Asif, 2017a)." The SEA is a recognized systematic approach to overcoming the limitations of project-level EIA by considering the environment at higher tiers of planning and decision-making (Treweek et al., 2005). In this perspective, (Lashari et al., 2020) also argue that EIA is inefficient to assess ecological impacts of CPEC and highlighted to conduct SEA for CPEC sustainability. Therefore, it is very essential to assess and evaluate CC and environmental PC i.e., environmental and CC considerations in the long-term CPEC plan (2017-2030) and aligned policy instruments to promote sustainability of CPEC development.

Section: I Climate change policy coherence and CPEC plan sustainability

This section is intended to establish background knowledge about research objective-1 of this thesis. It explores CC PC across Pakistan's national and provincial sectoral policies of water-agriculture-energy policies, development plans, strategies and their implications for the long-term CPEC Plan. In this context, it is comprised of an introduction part (2.3) underlining CC PC, country CC vulnerability, development sectors and CC, and CPEC development, in order to establish the research gap and research objective. Following this, the conceptual framework (2.4) deals with the concept of CC, PC, SD and CEPC, followed by the procedural, technical and management framework of SEA (2.5) are explored. The government policy documents used for analysis (see Table 3.1) and methodological approaches adopted are presented in methodology chapter-3 (see Section 3.1.2.1. & Table 3.2).

2.3. Climate change policy coherence CPEC plan

Pakistan is highly vulnerable to impacts of CC (Malik et al., 2012) which is compromising national security in terms of water resources, food, agriculture and energy sectors (GoP, 2012d). Pakistan has faced several climate-related disasters in recent years (Mukhtar, 2018), comprising of droughts, floods, glacial lack outbursts, storms, avalanches, and landslides (Ali and Kandhro, 2015). This is said to have caused

a loss of US$ 20B over the past two decades (Atta Ur and Shaw, 2015). In the 2010 floods alone, 20 million people and 1/5th of the country's geographical area were directly affected (GoP, 2012b) Whilst improved agronomical and conservation practices, as well as more efficient resource use, can help adapt to CC (Hellin et al., 2014, Howden et al., 2007), to what extent these can be implemented in a developing country like Pakistan is uncertain. Even though Pakistan is adding to less than 1 percent of the Global's GHGs emissions (Mohydin, 2019), it has been said to be amongst the top 10 states most at risk of CC (Kunbhar, 2021). In adding up to socio-economic and environmental loss, Pakistan from 2000 to 2019 wasted 0.52% per unit of its GDP because of CC events (Eckstein et al., 2021). However, the government of Pakistan (GoP) is expending only 0.00028 percent of GDP on EP Khan (2016). The Chinese BRI CPEC is a mega-investment programme in Pakistan. Numerous CC and environmental impacts associated with CPEC related projects are recognized in scientific literature see (Janjua and Asif, 2017a, Qazilbash, 2017, Ahmed, 2018, Nabi et al., 2018, Kouser et al., 2020, Malik et al., 2020). CPEC development is a geopolitical and geo-economics game-changer for Pakistan as well as for the regional countries. Under the CPEC portfolio, Pakistan will receive seventy percent of its total financing as FDI (Husain, 2018).

In this context, CPEC's budgetary amount is larger than collected FDI to Pakistan since 1970 (Ghani and Sharma, 2018). The key investment will be in the energy and infrastructure sector development (Vats, 2016, Mehar, 2017) that are likely to speed up GDP growth to 7.5 percent by 2030 (Mirza et al., 2019). There are obvious inconsistencies, including e.g. the CPEC coal power projects that are not consistent with Pakistan's own environmental policies Ebrahim. (2020). For example, government's alternative energy policy (2019) commits to 30 percent of the energy mix being from renewable sources by 2030 (GoP, 2019a). It is within this context that subsequent analysis of CC mitigation and adaptation coherence across sectoral and CC policies, development strategies and plans is provided. Figure 2.1 shows major CPEC projects planned in Pakistan. The energy sector will make up around 56 percent of Pakistan's total annual GHG emissions in 2030 (Janjua et al., 2018a). Most CPEC related energy projects are coal-based with critical ecological and potentially societal effects (Bilgen, 2016, Verma et al., 2017).

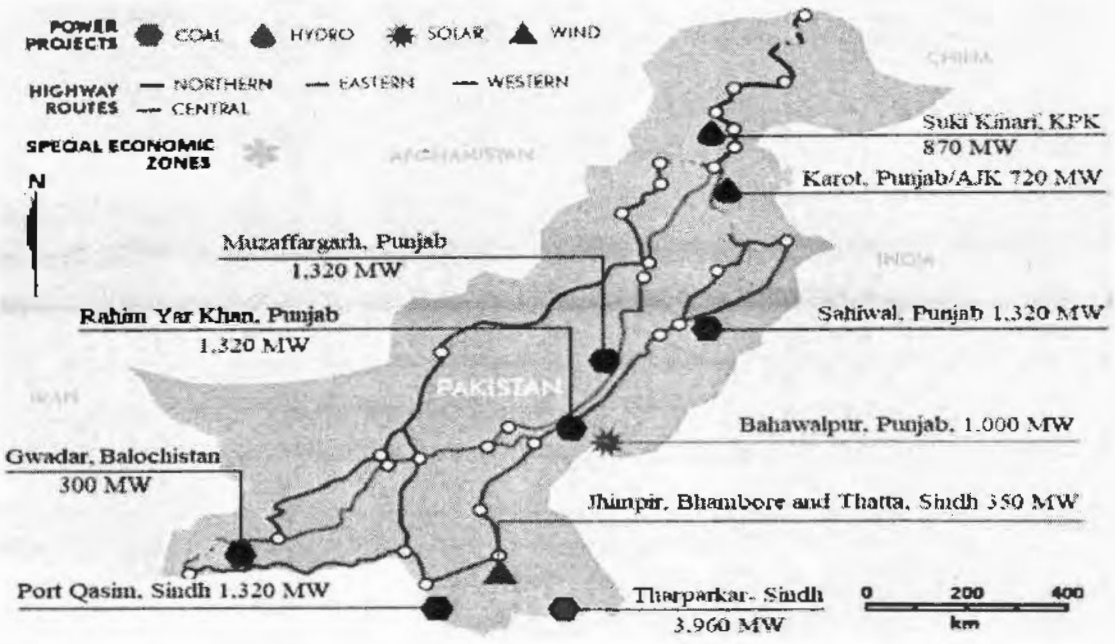

Figure 2.1: Majors CPEC projects (Farooqui and Aftab, 2018)

The energy and agriculture sectors are key development areas of CPEC 2017-30 (GoP, 2017a) adding considerably to GHG emissions. Energy sector GHGs releases have risen by 117 percent since 2015 and those associated with the agriculture sector have increased by 145 percent (GoP, 2016b). Similarly, the water, energy, and food sectors are particularly vulnerable to CC (Hussain et al., 2020b). However, coordinated, cross-sectoral and multi-scale CC adaptation and mitigation planning have been missing (Atta-ur-Rahman, 2010)

Energy, agriculture, water, and industries are interlinked sectors and are key elements of economic growth in Pakistan. In context of CC, sectoral development areas, the energy sector is a major GHG emission (50%) contributor, followed by agriculture (39%), industrial processes (6%) and other activities (5%) (GoP, 2010b). Pakistan is an agricultural economy based country. In this context, the agriculture sector contributes almost 21 percent to Pakistan's GDP and to more than 43 percent of the income of rural inhabitants (GoP, 2015c). Only the agriculture livestock sector contributes more than 11.53% to GDP (Zaman et al., 2022). Keeping in view the significance of agriculture in national economy, the agriculture sector is included as an area of cooperation in the long-term CPEC plan to make sure Pakistan's economic sustainability. Food security has become a global issue, and CPEC is of strategic importance for coping with food security in the country (Khan, 2021e), and would enhance fisheries product export between Pak-China and the World (Ali et al., 2020). In this context, transport infrastructure development under CPEC would contribute 6.43 % to the national GDP. This can increase to 14.03 % through reforms in other linked sectors (De Soyres et al., 2020, Ramay, 2020). The transport sector alone contributes 21% of Pakistan's total GHG emissions (Hussain et al., 2020b).

Currently, Pakistan is facing the worst energy crisis and an acute shortage of water. Water availability has declined from 5000 cubic meters in 1951 to existing measures of

less than 1100 cubic meters per individual (GoP, 2014). In the future, CC could drastically affect water availability and thus agriculture (Qureshi, 2005, GoP, 2012d) and the energy sector. To mitigate water scarcity, the Pakistan agriculture sector started using wastewater discharged from various industries (Abid et al., 2021). CC adaptation and mitigation are cross cutting concerns and need to be dealt with in an integrated manner (Birkmann and von Teichman, 2010), for example, through SEA of PPPs (Fischer, 2007) and EIA of projects (Jiricka-Purrer et al., 2018). Currently, research has emphasized various CC planning challenges; for instance, a lack of cross-sectoral (Atta-ur-Rahman, 2010) and coherent (Khan and Jan, 2015) planning, in addition to lack of institutional harmonization (Chaudhry, 2017, Ahmed et al., 2020) CC PC is an area which has not yet been studied in Pakistan. In this context, there are particular concerns with regard to the CPEC.

2.4. Climate change policy coherence conceptual framework

Policy Coherence deals with compatibility across policies along the entire policy cycle, from policy objectives to impacts (Nilsson et al., 2012). It promotes synergies between and within different policies (Nilsson et al., 2012). Whilst there is no universally agreed definition of PC it is said to lead to policy stability and reduced policy failure (Howlett and Rayner, 2007). Policy incoherence causes harmonization and execution problems (Cohen et al., 2017) and leads to inefficient usage of resources (Mallory, 2016). In this context, PC promote synergy, or consistency among interrelated policies to achieve shared goals (May et al., 2006, Picciotto, 2005, Sianes, 2017). PC is accomplished when numerous policies interact to counter one another or can be exchanged for one another (Jacques Forster and Stokke, 1999, Sianes, 2017). Numerous policies, some of which cover gaps in other policies, are considered to be complementary, while interchangeable or substitutable policies can be substituted for one another.

In contrast, incoherent policies, where interactions between policies oppose one another are considered to be antagonistic (Lambin et al., 2014). Consistency within sector-specific policies and plans is a pre-condition of PC (Voyer et al., 2020). Internal PC refers to interactions between policy objectives within a single policy domain, and external PC means interaction of different policies (Nilsson et al., 2012). CC PC is about coherence between CC adaptation and mitigation within and across policy domains (Nilsson et al., 2012). Similarly, internal CC PC promotes synergies and co-benefits (Di Gregorio et al., 2017) and reduces negative interactions. External CC PC refers to mutually beneficial practices and trade-off reduction between CC aims and non-CC objectives (Di Gregorio et al., 2017).

The concept of PC with respect to CC and SD has been examined by various authors. For example, CC PC among water, energy, land, food and climate policies was assessed by (Papadopoulou et al., 2020). Kalaba et al. (2014) analyzed PC between CC, agriculture, forest and energy policies for Zambia and Scobie (2016) emphasized challenges for small island developing states. These were said to include inadequate

political will, and lack of accountability among actors. Similarly, bureaucratic politics were found to undermine policy integration and CC PC in Indonesia (Di Gregorio et al., 2017). Ranabhat et al. (2018) suggested that a collaborative and multi-stakeholder approach was required for effective CC PC in Nepal. Benson and Lorenzoni (2017) studied PC and CC adaptation in flood risk management plans in the UK and England et al. (2018) assessed CC adaptation and PC across sectoral policies in South Africa. Similarly, Sharmin (2022) explored synergy among energy usage, per capita GDP, globalization, urban population, agricultural sector, industries and CO_2 emission in eight South Asian countries including Pakistan.

Pakistan is a signatory to the Sendai Framework for DRR 2015–2030 (UNDRR, 2015), the Paris Agreement on CC (UN, 2015) and the SD goals (SDGs). All of those stress the importance of PC. With regards to the SDGs, all members have "to pursue PC and an enabling environment for SD at all levels and by all actors" (UN, 2016). Pakistan's overarching National climate change policy (NCCP) 2012 is committed to integrate CC and the environment into development policies (GoP, 2012d). CC mainstreaming requires PC and the reduction of inconsistent policies, creating opportunities for synergies (Juhola and Westerhoff, 2011).

The improved sectoral PC in terms of CC adaptation mitigation measures and environmental sustainability initiatives requires government's commitment to enable and frame CC and environmental concerns and promoting SD. The CC and environmental mainstreaming create synergetic effects, increase resource efficiency, reduce contradictions between policies, avoid competition between adaptation and other policy priorities (Runhaar et al., 2018, Uittenbroek et al., 2014), and promote innovation in sectoral policies and plans (Adelle and Russel, 2013). In this context, PC is a well-known approach in planning practice (Oliveira and Pinho, 2010, Navarro-Yáñez et al., 2020) even in the context of SEA (Isola and Pira, 2018), a planning tool for establishing and reaching environmental sustainability policies, plans and actions. PC analysis allows to establish complementary relationships between objectives of plans developed in the same territorial area to ensure a certain degree of external coherence with respect to their reference policies; the coherence of plans with other policies or plans developed in the same territorial area to generate synergies and /or avoid redundancies (Navarro-Yáñez et al., 2020). PC coherence analysis is presently used in SEA procedures (Besio et al., 2013) for balancing socioeconomic objectives and environmental concerns (Leone and Zoppi, 2015).

In the context of methodological approaches used to study PC, numerous methods and frameworks were developed and adopted in different studies. For example (Reyes-Mendy et al., 2014) develop an analytical framework related to policy statement coherence analysis for water policies in Chile within the environmental policy domain to assess the degree of coherence with the environmental regulatory response. Similarly (Guerrero and Castaneda, 2021) develop a quantitative framework to measure the coherence of policy priorities for development by establishing a coherence index. In

this context (Siitonen, 2022) studied PC between three European Union's policies areas i.e. development, migration and foreign policies with normative theorizing and normative analysis. Similarly, (Yunita et al., 2022) studied PC and politics for SD in the Netherlands and used a qualitative approach including semi-structured interviews followed by document analysis. (Santos-Lacueva and Velasco González, 2018) determined coherence between tourism and climate policies domain in two levels of government i.e., the national state (Spain) and the regional level (Catalonia) on the framework-based analysis.

Pakistan is facing challenges with regards to policy formation and execution that lead to a reduction of PC. Firstly, stakeholder consultations have not been given due consideration in policy formation suggesting that consultation, deliberation and debate among stakeholders are hindered by high decision-making bureaucrats in policy formation processes. Furthermore, the former governor of the State Bank of Pakistan stated that capacity of provincial ministries and departments was inadequate in preparing policy documents, due to lack of essential knowledge and competence (Husain, 2013) and that "Inter-ministerial consultation is more hostile than cooperative in nature. Ministers feel personally offended if their policy documents are criticized by other ministers. Stakeholder consultation is superficial and views of stakeholders, if diverting from those preparing them, do not find any place in the revised documents" (Husain, 2013,p.7).

Secondly, effective execution of a policy requires availability of adequate resources (Gerston, 2010). In the case of Pakistan, due to financial constraints and capacity building issues, these resources are not utilized properly in policy development processes. Similarly, other factors explaining the lack of consistency include poor institutional coordination, corruption, and weak policy formulation and implementation processes (Sirajul, 2015). Sectoral policies mention the adoption of integrated management (e.g. integrated water management) but fail to outline any implementation frameworks. Integrated water resources management cannot be executed due to national and provincial mandates on water resource management, and associated equitable dissemination of costs and benefits among stakeholders (Khan, 2019). Finally, contradictory interests lead to policy incoherence (Siitonen, 2016). In this context, it was established that sectoral policies are highly incoherent and fragmented, whereas, for achieving sustainability, PC is crucial. The coherence of a policy and its effective implementation determine the sustainability of linked policies, plans and programs.

2.5. Proposed procedural, technical process and management framework of SEA in Pakistan

SEA is a process of assessing the potential environmental impacts of PPPs at the strategic level. It is a systematic process of evaluating the environmental impacts of

PPPs before they are implemented. In Pakistan, SEA has been recognized as an effective tool to integrate environmental considerations into PPPs. In Pakistan, so far, no formal SEA has been practiced. However, few SEA studies have been conducted in support of international donors to establish and understand SEA practices in Pakistan. In this context, for example, NIAP, a programme from November 2009 to May 2014, was jointly launched and implemented by GoP and IUCN, to introduce SEA in national development planning. The programme was funded by Embassy of Kingdom of Netherlands and technical assistance was offered by Netherlands Commission for EA (Fischer; et al., 2014). In this context, the SEA procedural steps in Pakistan (See Figure 2.2) and proposed technical process and management framework of SEA at the operational level involve several key steps. Here is a brief overview of technical process and management framework of SEA.

Technical Process of SEA:

The technical process of a SEA typically involves the following steps:
PPP identification: The first step is to identify PPPs that are being considered for SEA studies. This may include a range of different types of PPPs, including sectoral development plans, energy policies, transport policies, and others.
Scoping: It involves defining the scope and boundaries of SEA. This typically involves identifying key environmental and social issues that need to be considered, as well as potential impacts that need to be considered in the assessment, and any potential gaps in data or information. The scoping process is typically carried out by a team of experts, including environmental specialists and representatives from relevant government agencies. They also define the baseline environmental conditions and potential impacts of the PPPs.

Baseline data collection: This step is to collect baseline data on the environmental conditions and trends in the area that will be affected by the PPPs. This may involve gathering information on factors such as air quality, water quality, land use, and biodiversity.

Impact assessment: This step is to assess potential environmental impacts of PPPs. This may involve using a range of numerous analytical models and tools to predict the likely impacts on the environment and also include consultation with stakeholders including commutative impact assessment.

Analysis: In this phase, SEA team collects and analyzes data to evaluate the potential environmental and social impacts of the PPPs. Depending on the nature of the study they use various tools such as GIS, environmental models, and impact matrices to identify the significance of the impacts.

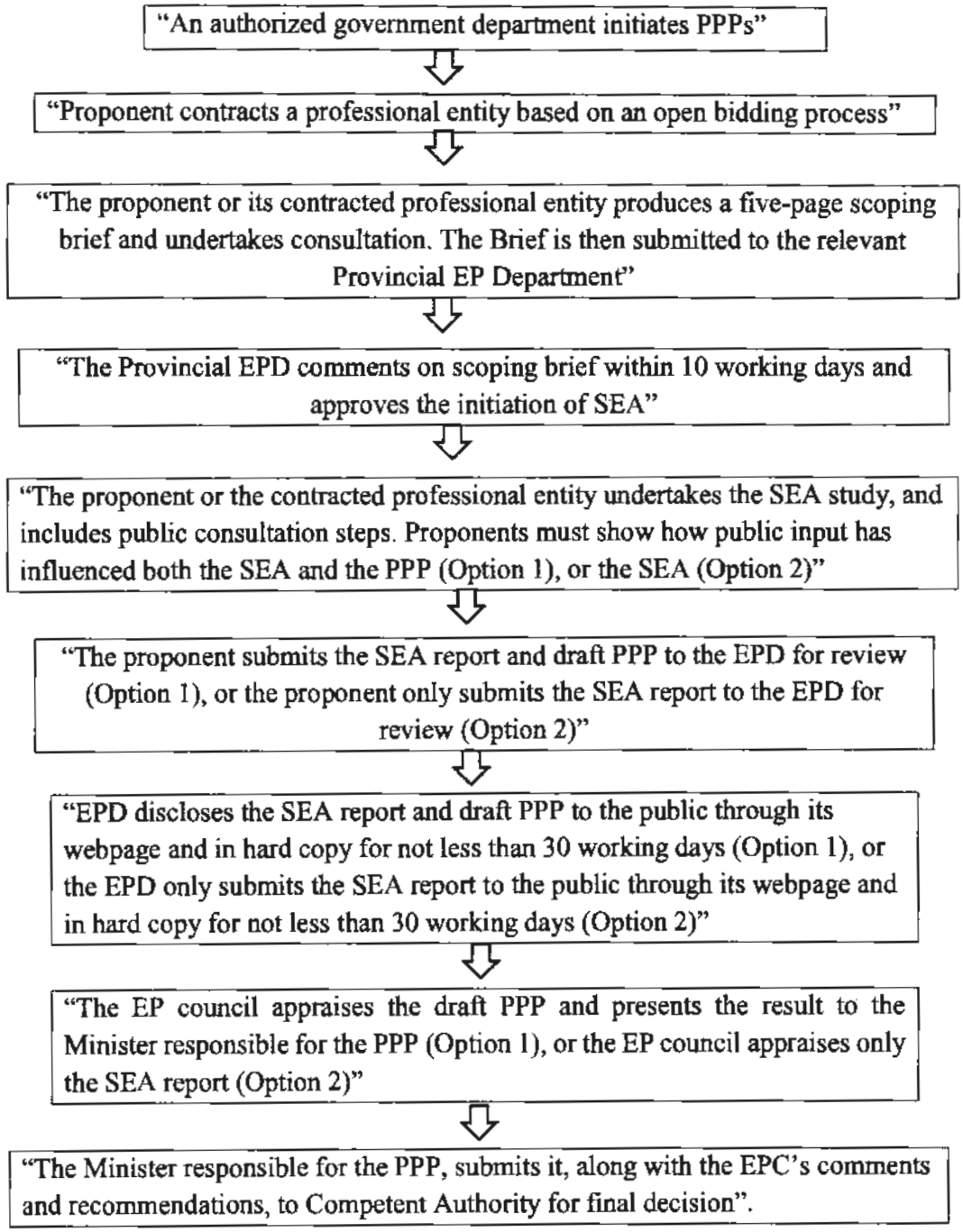

Figure 2.2: Flow Diagram of the SEA Procedure. Source: (GOP and IUCN, 2014)

Mitigation measures: Based on the results of the impact assessment, SEA team identify potential mitigation measures that can be put in place to minimize or avoid and reduce negative social and environmental impacts, and enhance the positive impacts of PPPs. These measures may include changes to the PPPs, to provide alternative measures or the implementation of specific actions to address social and environmental concerns.

Monitoring and evaluation: The final step in the SEA process is monitoring and evaluation. This involves tracking the implementation of the PPPs and assessing their effectiveness in achieving the intended environmental outcomes.
Reporting: The SEA team prepares a report to summarize findings of assessment, including identified environmental impacts, proposed mitigation and enhancement measures, and any alternatives considered.

Management Framework of SEA in Pakistan:
Legal Framework: The legal provision for SEA in Pakistan is provided by Pakistan Provincial EP Acts of KP, Balochistan, Sindh including GB . These acts mandates that SEA need to be conducted for provincial governemnt PPPs.

Institutional Framework: The Ministry of CC is the primary institution responsible for coordinating SEA in Pakistan. The ministry works closely with other government agencies, such as Planning Commission and EP Agencies, to ensure effective implementation of SEA.

Public Participation: Public participation is an essential component of the SEA process The SEA team need to conducts public consultations/stakeholders to gather feedback for inclusive decsion making on PPPs and to inform stakeholders about the potential environmental impacts.

Monitoring and Evaluation: The SEA process includes monitoring and evaluation to track implementation of the proposed mitigation and enhancement measures and to assess their effectiveness in reducing negative impacts and enhancing positive impacts In summary, the technical process and management framework of SEA involves a series of steps. These steps are designed to ensure that potential environmental impacts are identified and addressed at the strategic level, to promote SD and minimize negative environmental impacts. In terms of the management framework for SEA, this typically need to involves the establishment of a dedicated SEA unit within a government agency or the use of external consultants to carry out the assessment. The management framework may include stakeholder engagement and consultation to ensure that the views of relevant stakeholders are taken into account throughout the process. The SEA process may also be integrated into existing policy and planning frameworks, such as the NEP or the National SD Strategy.

Overall, the proposed technical process and management framework of SEA in Pakistan is designed to promote SD and minimize negative environmental and social impacts. By identifying and addressing potential impacts at the strategic level, the SEA process can help to ensure that PPPs are developed and implemented in a way that is ecologically and socially responsible.

Section: II Coherence analysis between CPEC related development policies and environmental policy instruments

In connection with chapter-4, this section is to explore literature to establish research objective -2 and its related research question. In this context, the introduction part is about the PC concept, and environment (2.6), followed by CPEC developmental concerns and the need of policy coordination for sustainable CPEC- BRI development (2.7) to establish the research gap. The methodology used to achieve research objective -2 is presented in Chapter 3, Section 3.1.2.2, Table 3.4 & 3.5.

2.6. Coherence analysis of CPEC related development policies

The balance between economic development, CC and EP has been a critical concern for SD. Governance functions, coherent policies and coordination among policy sectors, have been deemed essential elements in an attempt to execute the 2030 Agenda for SD (Dombrowsky et al., 2022). The SDG-17 calls for policy coordination as well as policy and institutional coherence. Policy & functional incoherence are major obstacles to harmonization among interlinked policy sectors and sustainable outcomes. In the professional debate and policy practice, the concepts of policy integration, PC, policy coordination, and collaborative governance are commonly used interchangeably (Bouckaert et al., 2010, Cejudo and Michel, 2017, Lenschow et al., 2018). Policy coherence for SD has encouraged sustainability through policy coordination.

The term PC originates from practitioners' debates on development policy. The OECD originally defined it as an "overall state of mutual consistency among different policies" (OECD, 1996), a principal instrument to promote a sustainable future for human security (Zeigermann, 2020), and a principal instrument to ensure coherent alignment of SDGs with domestic policies (Mbanda and Fourie, 2020). In the professional debate, Nilsson et al. (2012) PC is defined as "an attribute of policy that systematically reduces conflicts and promotes synergies between and within different policy areas." Likewise, Cejudo and Michel (2017) make a distinction between coherence at the policy goals and instruments level. The planning obligations are key instruments for the effective participation, coordination, review, and enforcement of adaptation policies (Biesbroek et al., 2010). Similarly, Sharma and Kumar (2020) concluded that policy coordination encourages mitigating trade-offs and promotes synergies amongst the resources as well as conserving the ecosystem in the perspective of the SDGs. In context of Pakistan, there is a lack of effective policy coordination among stakeholders, a hallmark of Pakistani politics and a major cause of policy failure (Stiftung, 2018 p.33).

2.7. CPEC development plan, concerns and policy coordination coherence

CPEC development connects Asia with Europe and Africa through a common and shared destiny vision (Ali et al., 2017a, Liaqat et al., 2018, Cheng, 2016). It has been

referred to as an economic and strategic game-changer both for China and Pakistan (Makhdoom et al., 2018, Mahmood et al., 2020). In this context, Graceffo (2021) recognized that by 2019 among the BRI countries, the largest debt of China to Pakistan was $20 billion. Numerous studies have shown that Chinese investment will not only be economically attractive for Pakistan but for other regional countries, too, including e.g. Afghanistan, India, Iran, and UAE (Butt and Butt, 2015). CPEC is a prominent value-added long-term development plan having a time frame of 2017-2030. The CPEC plan defines the overall direction, ideas, and vision of cooperation areas of short, medium and long-term goals.

In this context, CPEC is a game-changer for the four provinces of Pakistan as well as for the regions of GB and Azad Kashmir. Road and transport infrastructure development will play a vital role in SD Ali et al. (2021a), stability, and peace Menhas et al. (2019) in the country and region. Pakistan has a distinctive geographical situation in South Asia (Haq and Farooq, 2016). In this context, CPEC not only provides access to China for their trade, and also improves socio-economic conditions and achieves, but it also promotes strategic alliance Haboudinejad and Ali (2022), and SD goals (Menhas et al., 2019, Ali et al., 2021b) for Pakistan and the region.

Globally SDGs have become the main developmental objective; hence, CPEC comprises regional interconnectivity, infrastructure construction, technology development and improvement, SEZs development, agriculture sector enhancement, energy production and consumption, and especially, poverty reduction through education, livelihood improvement, and better public health services (Menhas et al., 2019, Recorder, 2015). Based on these combined ideas, interconnected agendas, and well-suited governance approaches, the BRI CPEC related development and the Agenda 2030 for SD growth progressively, pursuing and escalating the networks between BRI and 2030 SD goals to deal with global EG deficits and increase collaboration between countries (Dong et al., 2018).

However, CPEC's associated national and international geopolitics, transparency, and SD path, especially governance seem to be the most critical concern for the efficient execution of all the plans, policies, as well as targets associated with CPEC (Nasir et al., 2021). In addition to this brutal radicalism and extremism, ethnic nationalist parties are another overwhelming contest for the economic corridor (Iqbal, 2018). Similarly, Yin (2019) highlighted issues and risks, for example, CC and related environmental pressure, that can hinder the sustainability of BRI projects, and SD and to achieve SD goals.

Climate change has become a key global challenge over the past few decades. Most carbon emits from energy sectors, transportation as well as industries (Akbar et al., 2021). For example, the transport sector alone contributes 21% of Pakistan's total GHG emissions (Hussain et al., 2020b). BRI is strongly associated with the environmental sustainability of the infrastructure endeavour that inherently incorporates aspects of CC and pollution (An et al., 2021). BRI-funded CPEC programme has become the socio-economic and geopolitical future of both China and Pakistan including the South Asia region. It serves as an access to contribute to trade and more industrial gains in regions and the global market. On one side, it is an economic miracle for both nations and

regions, on the other side, it posing a possible risk to the natural environment i.e. due to extensive transport highways infrastructure development, the key impact is endangering biodiversity and ecological sustainability (Ali et al., 2021b).

BRI is expected to accelerate fiscal growth and development amongst the nations concerned. However, various challenges and threats e.g., CC and environmental concerns have been reported in the scientific literature related to BRI investment. In this context, Abban and Hongxing (2021) highlighted that GDP; trade openness, and fossil fuel consumption are key factors that markedly initiate CO_2 emissions among the BRI routes. Similarly, (Roy et al., 2022) recent work on the globalization-environment nexus for 66 BRI countries of the 2000–2015 period concluded, that 40 percent of BRI nations are above the world average resource usage and half of these nations have overlapped all of the safe operating limits which is not a good sign, environmentally.

Numerous other studies showed the environmental and CC concerns related to BRI, for example, BRI investment tends to upsurge more energy efficiencies in resource-rich countries than those in resource-poor countries and tends to increase more energy efficiency in poor nations than those in rich nations (Wu et al., 2021c). Similarly, economic policy tools, per capita GDP, FDI, and CO_2 releases showed a robust connection in the trade/industry, and transport sectors' emissions in Belt Road Initiative countries between 2000 and 2018 (Akbar et al., 2021). Similarly, most of the BRI regions attained swift GDP progress with growing carbon releases (Han et al., 2020). For example, the CPEC initiative of China's BRI infrastructure development and other monetary, governmental, and regional attributes are tremendous. Though, EP, economic boost, and global relations have positive implications for the endeavour of the CPEC (Xiaolong et al., 2021). CO_2 is a key contributor to CC, which causes significant pressure on natural resources and environmental settings (Rauf et al., 2018).

In BRI-related Central Asian countries, the cultivated and urban land areas constantly expanded, and jungles, pastures, and water areas declined from 1992 to 2015 (Han et al., 2021). Similarly, the Chinese outward FDI across BRI countries increases carbon releases in moderate to high emission nations. Similarly, Shan Lee et al. (2020) concluded that globalization and economic growth in 49 BRI countries worsen CO_2 emissions however, implementation of green technology could reduce CO_2 emissions. Other BRI likely ecological, social, and corruption risks include CC concerns linked with major infrastructure schemes, e.g., environmental deprivation and biodiversity loss (Hong and Johnson, 2018, Ruta, 2018, Gokkon, 2018). In the case of CPEC, For example, Baluchistan province represents an acute water shortage, where CPEC developments are confronting significant limitations in arranging water needs (Ahmad, 2020) and water availability issues in Gwadar. Similarly, Zubedi et al. (2018) concluded that CPEC investment not only pledges to put Pakistan on economic development but concurrently, it depicts an enormous threat to global CC. CPEC energy generation investments are revenue-focused and do not reflect development or environmental goals (Reynolds et al., 2018).

Northern Pakistan, GB is a gateway of CPEC (Hussain et al., 2021a), which is covered with the world's largest glaciers (Shafique et al., 2018), and biodiversity. With the

recent innovations in science and technology, human-caused activities, and uninterrupted CC, glaciers are meltdown swiftly at an appalling rate following glacier retreat events (Käab et al., 2012). Various associated possible threats of CPEC development include CC/ global warming, logging, CO_2 emission, inundating, farming runoff and worsening local fauna and flora leading to disruption of the local biodiversity with the construction of roads (Nabi et al., 2018). CPEC is subjected to rapid infrastructure development, which may lead to potential ecological vulnerability (Kamran et al., 2021). Similarly, CPEC development could lead to industrialization and urbanization in coastal and marine areas of Pakistan. However, marine ecological safety policies that govern the protection of coastal and marine areas are either limited or completely missing (Ullah et al., 2021b). It leads to the ecological vulnerability of the CPEC region due to CC effects and human activities (Wu et al., 2021a).

Key governance components are political and leadership dedication, policy and regulation development, institutional coordination and capacity, stakeholder engagement, resource management, technology, and infrastructure development. Pakistan has not effectively employed governance factors to deal with CC and water-related problems, lacking mostly in political, policy, institutional, coordination, and infrastructure aspects (Yasin et al., 2021). CC has impacted livestock, agriculture and forestry, water, food, energy security, and the society of Pakistan (Hussain et al., 2020b). In the case of Pakistan, the key problem in dealing with CC disasters is low institutional and government capacity and coordination (Xu and Grumbine, 2014, Hussain et al., 2020b) limited financial resources, especially provincial and district line department capacity is of great concern (Iqbal et al., 2022). The fiscal and power production areas are clearly enhanced after the commencement of CPEC, but the thing that should be deemed all the ecological costs (Khwaja et al., 2018).

CPEC infrastructure development dimensions such as EP, leadership, and BRI have positive nexus with CPEC development (Hao et al., 2020). Environmental issues such as water resource scarcity and air quality are two major concerns that are affected by road infrastructure development. The Country's lakes and rivers, tributaries, game reserves, mountains and sanctuaries might be polluted by the CPEC associated human-caused actions or incredible infrastructure developments (Khan and Chang, 2021).

Pakistan's Thar Desert with 175 billion tons of coal is the 7th largest coal reserve of the world, is capable to produce 100,000 MW for the next 200 years (Shaikh, 2018). The CPEC Thar Coal project of $2 B with 660 MW generation capacity has environmental and social issues such as contamination of the groundwater (Baloch, 2018). The CPEC coal power plants are a blend of subcritical and supercritical nature, with no ultra-supercritical plants. Furthermore, most of them use domestic coal reserves that have high sulfur and ash content. Supercritical coal power plants need higher investment costs and reduce the volume of coal required per unit of power produced (Ahsen, 2019). The super-critical coal-fired CPEC power plant highlights China's commitment to green and environmentally justifiable development not only Pakistan but also along the BRI route (News, 2017). In this context, Sikandar Ali et al. (2021) concluded that the lack of consistency between coal exploitation and CC is a major weakness of environmental sustainability. In the perspective of CC and the ecological costs of using Thar coal with

outdated technology are more in comparison to short-term monetary gains (Ali et al., 2021c). This indicates negative implications on the environment due to such non-efficient coal plants (Haris et al., 2021)

Similarly, Mir et al. (2020) conducted an assessment of sectors such as energy, industrial processes, product use, agriculture, forestry, and other land use, and the waste sector to establish GHG inventories for Pakistan from 1994 to 2017, and concluded that the energy sector released the most abundant GHG into the atmosphere. Likewise, Rehman et al. (2021) study revealed that major sectors, such as energy, industrial, agriculture, waste, land-use change, and forestry show an increasing trend in forecasting GHGs emissions between 1990 and 2016.

Pakistan is placed 155th in the globe in terms of CO_2 emissions per capita (Bank, 2019). However, GHGs emissions have increased by 123 percent since 1994 and are anticipated to keep on growing as the country engages in rapid monetary growth (GoP, 2016b). In this context, (Anser et al., 2020). recognize that Pakistan is among the top ten most prone nations to CC in the world. However, the country's adaptive capacity is perceived to be low due to high poverty, lack of financial and physical resources (Hussain et al., 2020b), and lack of institutional coordination and cooperation. One of the key challenges related to CC policies is to formulate and execute policies to transfer climate policy into sectoral actions and lead to consistency and coordination with sectoral objectives (von Lüpke and Well, 2020).

According to the green *BRI center* "138 countries are part of the BRI" https://www.green-bri.org/countries-of-the-belt-and-road-initiative-bri/ . In this context, more than 3rd of the globe`s GDP and two-thirds of the globe`s inhabitants are linked to BRI investment. The total BRI development fund size is estimated at US D 4 to 8 trillion for five key cooperation areas i.e. policy coordination, facilities connectivity, unhindered trade, economic incorporation, and people-to-people contact https://www.beltroad-initiative.com/belt-and-road. The mutual prosperity through cross-border trade, policy coordination, investment flows, connectivity of infrastructure, financial integration, people-to-people bonds is China's BRI main goals (Niyangoda et al., 2021, Haji-Yousefi et al., 2021, Adhikari and Ma, 2022, Luo et al., 2022) including of CPEC development.

Integrated policy coordination is needed to promote SD and to deal with CC and environmental degradation concerns of CPEC development. The planning tool such as SEA enhance and promote integrated planning governance and integrate CC and environmental consideration in PPPs. There is a lack of policy coordination among increasing economic enclosure, innovation, and carbon mitigation policies in South Asia countries (Amin et al., 2022). In this context, Gallagher and Qi (2021) concluded that China boosts foreign investments in green energy including examination and growth of higher carbon industries and fails to explicitly limit or prevent endeavours in carbon-intense and fossil fuel industries in its overseas investments, revealing an inconsistency among policy for domestic and overseas investment. Similarly, Kristensen et al. (2021) revealed that green fiscal performance reduces CO_2 releases, however, FDI and GDP increase CO_2 emissions.

There are prominent international documents and commitments (e.g the Paris Agreement and the UN 2030 Agenda for SD; Sendai Framework for DRR 2015-2030) and Country National SD strategy 2017 seeking to address CC and environmental concerns through a policy coordination approach. Numerous studies have been conducted related to CPEC development, CC, and related environmental concerns. However, there is a dearth of scholarly debate and discussion on policy coordination in the context of the CEPC development plan linked to sectoral policies, and current country EP policy instruments. There are particular concerns about CPEC sustainability and policy coordination, PC to address CC and environmental issues. In this context overlaps and gaps, mutual benefits, and trade-offs in Pakistan EG and CC policies, CPEC plan and linked sectoral policies are examined in Chapter 4.

Section: III DM, environment consideration and CPEC Plan sustainability

This section envisioned relevant literature for the research objective -3, and its related research questions to explore the EPI across development and DM policies and plans, and its implication for the sustainability of the CPEC Plan. In this context, the research gap is established in (2.8), followed by disaster events and their consequences are explored (2.9), as well as disaster-development-environmental linkages and CPEC are discussed in (2.10). Following this, Pakistan DM and EA setup (considering both EIA and SEA) and international commitment are explored (2.11) and challenges for EPI in DM are established in this section. The methodological approaches underlying achieving the research objective -3 are explained in Chapter 3, Section 3.1.2.3.

2.8. DM and environmental policy integration in Pakistan

In addition to environmental challenges connected with CPEC projects (Nabi et al., 2018, Kouser et al., 2020, Munir and Khayyam, 2020), the CPEC development is vulnerable to natural disasters (ECOSF, 20117, Peng et al., 2017). In this context, CPEC projects have also been said to expose the country's socio-economic, environmental, and climatic vulnerabilities and disaster risks (DR) (PreventionWeb, 2015, Khan, 2018, Rashid et al., 2020) e.g Glacial Lake Outburst Floods (Saifullah et al., 2020). Natural disasters cause environmental degradation (Tran et al., 2009) and country like Pakistan had significant GDP loss because of environmental degradation events. CPEC is predicted to greatly speed up industrial development and urbanization in Pakistan (GoP, 2017a). This is expected to lead to increased environmental disaster risk (DR) (Khan, 2018, Rauf, 2019). In this context, various studies have suggested vulnerabilities to CC associated disasters (Yamada et al., 2016, You et al., 2016, Rahman and Dawood, 2018, Ullah et al., 2019).

The EPI is an approach that aims at supporting SD (Aguilar-Støen et al., 2016, Jordan and Lenschow, 2009). Pakistan has legal provisions for EIA and some requirements for SEA (Nadeem and Fischer, 2011) and has also been said to have proactive approaches of DM in place (Atta Ur and Shaw, 2015). However, DM, development planning and

environmental management are currently operating in isolation, and an integrated planning approach is almost completely lacking (Atta Ur and Shaw, 2015). Little research has been conducted to linkages of CPEC development, disaster events and environmental impacts (see e.g (Li et al., 2019, Rashid et al., 2020).

2.9. Disaster events and development projects

Over the past few decades, disaster events have increased globally (Gaillard and Texier, 2010). From 1980 to 2020, they are said to have led to the death of more than two million people and a loss of $3 trillion in material assets (Bank, 2020). Financial losses have increased by a factor of 6.5 from $23 B per year in the 1980s to $150 B per year in the last decade (Bank, 2020). Disasters are a particular problem for developing countries where they can destroy development gains and accumulated wealth (Dilley et al., 2005). From 1998 to 2018, 91% of deaths associated with disasters were in low and middle-income countries (Bank, 2021).

South Asia is known to be a disaster-prone region (Sivakumar and Stefanski, 2010). The Climate Risk Index 2015 ranks Pakistan as the 6th most vulnerable to natural disasters (Wasif, 2017). Since 1947, natural disasters have caused losses worth $28.29 B here (Wasif, 2017). Kreft and Eckstein (2013) ranked Pakistan as the number three country most affected by extreme weather events after Haiti and the Philippines, while (Eckstein et al., 2021) ranked it the fifth most affected country to CC globally. Recently GoP declared National Emergency as climate-intensified floods affected 33 Million people (Stancil, 2022). Additionally, the recent deadly flood of 2022 caused damage to 2 million homes, almost 24,000 schools, 1,500 health facilities, 13,000 kilometres of roads Butt and Khan (2022), and economic damage were Worth $12.5 B (Majumdar, 2022) in Pakistan.

Most frequently occurring disasters in Pakistan include floods, droughts, storms, avalanches, glacial lack outbursts, landslides, earthquakes, tsunamis and epidemics Raza and Haq (2015) and disaster events of the past two decades have caused losses of more than US$20 B (Atta Ur and Shaw, 2015). Environmental and DRR policies and strategies are well developed within international community (Mercer, 2010). The international DRR agenda "Hyogo Framework for Action (HFA) 2005-2015" was signed by 168 countries, including Pakistan. Later, the Sendai Framework for DRR (2015–2030) was also signed (Pearson and Pelling, 2015). Both, HFA and Sendai Frameworks for DRR provide concrete actions to protect development gains and the environment from DR.

Disaster events can have a significant impact on CPEC development projects in terms of delaying the project's ability to achieve set goals and objectives. In this context, for example, the CPEC Karakoram Highway (KKH) Phase II (Havelian-Thakot) project, is a key initiative of BRI and is recognized as a geological disaster museum owing to repeated natural disasters (Ali, 2017). The KKH is in risk of numerous disaster hazards of rockfall, debris fall, rockslide, debris slide, debris flows, and mudflows, consequently, CPEC is highly susceptible to landslides disasters (Maqsoom et al.,

2022). Similarly, (Li et al., 2022a) study recognize low disaster-risk areas to high risk areas along the CPEC routes.

In this context, the CPEC development projects are located in geological disaster zones, and the occurrence of potential geological disasters poses a great threat (Chen et al., 2022a) to CPEC projects. For example, numerous interconnection CPEC projects pass through mountainous areas, cold areas and arid areas of diverse climates, frequent extreme weather, vulnerable ecosystem and natural disasters that may restrict the smooth implementation of CPEC projects (Li et al., 2019). In this context, roads, railways, and other transport infrastructure projects under CPEC are threatened by landslide disasters. The landslide hazard level is higher in the northern part of the CPEC plan (Chang et al., 2021). The Himalayan, Karakoram and Hindu Kush (HKH-TMHA) are the main mountain ranges in the Asia region of CPEC development with various glacial lake-related disasters in the HKH-TMHA region (Li et al., 2022b) are potential threats to the sustainability of CPEC development.

In this context, disaster events can cause delays in the implementation of development projects under the CPEC plan. The disaster events like floods, glacial lake outbursts and landslide hazards are directly and indirectly associated with environmental degradation. Resources that were intended for development projects may have to be diverted to address disaster impacts. This diversion of resources can result in delays in project implementation, leading to additional costs and longer project timelines. Additionally, disasters can reveal the vulnerabilities of development projects, and highlight the need for better planning in context of DRR and environmental sustainability. Development projects that are not designed in terms of DRR and environmentally friendly approaches are a potential threat to the sustainability of the project. Therefore, it is essential to integrate DRR and environmental protection measures into project management cycle to ensure their sustainability in terms of disaster resilience and environmentally friendly development.

2.10. DRR and EA in Pakistan

Pakistan has a proactive approach to DM and EP. The earthquake of 2005 and the flood event of 2010 Shafiq and Ahsan (2014) compelled the government to establish an institutional and legal setup for DM. Similarly, Pakistan has some comprehensive legal provisions for EA in place. Before the 18th constitutional amendment, the Pakistani EP council (PEPC), EP agency (Pak EPA) and EP Act (PEPA) of 1997 dealt with environmental issues in the country. However, subsequently, the subject of environment and DM was decentralized to provinces Mayo et al. (2013), providing an opportunity to integrate environmental policy into the DM here.

Pakistan's first NEP to address environmental issues, CC and natural DM was approved in 2005 (GoP, 2005b). Furthermore, the first National CC Policy and a National DRR Policy were released in 2012 and 2013, respectively (GoP, 2012d, GoP, 2013c). Although legislatively supported policy documents for EP, DM and CC are in place, an ordinated policy implementation is missing (Atta Ur and Shaw, 2015, Atta-ur-Rahman, 2010). Formulation of policy documents (e.g. NEP 2005, national DRR policy 2013),

supported by legislative instruments is a positive step to address disaster events and environmental issues.

2.11. Linkages of disaster events, the environment and development

There are multidimensional linkages between development, the environment, and disaster events (Gore and Fischer, 2014). The UNISDR (2009) define a disaster as "*a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope, using its own resources*". Disasters can erode decades of social, infrastructure and technological development (ISDR, 2007). Development can cause environmentally damaging activities (e.g. land clearing; DEWGA (2008) and disasters can cause e.g. floods and droughts, earthquakes, landslides and forest fires (Srinivas and Nakagawa, 2008). Environmental degradation contributes to DR, which in turn adversely affects development and contributes to further ecological degradation (ISDR, 2007).

In addition to the HFA (2005-2015) and Sendai Frameworks for DRR (2015–2030), the Paris / COP 26 agreements on CC, as well as the United Nations' SD Goals highlight the need to develop policies based on DRR of environment and development dimensions. Environmental assessment instruments are key tools for DRR (Fischer, 2014), including EIA of development projects (Fischer and Nadeem, 2014) and SEA of policies, plans and programmes (Fischer, 2007). The HFA, the Millennium Declaration and the UN Millennium Ecosystem Assessment concluded that environmental degradation and DR share common causes (Tran et al., 2009). Similarly, UNISDR (2002) recognized that environmental protection (EP), as a component of SD and consistent with poverty alleviation is imperative in the prevention and mitigation of disasters.

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Section: IV Stakeholder perceptions of environmental governance of Pakistan : implications for CPEC plan

Keeping in view environmental and CC concerns of CPEC development, the SWOT related to CPEC sustainability (Section V), CC PC and CEPC development are discussed in section -I of this chapter. This section aimed to explore literature to investigate research objective -4 and its related research questions. In this context, this literature review section first, introduces and explores development, environmental concerns, EG and CPEC sustainability (2.12) followed by a brief overview of Pakistan's EG setup and sustainability concerns (2.13). Finally, the knowledge gap is explored under (2.14) to establish research gap. The methods and approaches used to achieve research objective-4 and its related research questions are discussed in Chapter 3, Section 3.1.5.

2.12. Environmental governance and sustainability of CPEC plan

Economic development is a key interest of each country; however, an increase in economic activities may have ecological concerns. In this context, FDI has been deemed a driver of economic growth while it impacts the environmental quality of BRI host countries (Khan et al., 2022), With rapid industrialization and urbanization, Pakistan's environmental concerns have become progressively severe. Economic growth is the developmental process by which evolving countries become developed economies. Economic growth and EP complement each other, with the former driving the latter and the latter driving the former (Chen et al., 2022c). In this context, potential environmental threats, and complex and challenging environmental issues require EG critical factors to enable the effectiveness of conservation and ecological management (Bennett and Satterfield, 2018). Good governance, with transparency and accountability in involved institutions, is critical Massey (2022) to achieve SDGs. The main intention of EG is to maintain and improve environmental systems' ability to address environmental and CC concerns. Furthermore, a good and effective EG identify environmental threats early, formulate sound environmental policies, promote active public participation, and facilitates the successfully implementing of those policies (Ge et al., 2021).

However, when a country's EG system, for example, Pakistan faces huge challenges, such as poor ecological situations, low governance capability and capacity, and weak public participation in the decision-making process of EP. SD and environmental sustainability have become great developmental concerns of CPEC-related FDI-driven development. In this context, EG capability determines a country's ability to execute EG and EP (Chen et al., 2022c). The greatest challenge in Chinese investment and tackling environmental problems is not only the technical aspects of new green technology or new financial instruments but the need to incorporate international standards of governance, transparency and accountability (De Jonge, 2017). The lack of good governance, in particular transparency Bank (2019a), stakeholder engagement and enforcement of environmental rules along the CPEC BRI are of potential concern. Similarly, stakeholders' effective involvement, becomes more important for any mega project, when it comes to the public concerning projects Maqbool et al. (2022), and the CPEC plan is no exception. The CPEC development established new challenges and opportunities for EG. In this context, recently in a policy dialogue stakeholders highlighted and emphasized green development under CPEC portfolio (Report, 2022).

2.13. An overview of Pakistan's environmental governance system policy instruments

The country has institutional structures to address environmental and CC concerns. The Ministry of CC, Pakistan EP council, Pakistan's EP Agency, a NEP 2005, National CC Policy 2012, recently updated NCCP 2021, implementation framework for CCP 2013-30, National CC act 2017, Pakistan EP Act 1997, and Pakistan National SD strategy

2017 are the main federal level institutional and legal policy instruments for addressing CC and environmental issues. The CC Act determines Pakistan CC Council, CC Authority and CC Fund. Similarly, all Provincial Governments including GB and the State AJ&K have their own CC and EP institutions in the form of EP agencies, backup with legal policy instruments of EP laws and CC policies (see Chapter 3 Figure 3.4). However, in the context of CC, none of the provinces has a CC-specific act. Similarly, except for Punjab Province, all other Provincial Governments including GB, and AJ&K failed to formulate their own environmental policy.

Federal and Provincial governments have developed CC policies to address the CC and EC of the country. The country's first National CCP 2012 (GoP, 2012d) provides a comprehensive framework for CC adaptation and mitigation for various CC vulnerable sectors such as water, agriculture, energy, transport, town planning, forestry, industries, coastal areas, biodiversity, human health, and other vulnerable ecosystems. It recognizes policy measures linked with effective CC and EG. For example, it highlighted policy measures for governance reforms, adaptive capacity building and capacity enhancement of relevant stakeholders, and institutional strengthening to address CC and EC. Regarding knowledge and information, the policy emphasizes developing CC adaptation and mitigation measures on local and indigenous knowledge, promoting indigenous knowledge with scientific research for an ecological and sustainable green revolution, and knowledge-based management with strategic CC research to ensure benefits from international scientific advancements.

Similarly, one of the policy objectives is "to strengthen inter-ministerial decision making and coordination mechanisms on CC". Additionally, policy measures are committed to devising and strengthening coordination mechanisms among national and international institutions. Likewise, the policy emphasizes that each concerned department needs to clearly define coordination procedures and outline the roles and responsibilities during natural disasters. Institutional mechanism policy measures recognize to "improve inter-ministerial and inter-departmental decision-making and coordination mechanisms on CC issues both at provincial and federal levels to develop Pakistan's stand on various international policy issues relating to CC".

The policy also highlighted measures for the active contribution of related stakeholders in the planning and decision-making process in natural resource management, CC adaptation mitigation, and DRR activities. The policy highlight measures for effective management of rangelands and other resources while ensuring the rights of the indigenous community. The policy recognizes technological innovations and advancement as policy measures in the field of CC, for effective implementation of adaptation and mitigation measures.

Pakistan is a signatory of international environmental protocols and conventions. The national CCP recognizes different financial resources for CC and highlighted policy measures for transparent funding by developed countries. However, the policy failed to recognize the role and responsibilities of relevant stakeholders and departments related to the most vulnerable CC sectors highlighted in the policy. The emphasis of the CC policy 2012 is on climate resilient development and adaptation. However, the recently updated National CCP 2021(GoP, 2021f) highlights equally CC adaptation and

mitigation measures with a key focus on nature-based solutions and recognizing CC mitigation targets. Similarly, National CCP 2012 failed to incorporate policy measures about SD goals, CC mitigation targets, and sectors like tourism, blue economy, and natural capital accounting system development, which are well integrated with updated National CCP 2021.

2.14. CPEC development and Pakistan environmental governance

Pakistan has a well-developed EG system (Shafiq-ur-Rehman, 2018) to address environmental and CC concerns at the Federal and Provincial Levels. However, the absence of long-term sustainable policies, maladministration, bad governance, and lack of awareness at the local level (Bazmi, 2018) are potential problems with water, energy, and food security. The researchers recognize that inconsistencies in EG in Pakistan (Shafiq-ur-Rehman, 2018) , policy formulation without adequate consultations with stakeholders (Hassan et al., 2019), CC integration into budgetary and planning processes (UNDP and GOP, 2015), lack of institutions capacities Khan et al. (2020e), and integrated planning for disaster resilience development Shah et al. (2020), transparency in CPEC investment (Malik et al., 2021 , Dawn, 2021b), PC (Waheed et al., 2021) and CPEC development, and insufficient capacity (Mustafa et al., 2021) are the key challenge related to EG and environmentally friendly development.

In addition to this, the poor institutional framework to address CC challenges in Pakistan (Iqbal, 2020), poor governance system, corruption, weak administration (bureaucracy), and inadequate execution of environmental laws (Sheraz et al., 2022), institutional quality along with political stability, and accountability are known as weak indicators in BRI countries (Khan et al., 2022) including Pakistan. The efficiency of the EG of the BRI not only centres on China's urgencies and obligations, but also on the political commitment and capability of BRI-linked states to sustain, execute, and impose strict ecological laws and regulations (Coenen et al., 2021). In this context, the role of institutions and EG indicators are important to enrich FDI inflow which can, in turn, enhance fiscal development and ecological quality protection (Khan et al., 2022). Similarly, Cheremeteff et al. (2021) highlighted that BRI-related development is planned and executed with inadequate transparency and public participation, has an insufficient ecological legal framework and with little respect for ecological rules, and rights of vulnerable local societies and aboriginal individuals.

In this context, as a far-reaching infrastructure and massive financing development strategy, the BRI-funded CPEC development plan raises critical questions about its environmentally friendly and CC concerns, and its consequences for the tcountry's EG. This chapter section explores how Pakistan is eagerly and swiftly developing policy instruments for its envisioned "green and sustainable CPEC" considering key EG criteria factors.

Coherent planning and implementation are needed to address CC and EC. Therefore, the GoP is currently planning to develop a national adaptation plan for boosting climate-resilient (Reporter, 2021) development. EG is an area that addresses all types of pollution including CC and biodiversity conservation (Dong, 2017) and sustainability.

The concept of EG implies a set of governing procedures, mechanisms, and organizations through which political actors influence ecological actions. EG is a substantive approach (Blake and Barrie, 1990) to improve environmental management activities.

To date, much research on the BRI-CPEC has focused on geopolitical as well as geo-economics perspectives, with little research being done in the context of country EG and CPEC development sustainability. The ecological concerns have attracted less attention, and study on the EG challenges and institutional structures developing as part of the "green BRI" remains sparse (Hughes et al., 2020). Current literature has recognized numerous CPEC development-related social-cultural (Kanwal et al., 2019b, Sun et al., 2020) economic and environmental Kakar and Khan (2021) impacts. However, these studies are mostly descriptive in nature and based on reviewing existing literature and policy documents. No considerable attempt was made to approach key experts/stakeholders, asking about their perception of the country's (Pakistan) current EG setup and sustainability concerns of CPEC development. Furthermore, no work has been done to weight and rank EG critical criteria factors to establish policy implications for sustainable CPEC. The thesis Chapter -6 analysis and results is an endeavour to fill this gap.

Section: V Sustainability assessment of CPEC plan

In this section, literature related to Pakistan's experience in applying EIA, and SEA is explored, in particular about EA and CPEC plan. This section is divided into two sub sections. Section A covered, an overview of EA, SD and CPEC sustainability (2.15), followed by exploring Pakistan's EA tools and sustainability (2.16). Further, institutional setup for EG institutional setup of Pakistan is explored in (2.17 & 2.18) followed by exploring shortcomings identified in EIA system, EA and CPEC development are explored in 2.19, and EG challenges, EA and CPEC development are discussed in 2.20 Similarly, in section B, a brief history of SEA in Pakistan (2.21), followed by an overview of the 18th Constitutional Amendment, Pakistan EIA system, CPEC development and SEA integration is discussed in 2.22. Furthermore, CPEC institutional framework, the opportunities and needs of SEA for the CPEC plan are explored in 2.23. Finally, SWOT Analysis MCDM Best West Method and the research gap are explored in 2.24 to address **(Research Objective -5).**

Sub-Section: (a) Pakistan's experience in using decision-making environmental assessment tools

2.15. Environmental assessment and CPEC plan sustainability

EA is an important instrument of environmental management and planning evaluation tool to deliver SD. Globally decision-makers use EIA to legitimize trade-offs between socio-economic gains and ecological damages (Dusík and Bond, 2022). SD promotes

environmental consideration in development planning, to implement strategic interventions related to EIA and SEA for environmental sustainability. The EIA assesses the environmental impacts of development projects before execution (CHANG et al., 2018). SEA is considered as a sustainability or integrated assessment tool (Morrison-Saunders et al., 2015). Globally EIA is one of the most enduring and influential environmentally friendly management tools (Hanna, 2022).

However, there are growing concerns about EIA's effectiveness in developing countries. For example, the long-term impacts on the environment, biodiversity loss, CC and the limited considerations of cumulative impacts Vu (2022). SEA as a strategic approach supports an overall environmental SD vision (Fischer and González, 2021) , reduces environmental risks, enhances environmental benefits, improved plan implementation, and less tangible advantages such as better democracy and more proactive environmental integration Acharibasam and Noble (2014) promote SD at the strategic level of decision making. In Pakistan, EIA is employed as a project justification tool rather than a project planning tool (Nadeem and Hameed, 2008) to contribute to attaining SD. The robust and effective EIAs and SEAs are vital for recognizing the direct and indirect effects of CPEC development. They can potentially alter infrastructure designs (Hughes et al., 2020, Lee and George, 2000) to avoid or mitigate impacts.

Pakistan is one of 142 countries that have signed China's BRI infrastructure investment that intends to invest $1 to 8 trillion dollars in development initiatives (Aziz, 2022). The fiscal development under BRI comprises a cumulative GDP of about USD 21 trillion (Rolland, 2015). The CPEC Long Term Plan (2017–2030) key focused development areas including connectivity, Gwadar port development, energy plants, tourism sector, roads, and railways infrastructure, industrial zones development, people's income, non-governmental exchanges, and economic collaboration and projects related to communication networks (GoP, 2017a).

In this context, CPEC development could contribute in implementation of UN 2030 Agenda of SD even beyond Pakistan (Ali, 2018a), especially in the broader Asian continent. Geographically, Pakistan has a vital strategic position to act as a bridge between Asia, the Arabian Sea, the Middle East, and Africa (Mu et al., 2022). Numerous socio-economic and developmental strengths and opportunities are claimed to be achieved through CPEC investments. For example, the GDP rate is expected to rise 7% by 2020 from 5.2% in 2017, annual revenue collection is projected at around $5bn by 2022 (CPEC, 2022) and to create 2.3 million jobs between 2015 and 2030 (PCI and CRI, 2021). However, the environmental and CC concerns of CPEC development are of great potential threat to SD. For Example, CPEC development-related deforestation (Ebrahim, 2017, Khalid et al., 2022, Aziz, 2022), CPEC coal-fired power plants (Khalid et al., 2022), and increased vehicle trafficking on the KKH of the mountainous region (Kouser et al., 2020, Aziz, 2022) and biodiversity lost (Nabi et al., 2018) are emerging CC and environmental concerns. China has cut carbon releases by

shutting its coal-fired energy plants in China. However, the CC driven CPEC coal-fired energy plants instalment in Pakistan is entirely ignorant of global environmentally friendly development standards (Hadi et al., 2018). This context suggests promoting legal collaboration between China and Pakistan relating to environmental laws (Khan and Chang, 2021) to make CPEC a sustainable project.

The EA such as EIA is an obligatory legitimate requirement in both China and Pakistan (Khwaja et al., 2018). In EIA, a development project is evaluated for its ecological effects, and approval is bestowed if enough adaptation and mitigation measures are taken to control the hostile environmental impacts of the project. EA of CPEC projects demands compliance with the international legal requirement for SD, for example, Agenda 2030 of SD goals and UNFCC, to which Pakistan and China are signatories Sohail et al. (2014) emphasize climate resilient and environmental SD. Similarly, Pakistan has joined the Kyoto Protocol to initiate a clean development mechanism to mitigate GHGs (Zubedi et al., 2018, Khan and Chang, 2021). CPEC development has considerable strategic importance for both China Pakistan and regional countries. In this context, SEA has an important functional role to address CC and ecological sustainability at the policy and planning stages and the possible impact of strategic planning (Yang et al., 2021).

However, a lack of transparency and vague terms and conditions of investment has raised uncertainty regarding the EIA related to CPEC developments (Khalid et al., 2022). Similarly, failure to account for transboundary environmental impacts has implications concerning the balance between the pillars of SD (Amos and Lydgate, 2020). Impact Assessment tool such as EIA identifies the environmental and socio-economic impacts before decision-making in transboundary projects (Dereg, 2011). In the case of Chinese FDI, recipient countries are required to apply EIA mitigation standards to all BRI-related projects, and to conduct SEA, strategic planning for the cumulative impacts of BRI intrusions (Bai et al., 2018, Hughes et al., 2020). SEA facilitate environmental and social issues related to SD plans, including policymaking and planning processes, and supports the design of more sustainable policies and plans at strategic levels of decision-making (do Rosádrio Partidário, 2017). These EA tools (EIA & SEA) are associated with basic obligations for each international funding and loan (Narain et al., 2020).

2.16. Pakistan environmental assessment tools and sustainability

In Pakistan, the EA process was introduced through the PEPO 1983 (GoP, 1983). In 1994, EIA was made mandatory for all projects that likely caused adverse ecological impacts (Hameed and Nadeem, 2019). The process of EIA was legally implemented in the country after the legislation of the Pakistan EP Act (PEPA) 1997. The EIA and IEE are the key tools to manage the EA of developmental projects. Section 12 of PEPA 1997 required to submission of a detailed EIA report of the project to EPA before its commencement (GoP, 1997a). It provides the basic means to manage and approve IEE

or EIA associated with development proposals /projects. Under Section 2 (xi) of PEPA, EIA means "an environmental study comprising a collection of data, prediction of qualitative and quantitative impacts, comparison of alternatives, evaluation of preventive, mitigation 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"(GoP, 1997a, p.3). Similarly, *Section 2 (*xxiv*)* of PEPA 1997 defines IEE *as* "a 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 EIA (GoP, 1997a, p.5). In this context, Both the Federal and Provincial Government EP Acts have provisions to establish Environmental Tribunals to address the appeals of any aggrieved person (stakeholders or proponents) against the decisions made by relevant EPA, rules, or regulations made thereunder, within 30 days of the date of announcement of impugned order or direction to such aggrieved person.

In the context of SEA consideration, the Provincial Governments of Baluchistan, KP, Sindh, and GB have made SEA /consideration of ecological impacts of provincial PPPs an obligatory requirement. This is a very important and much-needed addition to the EP Act (Fischer and Nadeem, 2014). However, the Federal Government, Punjab, and the State of Azad Jammu and Kashmir still failed to make SEA a mandatory requirement. IEE / EIA/SEA provision in Federal and Provincial Government Environmental Acts is presented in **Annexures E & F**.

PEPA 1997 highlighted that every proponent should submit an EIA or IEE as the case may be in response to the expected adverse ecological impacts. The EA process was legally strengthened through PEPA 1997, which became operational under the EIA Regulations 2000. Regardless of the country's sound legal basis and comprehensive guidelines, the evidence suggests that the EA approaches especially SEA in Pakistan have not yet evolved adequately. However, in the context of EA guidelines, PEPA 1997 had issued EIA and IEE guidelines for environmental sustainability in the country
The EA guidelines are used as a tool to identify societal and biophysical impacts of development and how these will be mitigated to attain environmentally and socially sound sustainable decision-making. EA guidelines are prepared worldwide to enable consultants and stakeholders to meet EIA objectives and formulate quality EIA reports. Therefore, in 1997, Pak-EPA prepared EIA guidelines for this purpose. Regardless of this, the issue is that, even after a long time, the guidelines have not been reviewed (Hameed and Nadeem, 2019) at the Federal level.

In 2017 Government of Punjab Strategic Planning and Reform Unit established social and EA guidelines for irrigation sector projects. These guidelines highlighted to conduct of IEE and EIA in line with the Punjab EPA,1997 (Amended 2012), and the IEE/EIA review regulations, 2000 (GoPB, 2017a). However, these guidelines failed to consider SEA. Similarly, Sindh-EPA (EA) Regulations, 2021(GoSD, 2021), KP-EA

Rules, 2021(GoKP, 2021), draft Punjab Review of IEE & and EIA Regulations, 2020 (GoPB, 2020), Baluchistan EPA Review of IEE and EIA Regulations, 2020 (GoBA, 2020) and AJ&K EPA Review IEE & EIA Regulations, 2009 (GoAJK, 2009) failed to consider SEA (see Table 2.1). There is a need to integrate SEA provisions in IEE and EIA review regulations at the Federal and Provincial levels. Additionally, a review of IEE and EIA regulation 2000 of the Federal and GB required revision with the provision of SEA integration.

Table 2.1: Provincial government EA review regulations /guidelines

EA regulations /guidelines	**Environmental assessment tool**			
	IEE required	EIA required	SEA required	Environmental checklist/ general environmental approval
Punjab Review of IEE & and EIA Regulations, 2020(GoPB, 2020),	Project falling in Schedule I	Project falling in Schedule II	not mentioned	For projects not listed in Schedules, I and II to comply with EPA guidelines
Sindh-EPA (EA) Regulations, 2021 (GoSD, 2021)	Projects listed in Schedule-II	Project of any category listed in Schedule-III	not mentioned	A project of any category listed in Schedule-I required an environmental checklist
KP-EA Rules, 2021(GoKP, 2021)	Project of category falling in Schedule-III	Project of category falling in Schedule-II	not mentioned	Project of category falling in Schedule-IV required General Environmental Approval
Baluchistan EPA Review of IEE and EIA Regulations, 2020 (GoBA, 2020)	Project falling in Schedule I	Project falling in Schedule II	not mentioned	not mentioned
AJ&K EPA Review IEE & EIA Regulations, 2009 (GoAJK, 2009) failed	Project falling in Schedule I	Project falling in Schedule II	not mentioned	not mentioned

In this context, (Ahmed et al., 2018) found shortcomings in the EA process of Pakistan including EIA report formulation, SEA, and consideration of alternatives and decision-making procedures are entirely overlooked. Additionally, Khan and Chaudhry (2021) identify the challenges related to the EIA system in Pakistan such as environmental approval, EIA scoping, and limited stakeholder involvement in EIA. Similarly, regarding SEA implementation Pakistan Environmental Protection Agencies (EPAs) have weak capacities; poor quality EA reports, needs a political priority for environmental and natural resource management, least budget allocation for SEA research; weak coordination amongst relevant stakeholders during EIA or SEA studies; SEA non-mandatory status under the law; and less know-how or skill in the research or studies of SEA systems (Monteiro et al., 2018, Khan and Chang, 2021).

In the context of SEA practice and related guidelines, for example, globally more than sixty countries have some basic legal requirements for SEA in place (Fischer and González, 2021). However, many of these are just frameworks based, and provide a general mandate by establishing basic procedural principles, but leaving methodological specifics to regulations and guidelines (Montaño and Fischer, 2019). Most of the countries with legal frameworks are from the developed world. However, an increasing number of countries of developing status are also engaged with SEA that including a range of countries for example (see (Fischer and Montaño, 2014, Montaño et al., 2021, Jiliberto, 2021, Fischer and Retief, 2021, Fischer and González, 2021, Chanchitpricha et al., 2021).

However, SEA practice in developing countries has remained limited (Fischer and Onyango, 2012). In the case of Pakistan, SEA is still not exercised at the government level. Additionally, Federal and Provincial EPAs have not even formulated SEA guidelines and even SEA is not mentioned in established EA guidelines that cover only EIA and IEE.

2.17. Environmental governance institutional set-up at federal level

In 2002, the Ministry of Environment (MoE) was created as a full-fledged ministry (Sánchez-Triana et al., 2014), a second highest environmental institution after PEPC, with a mandate to design, plan and implement national environmental PPPs. Following the 18th legitimate change, all of these obligations were devolved to the provincial government while the Ministry of National DM was established to replace MoE. Later National Ministry of DM was changed into the Ministry of CC in April 2012. However, in June 2013, the Ministry of CC was demoted from a ministry to a division. In 2015 government again upgraded the CC division to the status of a Ministry (Ebrahim, 2015). The EP Agencies are responsible to carry out an IEE and EIA before the approval of any infrastructure or construction project (Pak-EPA, 2000). Pakistan EP Act, 1997 provides a strong basis for EA tools (EIA & IEE) through the establishment of supporting bodies and institutional development at the federal and provincial governments level. For example, PEPA, 1997 recognizes the establishment of a council known as Pakistan EP Council at the Federal Level under section 3(1), Pak- EPA 5(1), and all Provincial governments to establish EPAs under section 8(1) of PEPA, 1997

(GoP, 1997a). The subsequent section depicts the functions as well as the hierarchy of these institutes.

In addition to environmental legislation and EIA guidelines, Pakistan has a hierarchical institutional setup for EG (Nadeem and Hameed, 2006). The EIA set up in the country comprises numerous environmental agencies/departments and organizations at the federal level and provincial government. The PEPA of 1997 sets the institutional foundation for environmental quality management (Sánchez-Triana et al., 2014) and EG in the country. PEPC is the highest body at the federal level in charge to formulate and develop environmentally-friendly policies and programmes at the national level (Pak-EPA, 2005, Naureen, 2009), to make NEQS that are enforced by the Pak-EPA (Alam, 2018).

Pak-EPA was instituted in 1983. The important function of Pak-EPA is to assist PEPC, and the Planning Commission of Pakistan to prepare and revising PPPs, in lawmaking, provide guidelines for EP, promote SD, executing, monitoring, and evaluating the related government policies (Pak-EPA, http://www.environment.gov.pk/; (Shah et al., 2010). In addition to this, Pakistan EP Agency is in charge to implement PEPA (1997), governing the EIA of sectoral projects in the federal and territory jurisdiction; administering and implementing related rules and regulations (Sánchez-Triana et al., 2014). The Federal Government level Planning and Development (P&D) Department is responsible to processed IEEs and EIAs of public sector projects (Nadeem and Hameed, 2008, Fischer and Nadeem, 2014).

In this connection, the same authority of obligations is practised in the Provincial Government excluding some development projects, for example, military establishment projects and some trans-country impact projects (Nadeem and Hameed, 2008, Nizami et al., 2011, NIAP/IUCN, 2013). The Federal-level Planning Commission has established an Environment Section to integrate environmental consideration in development planning and projects Naim (2014) and to ensure EIA clearance from the concerned EPA related to public or private sector mega-projects. However, there is for example, Central Development Party held responsible for the approval of development projects, and related forums at the Provincial level i.e. Provincial Development Working Party and District Development Council at the district level for the evaluation and approval of projects (NIAP/IUCN, 2013, Naim, 2014).

2.18. Environmental governance institutional set-up at provincial and local level

In addition to the Federal Government level Pakistan EP Agency, the EP Agencies were established in all four Provinces including at state of Azad Jammu and Kashmir EP Agency and Gilgit- Baltistan. After the 18th constitutional amendment, Provincial EPAs have the mandate to deal with the environmental management and assessment aspects of their respective provinces. Their mandate comprises executing rules and regulations set under PEPA 1997 and other legislation, as per the needs of each province; designing, executing, and implementing ecological standards and rules; and evolving provincial

systems for the implementation of pollution charges, among other liabilities (Sánchez-Triana et al., 2014).

In this context, each EPA at the Provincial level has an EIA directorate to deal with the EIA / IEE for private and public sector projects. Additional explicit jobs responsibilities of EPAs contain: promoting SD, concentrating on industrial and urban pollution complications, creating an arrangement for inspections, establishing amhient air quality testing and monitoring services, following up and monitoring pollutants and maintaining the research laboratory for testing and monitoring, and the most significant and ultimate task is harmonization with federal and other provincial and local governments (Naureen, 2009). Similarly, all provinces have Environment Sections in P&DDs to integrate ecological concerns in development proposals before looking for ultimate endorsement and approval (Naureen, 2009, NIAP/IUCN, 2013)

The 18th Constitution Amendment bas highlighted the need for Provincial Government to have an environmentally friendly planning and management system. The ecological planning and development obligation lies with the Environment Section at the P&D Division, which does critical planning decisions in the province relating to any new development plans and encourages the preparation and approval/endorsement of strategies and policies at the provincial level. At the provincial level, the ecological priority situation is not institutionalized and there is no formal procedure in place to integrate them into multi-year development planning programmes, as is the case of the Medium Term Development Framework (MTDF) (Sánchez-Triana et al., 2015).

2.19. Shortcomings in the EIA system of Pakistan and CPEC development

EIA has become a legal obligation globally, and almost all countries globally had some provisions for EIA (Fischer and Nadeem, 2014). Similarly, Wood (2003) highlighted that more than 100 nations (as well as developing nations) are practicing EIA. At present, there are more than sixty countries with numerous formal SEA needs worldwide (Fischer and González, 2021). However, many reasons are attributed to the difference in the scope, rules regulations, and effectiveness of EIA preparation in developing countries (Wood, 2003). A country like Pakistan has considerable EIA regulations and legislation (Nadeem and Hameed, 2008, Saeed et al., 2012), however, inconsistencies between EIA legislation or administrative procedures and their effectiveness do exist (Ahmad, 2002). Various aspects are affecting the effectiveness of the EIA system e.g. deficiency in EIA legislation (Khosravi et al., 2019); capabilities and the diplomatic environment (Bitondo, 2000, Marara et al., 2011, Kabir et al., 2013); inadequate organizational abilities (Wood, 2003, van Loon et al., 2010, Clausen et al., 2011, Marara et al., 2011) including monitoring as well as enforcement capacities (Khadka and Shrestha, 2011); socio-fiscal situation, and the legitimate framework (Kolhoff et al., 2013, Marara et al., 2011, Wells-Dang et al., 2016). Similarly, basic principles for EA (Sosovele, 2011); and governance such as accountability,

transparency, adequate propagation of information, and liability (Wood, 2003, Kakonge, 1998, Sosovele, 2011).

According to Wood (2003), generally, most developing countries do not meet the above-stated benchmarks, and Pakistan is no exemption. Four decades have passed since the introduction of EIA in Pakistan, but still, studies recommend its execution and effectiveness (Khan et al., 2018, Khan et al., 2020d) great concerns of SD. In this context, academic and other national and international studies have identified some key issues in the existing EIA system of the country (Aslam, 2006, Riffat and Khan, 2006, Bank, 2006, Nadeem and Hameed, 2008, Nadeem and Fischer, 2011, Post and Schijf, 2011, Magsi and Torre, 2012, Shah, 2013, Sanchez-Triana et al., 2014, Hameed, 2017, Ahmed, 2018, Khan and Chaudhry, 2021) are summarized as follows:

- Insufficient coordination mechanism and institutional capacities
- lack of reliability and availability of data
- poor EIA report review, monitoring, and auditing, SEA, politically oriented decision-making process.
- inadequate competency of consultants and sub-standard EIA report preparation
- inadequate financial and technical means
- lack of professionalism of some EIA consultants/advisors and delayed transparency in decision making.
- insufficient public participation and consultation
- weak execution of mitigation measures, monitoring and follow-up system
- There is no legal mandate to EPA for coordinating land use planning in the context of EIA
- Projects start before obtaining environmental approval. Proper scoping is occasionally carried out. Limited stakeholder participation in EIA and proponents sometimes do not share projects compete information with consultants /advisors, which compromises the EIA quality and well-timed decision making. Moreover, some proponents attempt to influence the review and decision-making and do not ensure compliance to approval conditions.

In context of CPEC development, more than 60 % of CPEC's investment of $62 B is for energy projects. Of these energy projects, around 70 % are coal-fired power plants (Oh, 2018). The ecological impacts of coal-fired power generation plants are analyzed in several studies. In this context, for example (Aung et al., 2020) studies the effectiveness and compatibility of BRI countries' EIA with China and highlighted numerous inconsistencies and critical shortcomings of EIA models between China and BRI host countries. In context of CPEC (Ge, 2022) highlighted a theoretical frame for evaluating socio- ecological impacts to consider vulnerability and resilience when redesigning and implementing planned projects under BRI. CPEC investment is the biggest development plan in Pakistan's history, carrying unique geopolitical and fiscal shifts.

However, CPEC-related Pakistan's economic growth progress is at the price of environmental degradation (Nazir et al., 2023). The environmental impact concerns threaten China's aspirations, specifically when there is little guide for planning and evaluating ecological impacts of huge development under BRI (Teo et al., 2019). In the context of BRI investment (Aung et al., 2020) highlighted that developing countries often have weak ecological regulations and standards that make favourable environmental conditions for foreign investment. In this context, BRI in developing countries establishes less ambitious EIA governing frameworks for foreign investment that undermine ecological requirements. The weakened ecological policies, regulations and heavy investment flows to less-developed BRI countries like Pakistan may compromise their ecological sustainability. In this context, international support in regulation implementation is crucial to mitigate the negative environmental impact (Li et al., 2021b) across countries while executing BRI development projects.

2.20. Environmental assessment and CPEC development

In addition to the above-mentioned obstacles related to EIA preparation and implementation, there are numerous issues of overlapping and disintegration, resource fragmentation, jurisdiction, and lack of consistency and clarity among dealing departments and authorities related to CPEC development (Butt, 2021a). For example, the jurisdiction of Provincial Government EP Agencies overlaps with the Federal level EP Agency. The Federal Government directly works with the Government of China in terms of CPEC plan formulation, coordination, and CPEC project implementation. In this context, the Ministry of Planning Development and Special Initiatives (MoPD&SI), Pakistan Board of Investment (BOI), and the CPEC Authority are under the Federal Government jurisdiction that facilitates to coordinate, implementation, monitoring, and evaluation CPEC related activities in the country (CRI and PCI, 2021). Mainly, the CPEC Authority is authorized to integrate the ecological and social impacts of projects at any later stage while initially commencing them without any intrusion by any regulatory authority (Butt, 2021b).

Although CPEC Authority Bill 2020 provides legal and administrative protection to its authorities, but being of Federal Government jurisdiction will bypass the EP Agencies, whilst executing development schemes (Khetran and Saeed, 2017). Therefore, CPEC Ordinance is vague while determining procedures for regulatory authorities for an inter-coordination mechanism for EP. There are no particular laws or mechanisms in place to address environmental-related issues (Huma, 2018). Additionally, the EP Agencies have not carried out a rigorous IEE and EIA for CPEC projects; the country mechanisms related to IEE and EIA are out-of-date and unclear as the CPEC development projects hire the latest machinery for modern infrastructure development. Companies executing CPEC projects notified the country EP Agency that they adhere to China's Regulations related to the environment, which are quite contradictory to Pakistan's ground circumstances (Butt, 2021a). Pak-EPA is reluctant to give environmental clearance to

the CPEC project. In this context, an EA report, for example, on the CPEC project Raikot-Islamabad highway was rejected by Pak-EPA because of "unprofessional and lacking significant information"(Shahid, 2015). Similarly, in 2015 Lahore High Court ordered to holdup CPEC Sahiwal coal plant because of massive ecological issues. According to court papers, the plant is located in the centre of agricultural fields and would affect human health including animals, crops and adjoining industries. In context of EA of the project, EIA was carried out in a hasty approach and with unnecessary haste without involvement of concerned shareholders (News, 2015).

The CPEC is the most substantial development project in Pakistan with a wide interconnectivity role in BRI and is somewhat hastily administered under the Bilateral Investment Treaty and Free Trade Agreements between China and Pakistan (Qazi, 2019). However, there are no provisions regarding EP provisions in any of the treaties or agreements, nor strict processes and instruments to assess ecological degradation-linked issues. Ironically the country (Pakistan) has laws for EP but the government and citizens do not commit to executing and adhering to those laws/regulations (Huma, 2018).

Sub-Section: (b) Opportunities SEA integration for CPEC development plan

2.21. Brief historical background of SEA in Pakistan

SEA is a complex, dynamic and challenging process of incorporating environmental considerations into PPPs, that needs political will and commitment, a fair and transparent stakeholder engagement process, and a legislative framework (Victor and Agamuthu, 2014). In many countries like Pakistan, the SEA is still completely or relatively new. SEA is a part of the country's regulatory instruments. The Pakistan NEP 2005 promoted SEA as a tool to integrate the environment into the decision-making process but has not been formally practised yet. However, there are some experiences in the country with voluntary or donor-driven SEAs, but no specific guidelines or legal framework exists. The informal introduction of SEA in Pakistan began with the recognition of the participatory planning approach in the country's first National Conservation Strategy 1992, and later formulation of conservation SD strategies at the provincial and district level (Ayaz and Ansari, 2013, NIAP/IUCN, 2013). Pakistan has voluntarily executed SEA components like public participation without legislative obligation (Victor and Agamuthu, 2014).

The NCS in 1992, and the National Environment Action Plan in 2001 are only a few cases that evaluated the environmentally friendly aspects of the country at sectoral and policy levels. In this context, the Medium Term Development Framework (GoP, 2005a) was reviewed and evaluated for ecological integration to make it line up with the NEP. However, all attempts /practices were made with no legitimate compulsion (Khan, 2013).

In 2014 a set of draft SEA rules were developed under the NIAP (GOP/IUCN, 2014b). These were designed to be a hybrid, between formal regulations and proponent guidelines. Innovation in the SEA draft rules is the presentation of options for how

proponents should deal with the outcomes of SEA studies (Annandale et al., 2021). These options appear to have been offered because of political compromise, as "integration of SEA findings into the draft PPP" is distinctly different from merely "taking account of SEA findings". What makes the Pakistani experience unusual is that it was not only guidelines that received attention but a range of other measures, aimed at developing knowledge and skills for SEA (Annandale et al., 2021).

There was a specific attempt on engaging academia in the country in educating EA as part of their programs. In this perspective, a 'standardized' curriculum and other supporting teaching materials were developed (Fischer and Nadeem, 2014, Fischer; et al., 2014). Additionally, various capacity-building proceedings were conducted, involving hundreds of SEA actors in the country. While SEA in Pakistan has legal backing, the rules/guidelines are still in draft form only, and the country still has relatively little experience with the application of SEA (Annandale et al., 2021). The donor-driven SEAs studies have highlighted the usefulness and awareness of the SEA tool in Pakistan. These studies commenced and encouraged, a nationwide-ranging discussion on the significance of the SEA tool.

Before 2004, EIA-like SEAs were carried out to comply with the "safeguard" policies of international development organizations. However, after 2004, policy SEAs have progressively been carried out in the country to mainstream ecological sustainability, poverty alleviation, and social issues in policy preparation design and execution (Fischer; et al., 2014) resulting in raising of public awareness to design of environmentally sustainable public policies. In Pakistan, the remarkable strength of policy SEAs is the explicit consideration of poverty and social issues, especially when associated with environmental and sectoral-related reforms (Fischer; et al., 2014).

After the 18th constitutional amendment in Pakistan, SEA becomes a legal requirement in Provincial EP Acts except for the Punjab Province and federal level EP act. This decentralization of the subject of EP and ecology from the central government to provinces is one of the key concerns for the SEA execution. In particular, the Provincial EPAs have weak capabilities to effectively monitor SEA studies (Victor and Agamuthu, 2014). Therefore, Provincial Government EPAs require to enhance capabilities and approaches for effective SEA (Fischer; et al., 2014). In this regard, however, EIA practices of provinces could help the Provincial EPAs in SEA implementation (Fischer; et al., 2014).

2.22. CPEC development, SEA integration and 18th Constitutional Amendment

Constitutional Amendment-resultant gives significant Provincial autonomy for EG (Alam, 2018) to formulate environmental laws and implementation. In this context, numerous challenges and opportunities related to the 18th Constitutional Amendment are recognized in the scientific literature that can potentially impact the sustainability of the Chinese FDI CPEC plan. For example, weak harmonization amongst relevant institutions and agencies is considered a key matter of concern in the effective execution

of EA system in the Country. After decentralization, numerous functions related to the Pakistan-EPA have been assigned to provincial EPAs. This decentralization has established gaps in inter-agency harmonization, particularly for projects/schemes having trans-provincial impacts (NIAP/IUCN, 2013).

Projects under the CPEC portfolio for example roads and highways are trans and inter-provincial, which required a coordinated effort among Pak-EPA and respective provincial government EPAs to address environmental and CC concerns. In this context, the International Bank for Reconstruction and Development, and World Bank highlighted that inter-governmental and intersectoral coordination is nonexistent, and provincial EPAs need capacity development, for instance, in the field of air quality management, including designing and implementing provincial environmental policies (Sánchez-Triana et al., 2014).

Similarly, matters under federal authority, jurisdictional conflict for activities and projects on the Federal Legislative List (e.g highways); pollution control for maritime zones; inter-provincial coordination in environmental matters; foreign loans/aids and foreign aid access for provincial EP (Pastakia, 2014) are of important concerns of CPEC plan and sustainability.

Similarly, the cross-cutting and interlinked development areas, for example, Gwadar development, energy, transport infrastructure development, trade and industrial cooperation, and agricultural and tourism sector development are planned under the CPEC portfolio (GoP, 2017a). In such a scenario an integrated and coherent CC and environmental sustainability planning are needed for green and climate-resilient CPEC development. The EA tool such as SEA address the cross-cutting / cumulative CC and environmental impacts of PPPs.

The CPEC will pass through all provinces and planned different development projects in Provinces including GB and AJ&K. However, the local community and provincial stakeholders, for example, relevant political parties have serious concerns about the CPEC development plan. For example, GB highlighted the CC and environmental problem (i.e., pollution, glaciers retreat) of CPEC development, and KP raised ethnic biases and connected the Corridor with Punjab development. In the same vein, Baluchistan too dubbed the CPEC plan as Punjab's project, and others also raised route controversy and CPEC governance issues (Hussain, 2018).

In this context, the decision-making tool, for example, SEA can apply in political decision-making processes (Kørnøv and Thissen, 2000, Nitz and Brown, 2001, Arts and Partidário, 2005), to address political sensitivity decision-making to meet sustainability challenges (Lobos and Partidario, 2014) to facilitate discussion, conciliation, and agreements /contracts among multiple stakeholders on environmental sustainability Bank (2012b), conflict resolution over scarce resources, e.g; water resource in case of Pakistan Khan et al. (2016) by strengthening participatory governance structures (Molenaar and Nooteboom, 2020), and to drive green infrastructure planning and design (Chanchitpricha and Fischer, 2022).

Similarly, one of the implications of SEA for SD is that it confronts the complication of the concept; involving potential inconsistency, uncertainty, contested knowledge, and conflict (Fischer et al., 2010, Newig et al., 2007), providing a forum for Governments

and related stakeholders to talk about transboundary and cumulative sectoral development affects (Kobayashi et al., 2012).

After the 18th amendment, the provincial governments (for example Punjab) amended the PEPA in 1997 and enacted it as a provincial environmental act. There is no formal mechanism through which the PEPA (at the federal level) is linked with provincial EP Agencies (EPAs) (Khayam and Ahmad, 2020). In this context, SEA is an internationally established tool to deal with issues of CC, environmental concerns, and dispute resolution.

At the federal level, the NEP 2005 emphasizes environmental consideration and integration in sectoral policies and plans and promotes SEA as a tool to integrate environment in decision-making processes (GoP, 2005b). Similarly, PEPA 1997 recognized to conduct of IEE and EIA but failed to provide provisions about SEA of PPPs an incoherence between NEP 2005 and PEPA 1997. However, the 18th Constitutional Amendment provided an opportunity for the provincial governments to formulate their environmental acts and introduce SEA provisions. Therefore, all provincial governments had developed their EP acts, and incorporated provisions about SEA for policies, plans, and programs, except Punjab Province and State of AJ&K, EP acts failed to consider SEA (see **Annexure F**).

The long-term CPEC plan (2017-2030) is a pilot program (Nation, 2021,p.12) of multiple development projects that need to be undergone to ensure environmental consideration in strategic decisions and sustainability of CPEC. For example, SEZ development is an important component of the CPEC plan. Following the 18th Constitution Amendment, provincial governments are fully empowered to develop SEZs and coordinate with foreign companies (APP, 2021a). The Federal government has delegated responsibilities to the provincial government for SEZs development as a part of the SEZ Act 2012 (Ali, 2020).

In this context, a panel discussion of IUCN-PIDE on the *mainstreaming environment in CPEC* highlighted environmental concerns of CPEC development. One of the experts emphasized that the "development and environment should not be considered separately, and CPEC is a package of several projects, however, separate EIAs will not serve the purpose as the impact will be multiplied due to various projects and their impact will be multiplied"(Times, 2016).

The environmental laws of the Provincial Government are inconsistent and incoherent. The CPEC projects, for example, proposed SEZs under the CPEC portfolio are plane to develop across provinces, and a harmonized environmental regulatory and legislative structure and SEA are needed (Janjua and Asif, 2017a) to address environmental and CC concerns. In the case of SEA, cumulative impacts are considered, and mitigation is recommended for significant cumulative impacts (Thérivel and González, 2021). One of the core purposes of the 18th Amendment was fiscal decentralization. The Provincial SD Fund (SDF) has been established by the environment protection council of each province under their respective EP acts. The SDF allows each province to establish a funding mechanism for environmental work (Khayam and Ahmad, 2020). But its sources of funding are not guaranteed, and provincial environmental laws do not make a particular and reliable source of revenue for the fund's operations. This makes the

presence of the fund unreliable, as well as completely reliant on ad hoc financing (Pastakia, 2014).

In the same line of devolution Sánchez-Triana et al. (2014) highlighted that while decentralization of environmental responsibilities to provincial government extends numerous opportunities, such as the capability to take actions efficiently to local priorities, there are also considerable tradeoffs and risks. For instance, uneven environmental standards and institutional capacity building could cause additional ecological damage in different parts of the country.

It was expected that after 18th Constitutional Amendment in Pakistan, provincial governments have more fiscal and lawmaking independence. However, in the case of a massive development such as CPEC plan, a state-to-state cooperation agreement has been increased dependence on centralised planning and decision-making. In this regard, Pakistan's Federal Government takes a lead role in CPEC-related negotiations, it has become progressively vital to define provincial government's role in CPEC-induced industrialization and to trickle-down economic benefits (Ali, 2020) to Provinces, and related EG issues. The SEA can help in conflict resolution, for example through equal participation of relevant stakeholders. China is the first country in Asia, to establish formal SEA requirements (Annandale et al., 2021). Pakistan can learn better from China to develop SEA guidelines and implementation. WBG (2019) highlighted that CPEC's ecological footprint might be considered under the 'business as usual scenario, worsening poverty and placing the base of natural capital at risk if essential policy options are not conceived and executed effectively. In this context, Khan (2021d) recognized that there is an urgent need for ecological restoration of the countryside in Pakistan, especially in the ongoing mega projects under the CPEC plan in the country, and due attention is required to environmental constraints in CPEC development.

2.23. Institutional framework of CPEC Plan 2017-2030 and sustainability

The Ministry of Planning, Development & Special Initiatives (MoPD&SI) is the focal Ministry for planning, and executing CPEC plan (2017-2030) whereas its counterpart in China is National Development and Reform Commission (NDRC). Joint Cooperation Committee (JCC) – is a strategic body responsible for the decision-making of the CPEC (Rana, 2020c). The committee is jointly headed by Minister for PD&SI of Pakistan and the Vice Chairperson of NDRC, China. The JCC is the highest bilateral level of the CPEC planning body. It is co-chaired by the Pakistani Minister of PD&SI and Vice Chairman of NDRC on the Chinese side (GoP, 2020a). JCC is the top body to discuss, review and approve all projects in annual meetings. In this context, the 10th JCC meeting on CPEC was conducted on 23rd September 2021 (Authority, 2021b). In this context, on 17th August 2022, Federal Minister for MoPD&SI chaired a consultative meeting to review the preparations for the upcoming 11th JCC meeting on CPEC (Authority, 2022). Recently the 11th JCC meeting has been held on 10th April

2023, at CPEC Secretariat MoPD&SI and the 12th JCC meeting is scheduled to be held in July 2023 at Islamabad (Authority, 2023).

The JCC encompassed government administrative officials, political figures, and experts from diverse fields (Ali, 2021b). The JCC is backed by two national JCC secretariats, the MoPD&SI, Islamabad from Pakistan side and its counterpart the NDRC, Beijing from China. In this context, terms of reference of the CPEC-related secretariat are for the overall coordination of all CPEC planned activities. In order to carry out smooth implementation of CPEC plan 2017-2030, eleven Joint Working Groups (JWGs) are formulated under the JCC for CPEC-related development areas (Figure 2.3). These JWGs consist of professionals from government organizations including senior bureaucrats from Pakistan and the Republic of China to recognize and scrutinize potential development projects before forwarding those to the JCC for approval. Hence JCC is involved in crucial decision-making and is responsible for project design in general, including coordination, and CPEC project final approval whereas the JWGs are responsible to identify project proposals, planning, and execution of projects. In this way, JCC-related JWGs have an important role in the coordination mechanism, to review CPEC-related development policies, plans, and decisions about enclosure and approval of CPEC projects.

Figure 2.3: Institutional Framework of CPEC (Source, CPEC AuthorityMoDP&SI) https://cpec.gov.pk/institutional-framework/5

In context of Pakistan, numerous stakeholders are engaged at various levels of development planning-related activities. In this context, the Planning Commission (PC) Islamabad Pakistan is leading coordinating body for CPEC development in country. It carried out its responsibilities under MoPD&SI and is in charge of overall recognition, prioritizing including an endorsement of projects. The PC of Pakistan in association with China's NDRC determines which schemes and projects are to be enlisted in the CPEC plan (Rafiq, 2018) which indicates a meaningful way to execute CPEC long-

term plan 2017-2030. However, there are also numerous other government bodies tangled in the identification and recommendation of development projects to JWGs or JCC, particularly the Economic Coordination Committee, the Executive Committee of National Economic Council, the Central Development Working Party, and the CPEC Cabinet Committee headed by the Prime Minister, which encompasses of various ministers, secretaries including heads of key ministries involved in CPEC related projects activities (Ali, 2021b).

In addition to the abovementioned decision-making ministries and bodies, there are also several committees involved in evaluation and review process. In this context, e.g Parliamentary Committee on the CPEC encompasses representatives of government including opposition political parties in Parliament and the Special Committee of Senate on CPEC development. In this context, some wonder why the Parliamentary Committee on the CPEC was set up despite the previous existence of a Senate Committee—both committees are to provide oversight and distinctions between them are unclear Rafiq (2017 p. 33).

In January 2016, a Steering Committee headed by the Prime Minister of Pakistan has been established to review progress on the execution of CPEC Plan. The Committee comprised of Chief Ministers of all provinces meets up every three months to review the progress of CPEC projects (News, 2016). Similarly, in December 2020, Speaker National Assembly has approve the establishment of another Steering Committee under the chairmanship of the Federal Minister for Defense. This Steering Committee has a mandate to oversee and resolve issues related to CPEC projects in KP, including speedy implementation and timely completion of the CPEC projects in KP province. Federal Ministers, KP Provincial Minister, Members of the National Assembly, Additional Chief Secretary KP, and all secretaries of the concerned ministries are members of the Steering Committee (Times, 2020). In this context, on October 20th 2021, the 3rd meeting of the Pak-China relationships Steering Committee was held in Chairmanship of Federal Minister for PD&SI to discuss numerous concerns linked to CPEC projects (Authority, 2021a).

Similarly, numerous agencies are in place to cope with the operational linked challenges of CPEC projects. Additionally, each project under CPEC Plan has a coordinating ministry, a responsible agency/supervising agency, and an executing company/agency (see details at https://cpec.gov.pk/#). Still, there is a bit of knowledge information concerning existing functions, selection processes, or actual oversight capabilities (Wolf, 2021) of these agencies. It seems that these agencies provide CPEC-related decision-making and execution processes with a semblance of a 'bottom-up and project-based approach'. Additionally, CPEC is not to be seen as solely dependent on top-down directions from federal government. Moreover, there are 'Apex Committees'—civil-military hybrid institutions legitimately liable for managing security aspects concerning CPEC development. In this context, a special security division for CPEC is a good initiative to deal with the country's security threat Umar et al. (2017) related to CPEC development. It seems that these 'Apex Committees' are far exceeding their initial tasks (Wolf, 2021).

However, some insisted to establish a central CPEC institution with complete authority across all CPEC projects in Pakistan. It is reported that Pakistani institutions, particularly PC dealing with CPEC-related development, are short-staffed and overwhelmed, confronting obstacles to filling vacancies (Rafiq, 2017 p.50, Rafiq, 2018). However, the requirement to develop a new 'CPEC authority' is strongly advocated by government and bureaucrats. In this context, for example, Former defence secretary Lt Gen (retired) Khalid Naeem Lodhi suggested creating a "powerful and competent coordination body for overseeing the project and underscored the need for protecting Pakistan's interests in the project while keeping it safe from external threats" (Tribune, 2017a).

In this context, on 8 August 2019, National Development Council approved, in principle, the constitution of CPEC Authority to ensure fast-track execution of CPEC projects (Abbasi, 2019). Similarly, the key purpose of CPEC Authority formation is to develop a centralized mechanism to smooth progress on speedy-trial roots and build unity and collaboration (Mehdi, 2019) coordination Space (2020) among concerned departments and institutions, and timely completion of CPEC projects (Dawn, 2019a). The President of Pakistan has promulgated an ordinance called the CPEC Authority Ordinance, 2019 (GoP, 2019c) for establishing a CPEC Authority (Dawn, 2019b). In context of management and administration, CPEC Authority is comprised of a Chairperson, an Executive Director Operations, an Executive Director of Research and Six other Members including CPEC Economic Council (GoP, 2020a). The government appointed a Chairman of the CPEC Authority for four years periods.

In the context of CPEC Authority development, opposition political parties have rejected the government's act of establishing CPEC Authority through a presidential ordinance and termed it an "illegal" move in breach of the Parliamentary Committee's recommendations (Wasim, 2019). Additionally, the opposition claimed that the establishment of the CPEC Authority with a presidential ordinance was "backdoor legislation" (Mehdi, 2019). CPEC Authority Ordinance was promulgated by the President of Pakistan in October 2019. However, as Ordinance has expired. Therefore, government prepared a draft CPEC Authority Bill 2020 which has been approved by the Cabinet Committee on the Disposal of the Legislative Cases (Central, 2020) to practically hand over the corridor to the army (Shahid, 2020). In this context, the CPEC Authority Bill 2020 has passed by the Standing Committee of the National Assembly in October 2020 and later passed the National Assembly session on February 1, 2021, without taking the opposition and other stakeholders into confidence (Ahmed, 2021). In this context, more powers transfer from parliamentarians to un-elected officials (Space, 2020). The CPEC Authority Bill 2020 gives the Pakistani army far greater control over CPEC, projects, has caused discomfort in opposition ranks and triggered concerns over possible implications of establishing a "parallel government" (Sun, 2020).

According to CPEC, Act 2020, (GoP, 2020a) the CPEC Authority is responsible for planning, facilitating, coordinating, enforcing, monitoring and evaluating the smooth implementation of all activities related to CPEC, following the MOU between NDRC of China and MoPD&SI of Pakistan, outline of the long term plan of CPEC signed in

Bejing on 8th day of November 2014, as well as decision taken, from time to time, at the meetings of JCC. It is evident that Islamabad reaffirmed its commitment to complete CPEC projects as a national priority (Dawn, 2018). The CPEC is largely perceived as a national, centralized responsibility. However, such massive national nature development needs greater transparency, and an inclusive, credible and equally representative national body – a national commission on CPEC is needed to deal with the concerns of all stakeholders including KP and Baluchistan (Baloch, 2016). Governmental bodies in Pakistan responsible for CPEC planning and execution, especially Economic Coordination Committee gained power "without effective parliamentary oversight or normal bureaucratic mediation, and the decision-making process lacks transparency" (Stiftung, 2020 p. 17).

The coalition government decided to dissolve and discontinue CPEC Authority soon after taking office in April 2022, plan to merge the CPEC Authority with the CPEC secretariat (Jamal, 2022). Additionally, the current government decided in principle to dissolve CPEC Authority terming it 'redundant' and 'obstructive' and decide to return to the previous planning of routing CPEC projects with MoPD&SI and line departments and ministries for implementation country's biggest and most prestigious bilateral economic development project (Subohi, 2022).

Based on government policy documents review and key informant interviews related to CPEC institutional framework. It seems that policy discontinuation, lack of stakeholder consultation, and stakeholder concerns are not considered in institutional and legal framework development for the smooth execution of CPEC projects, which is a great concern related to the sustainability of CPEC plan. For example, the GoP has established a CPEC authority with the presidential ordinance and passed CPEC Act 2020 without considering the opposition political parties' concerns the main stakeholder in the Senate as well as National Assembly.

It is revealed that CPEC's current institutional framework is comprised of various committees, agencies, ministries, and joint working groups engaged in the smooth execution of CPEC. However, in the context of environmentally friendly, climate-resilient development and DRR and the sustainability-related working group is missing in the current CPEC institutional framework. In this context, although the Ministry of PD&SI, planning commission Pakistan revised draft manual 2019 for development projects that provide knowledge and guidelines for managing development projects under the public sector development programme. It includes impact of CC and disaster risk management in project financing. Similarly, the Environment Protection Agency is a member of the central development working party (CDWP). Additionally, the CP performa appraisal and analysis for the preparation of Planning Commission Performa No. 1 (PC-I) for new projects including environmental & social impact assessment, EIA, clean development mechanism assessment, and DRR analysis (MoPD&SI, 2019). In this context, a working group related to 'environment, CC, DM and sustainability need to be established and integrated into CPEC institutional framework to ensure the sustainability of CPEC Plan 2017-2030. The GoP has established policy institutions to facilitate the smooth implementation of the CPEC plan-2017-2030. In this context, the most important institutions are, for example;

*a) Center of Excellence- CPEC (*CPEC -CoE) *in Islamabad ()*

The GoP has established CPEC Center of Excellence in 2017 Authority (2017) with the following main objectives

- "To set up a research-based, independent policy think tank on CPEC, and provide policy-based research guidance to Federal and Provincial Governments and implementers of CPEC Projects"
- "To enable efficient coordinated implementations, with maximum benefits to both economies and society at large (https://cpec-centre.pk/mission-vision-new)".

In this context, six key policy research areas were targeted to achieve sustainable growth and development under CPEC Plan 2017-2030. The research areas under CPEC development include;

i- Urban Development
ii- Socio-Economic Impacts
iii- CPEC Industry and Trade Cooperation
iv- Regional Connection
v- Financing and Financial Sector Integration
vi- Job Growth and Human Resource Development (https://cpec-centre.pk/category/themes/)

In context of the above-mentioned research areas, the CPEC-CoE team had published working papers, policy briefs, CPEC quarterly and insights to achieve CPEC-CoE objectives including CPEC-CoE mandate i.e., promoting the true picture of CPEC, guide implementation of CPEC on policy matters; to become leading policy guiding Centre on CPEC (CPEC-CoE vision), and to contribute in robust policy-related information, knowledge and governance capacities up-gradation (CPEC-CoE Mission). In this context of CC and environmental concerns related to CPEC development, the CoE-CPEC team, for example, Arrfat (2020) discussed the global value chain and CPEC plan, (Ansari et al., 2018) highlighted CPEC transport projects, clean development mechanism and carbon financing; Shah et al. (2018) studied CPEC and sustainable urban development, and (Shah et al., 2018) recommend the need of urban policy intervention to ensure sustainable urban development in Pakistan. Additionally, (Hassan et al., 2018) study found that ecological, and socio-economic dimensions of CPEC partially mediate the link between concerns of sustainable issues and SD in Pakistan. The use of new technology (supercritical technology) in CPEC power plants, for example, Sahiwal coal-fired power plant reduces emissions as compared to conventional subcritical technologies (Asif et al., 2018).

Similarly, Janjua et al. (2018b) discuss technology transfers under CPEC plan from China to Pakistan and the resulting environmental implications and recommend conducting SEA to integrate ecological considerations into policies and plans including socio-economic considerations. Similarly, to ensure climate compatibility and climate resilience under CPEC Plan 2017-2030, key stakeholders consultation in a round table conference recommended to use of supercritical technology to reduce emissions from coal-based energy projects, need to planed and execute renewable energy projects to maximize energy mix of Pakistan and clean energy; to explore green climate finance and clean development mechanisms for CPEC projects, to conduct SEA for a

participatory, analytical and integrated approach for environmental consideration in CPEC projects (Janjua and Asif, 2017a). Similarly, experts discussed the environmental sustainability of SEZs in a round table conference at CoE-CPEC in 2017 and recommended conducting the SEA for the nine SEZs of CPEC plan by involving all key stakeholders (Janjua and Asif, 2017b).

In order to provide research-based input for sustainable CPEC Plan implementation, other Centers of Excellence for CPEC development were established in Pakistani Universities. In this connection for example

b) Centre of Excellence on CPEC- University of Central Punjab

A Center of Excellence on CPEC development has been established as a research-based think tank to facilitate the sustainability of CPEC development through focused research and policy brief development. It published CPEC Quarterly, analyzed CPEC-related areas, and further conducted conferences, seminars and roundtables to provide policy recommendations for CPEC-related decision-making government departments. Additionally, it enhances awareness about investment under CPEC and encourages researchers to contribute in CPEC related publications Source: https://ucp.edu.pk/centre-excellence-cpec/

c) Center for Research on CPEC- Karakoram International University

The Karakoram International University has established the "Center for Research on CPEC" to establish an understanding of its implications and fashion appropriate development policies for policymakers. Center for Research on CPEC is aimed to fill the gap by carrying out baseline studies and thus generating data for the researchers to inspect implications of CPEC. Source: https://www.kiu.edu.pk/cpec/center-for-research-on-cpec

d) *CPEC Project Management Unit - Board of Investment*

The CPEC's apex forum JCC has given the BOI, Pakistan, the task to provide multi-sector facilitation, coordination, implementation, monitoring and evaluation of CPEC-related industrial cooperation from Pakistan's side. In this context, An memorandum of understanding between Pakistan and China was signed on industrial cooperation on 20th Dec 2018. For this purpose, CPEC Project Management Unit has been established in BOI to facilitate CPEC Industrial Cooperation. Additionally, it provides policy and governance advice to Governments for the establishment and relocation of industries besides attracting FDI in various potential sectors & SEZs of Pakistan. **Source**: https://invest.gov.pk/project-management-unit?language_id=en.

2.24. SWOT analysis of CPEC Plan

In this chapter, a blend of approaches such as the BWM - mV Model, and SWOT analysis is adopted. Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is generally applied as an instrument to examine the strengths and weaknesses (internal factors) along with opportunities and threats (external factors) of the marketplace environment (Görener et al., 2012). SWOT analysis offers the fundamental framework to execute the analysis and evaluation of decision situations. In this study,

SWOT analysis with Multi-criteria Decision Analysis technique called BWM - mV Model (Wang et al., 2021) is applied to establish the importance ranking for SWOT factors/ criteria related to CPEC sustainability. The detailed method is described in Chapter 3, Section 3.3.3.

Literature reveals that some studies discussed the strengths, weaknesses, opportunities, and potential threats (SWOT) associated with CPEC development. For example, Ullah et al. (2021b), examined the SWOT related to coastal and marine areas management (Ul-Haq et al., 2020) highlighted challenges and barriers to electric transportation, (Naz et al., 2019) studies Saudi Arabia-CPEC feasibility. Similarly, (Hussain et al., 2017, Khundi, 2017) discussed the strategic examination of CPEC, Tadesse et al. (2020) analyze the effects of CPEC on the Pakistan education system, (Mikheev et al., 2021) studied Maritime trade SWOT. Furthermore, Solangi et al. (2019) evaluate energy strategies for sustainable energy planning, Kamran et al. (2020) discussed the renewable energy sector and sustainable energy evaluation and CPEC, Gwadar port development Gul et al. (2020) and (Niyangoda et al., 2021) studied CPEC geo-political and geo-economics regional and global dynamics.

However, these studies lack to give weight and rank SWOT factors related to CPEC development, to determine SWOT best and worst factors analysis to establish policy implications for the sustainability of the CPEC development plan. Additionally, a qualitative approach followed by an in-depth literature review, and semi-structured and key informant interviews were conducted to determine and established improved strategy policy implications to promote green and climate resilient and sustainable CPEC development.

Chapter-3

3. RESEARCH METHODOLOGY

The various phases of the research methodology are split into two main stages as indicated in Figure 3.1. Stage-I is about an in-depth literature review to establish the problem statement, research aim, research objectives & research questions, research purpose, potential research outcomes, and scope of the study as depicted in Chapter 1. Stage II depicts methods and approaches applied to explore research questions to achieve research objectives. The explanation for stage -II is demonstrated in the subsequent sub-section.

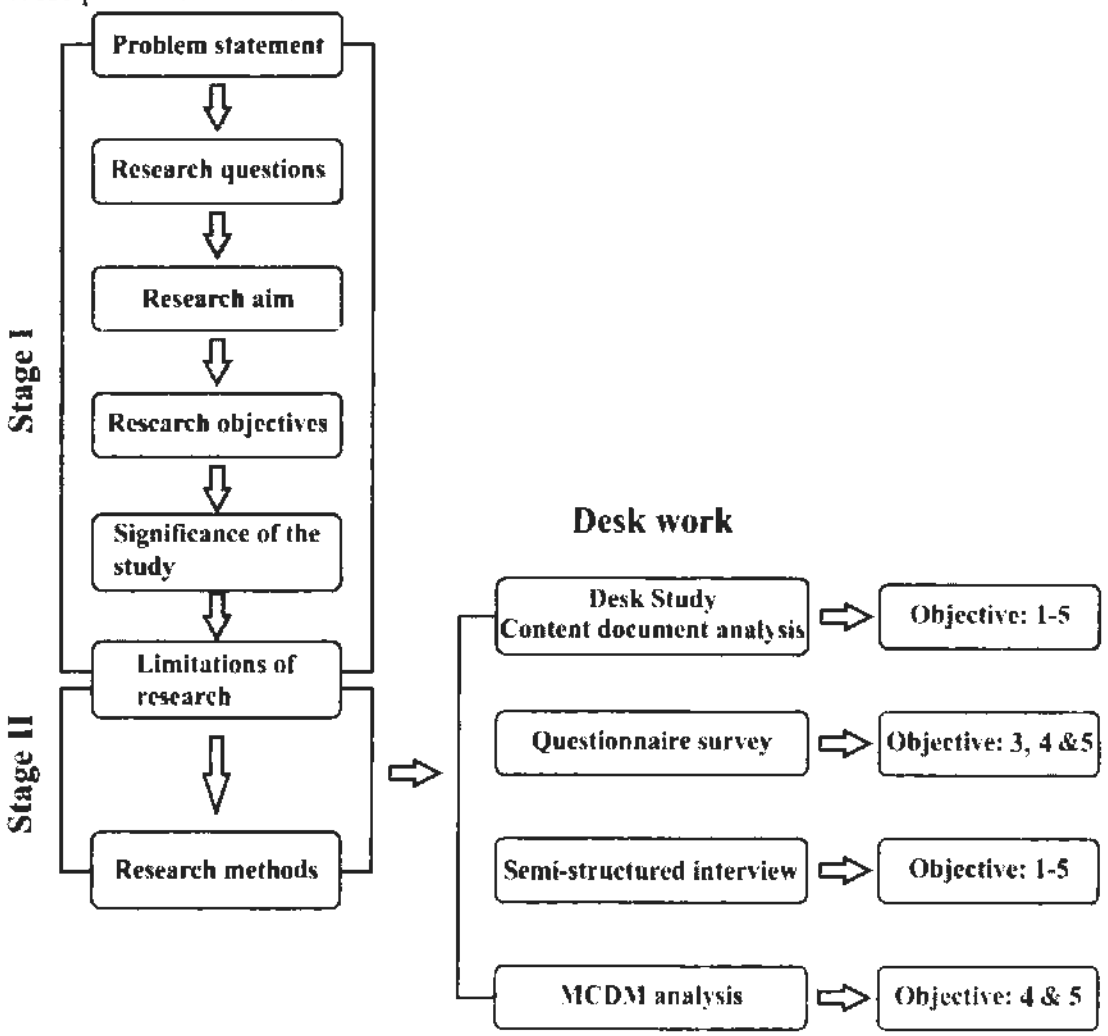


Figure 3.1: Flow diagram for research methodology

3.1. Research method and approaches

This research is exploratory in nature with a theoretical basis. Various research activities were carried out to explore research questions to meet the aim and objectives of the study.

3.1.1. Step I: Desk work

In-depth desk work (literature review) was carried out throughout the research to acquire wide-ranging knowledge to:

i- State and define the research problem, research objectives, and research questions to frame the thesis topic, by emphasizing CC and environmental concerns of the CPEC plan and the need to conduct SEA to deal with such problems.

ii- Investigate CC PC among sectoral policy documents (i.e., water, agriculture, and energy policies), CC policy instruments, development strategies, and DM plan **(Research Objective-1)** PC analysis across CPEC development areas and EG policy instruments **(Research Objective -2)** and CPEC plan 2017-2030.

iii- Explore EA, CC, and DM policy instruments of Pakistan in general and particularly EPI in DM and sustainability of the CPEC plan **(Research Objective -3)**.

iv- Explore current EG system of Pakistan and CPEC sustainability **(Research Objective-4)**, and key Strengthens, Weaknesses, Opportunities, and potential Threats related to CPEC development and sustainability; implications for CPEC Plan 2017-2030 **(Research Objective - 5).**

The desk work focuses on concepts (i.e., CPEC development-environmental and climate concerns and need for SEA) by reviewing recent practices, knowledge evidence assembled from publications of international journals, EA reports, and international procedures and strategies, guidelines, books, internet websites, legal documents, and doctoral thesis. In addition, some essential national documents reviewed include guidelines and legislation on EIA procedures including country SEA initiatives under the National Impact Assessment Programme (Ayaz and Ansari, 2013, NIAP/IUCN, 2013, Fischer; et al., 2014, GOP/IUCN, 2014b, GOP/IUCN, 2014a, Annandale and Ltd., 2014). Similarly, National and Provincial Water, Agriculture, Energy, Tourism, and industrial development Policies, CC Policies, National Environmental policies, Provincial and National SD Strategies, DM Plans, National and Provincial Disaster Management act, EP act of Federal and Provincial government, National Disaster Risk Reduction Policy (NDRRP) 2013, and NCCP implementation framework were reviewed.

Data sources

Three sources of data were used: a) Government documents, for example, relevant environmental legislation, CC, and environmental policy instruments, sectoral development policies related to CPEC development areas including donor-driven SEA pilot studies, b) key informant interviews and c) questionnaire-based feedback from key experts/stakebolders.

3.1.2. Step II: Content document analysis approach

A qualitative content document analysis (Altheide et al., 2008, Steve, 2001) with associated scoring criteria is used to assess government documents to establish the extent to which the Country's national and provincial water, agriculture, and energy sector policies, development plans, and strategies are aligned in a CC policy coherent manner **(Chapter-4 Research Objective-1)** see Table 3.2. Additionally, policy coordination coherence and CPEC sustainability were analysed and assessed through an integrated EG Evaluation Criterion Framework of Morales-Giner et al. (2021) see Table 3.6 **(Chapter-4; Research Objective 2)**. Policy documents for research objective 2 related to CPEC plan cooperative areas policies instruments related to transport sector development, energy, agriculture sector, trade industry, tourism development, and financial cooperation are shown in Table 3.4 & Table 3.5. Similarly, **(Chapter-5 Research Objective -3)** related to EPI in the country's policy instruments related to DM (e.g. national DRR policy, national DM plan, provincial DRR plans, and DM acts), and DRR integration in EP-related policy documents (e.g. NEP, National and Provincial government CC Policies, and Environmental Protection Acts) (see Table 3.3) were analyzed and evaluated through an established framework of Cheung et al. (2010) and Tajima et al. (2014) approach (see Figure 3.2).

Table 3.1: Policy documents reviewed/content analysis approach (Research Objective-1)

Sectoral Policies/ Strategies/ Plans	Documents of Federal, Punjab, GB and KP governments			
	Federal	Punjab	Gilgit-Baltistan	KP
Water	National WP (GoP, 2018d)	Punjab WP (GoPB, 2018e)	National WP (GoP, 2018d)	WP 2015 (GoKP, 2015d)
Agriculture	National Food Security Policy (GoP, 2018b)	Punjab AP (GoPB, 2018b)	Provincial AP (Draft) (GoGB, 2018)	AP (GoKP, 2013)
Energy	ıal PP (GoP, 2013d)	Punjab PP (GoPB, 2009)	PP (GoP, 2015b)	Hydro PP 2016 (GoKP, 2016a)
Climate	National CCP (GoP, 2012d)	Punjab CCP (Draft) (GoPB, 2017b)	CC Strategy and Action Plan (GoGB, 2017c)	CCP (Draft) (GoKP, 2016b)
Development Plans and Programmes	AD Plan 2019-20 (GoP, 2019b)	AD Programme 2018-19 (GoPB, 2018a)	AD Plan 2017-18 (GoGB, 2017a)	AD Programme 2018-19 (GoKP, 2018a)

Development Strategy	National Sustainable DS (GoP, 2017b)	Punjab Growth Strategy (GoPB, 2019)	Strategy for SD (GoP and IUCN, 2003)	Sustainable DS (GoKP, 2019a)
Disaster Management	National DM Plan 2012-22 (GoP, 2012e)	DRM Plan 2008 (GoPB, 2008)	DRM Plan Northern Area 2008 (GoGB, 2008)	Monsoon Contingency Plan 2019 (GoKP, 2019b)
Key Words: - Water Policy (WP), Agriculture Policy (AP), Power Policy (PP), Development Strategy (DS), Climate Change Policy (CCP), Development Plan (DP), Disaster Management (DM) Plan, Disaster Risk Management (DRM), Annual Development (AD)				

3.1.2.1. Methods / approaches for research objectives -1

Qualitative document analysis Altheide et al. (2008) and content analysis by Steve (2001) are the basis for the empirical research into PC underlying the research objective-1. A scoring system based on the work of Le Gouais and Wach (2013) was used for establishing sector rankings, followed by a validation based on semi-structured interviews with experts and practitioners.

The purpose of this analysis are:

i) to establish the extent to which CC adaptation and mitigation are mainstreamed into water, agriculture, and energy sector policies, development strategies and plans, and in disaster risk management plans in Pakistan;
ii) to analyse coherence in these policies, strategies, and plans with regards to CC adaptation and mitigation; and
iii) to critically review the CPEC development plan in the light of the above.

Stages of the analysis approach include; i) establishment of criteria of document selection; ii) identification of relevant documents; iii) document analysis; iv) validation, and lastly; v) finalization (Altheide et al., 2008). At stage i), official government documents were considered from relevant ministries and departments of the Federal and provincial governments of Punjab (PB), Sindh (SD), KP, Baluchistan (BA), GB region and the territory of Azad Jammu and Kashmir (AJ&K). Whilst the Federal and provincial governments of PB, KP and GB had complete sets of policy documents across the water, agriculture, energy, and CC policies, strategies, development plans and programmes (Table 3.1), in SD, BA and AJK only a few such documents exist. Therefore, these were not considered.

The subsequent focus is on water, agriculture and energy policies, strategies and plans, DM plans as well as cross-sectoral linkages for mainstreaming CC. For the collection of relevant policy documents, websites of federal ministries and provincial departments (stage ii) were used. In case policy documents were not placed on websites, officials were asked (by phone and/or email) to provide them. Documents were then

systematically analyzed (stage iii) with regards to whether CC adaptation and mitigation were mentioned; how they were being addressed, i.e. whether they were mentioned as generic statements or in policy objectives, and/or with detailed plans, activities, implementation frameworks; and whether statements of CC adaptation and mitigation were consistent with other policy documents. A four-step content analysis approach was used for document analysis (Steve, 2001). The PC assessment criteria are depicted in Table 3.2.

Table 3.2: Policy coherence assessment scoring criteria (Research Objective -1)

Coherence Category	**Coherence narrative**	**Score**	**Symbol**
High Coherence	The policy document aligns across water, agriculture, energy sectors, and statements for CC. Policy documents offer attention to water-agriculture-energy inter sector-alignment to adapt to and mitigate CC, activities, strategies, plans and implementation framework.	3	✓✓
Partial Coherence	Though water-agriculture-energy inter-sector alignment are considered in policy documents to adapt and mitigate CC, mechanisms to achieve it are not well defined. A few activities strategies, & implementation framework are incorporated but fail to incorporate comprehensive activities strategies, & implementation framework.	2	✓
Limited Coherence	The policy document in general statements (i.e., no specific approaches or plans) supports water-agriculture-energy inter -sector alignment to adapt and mitigate CC. But no details are presented for activities, plans and implementation frameworks.	1	⇔
No Coherence	No evidence found that sectoral policy statements are harmonized and/or aligned.	0	✗

Selected policies, as well as development plans and programmes, were assessed with regard to the presence of five key subjects: a) water b) agriculture, c) energy, d) water-agriculture-energy inter-sectoral alignment to adapt to and mitigate CC, and e) CC adaptation and mitigation (see Table 4.1 Chapter 4). When CC adaptation and mitigation were included were taken note of and the context in which they were found was described. Words used in the analysis of each selected policy document include:

- flood and drought management,

- disaster risk reduction,
- disaster management,
- water security,
- food and agriculture security,
- environmental protection,
- energy security,
- CC adaptation and mitigation,
- policy coherence/coordination,
- integrated planning/management.

Analysis was conducted for documents from each of the selected provinces and territories, making cross-comparisons of sectors, development plans, strategies, and policies possible. Policy development dates were recorded. Furthermore, information obtained was used to guide expert interviews. Allocated scores range from 3 (full coherence) to 0 (no coherence). By calculating the average of two values (mean of means), we assessed the coherence of policies relative to one another within each province/territory (Chapter 4 Table 4.2). For example, the coherence of the Federal's Water Policy (2018) in relation to its CC Policy (2012) is 2.3 (with an average coherence being 2 for the Federal's Water Policy and 2.6 for its CC Policy). This average value meant there was a partial PC score. Validation and finalization involved semi-structured interviews with experts that work across the various sectors. For this purpose, the assessment results of Chapter 4 (see Tables 4.1 and 4.2) were discussed with experts. To ensure confidentiality, no information is provided on the role of or relationship with interviewees. Interview records were coded according to sectoral themes and policy priority areas. Finally, the CPEC development plan was assessed in light of the results on PC in other decision processes of Pakistan, based on the criteria shown in Table 3.2.

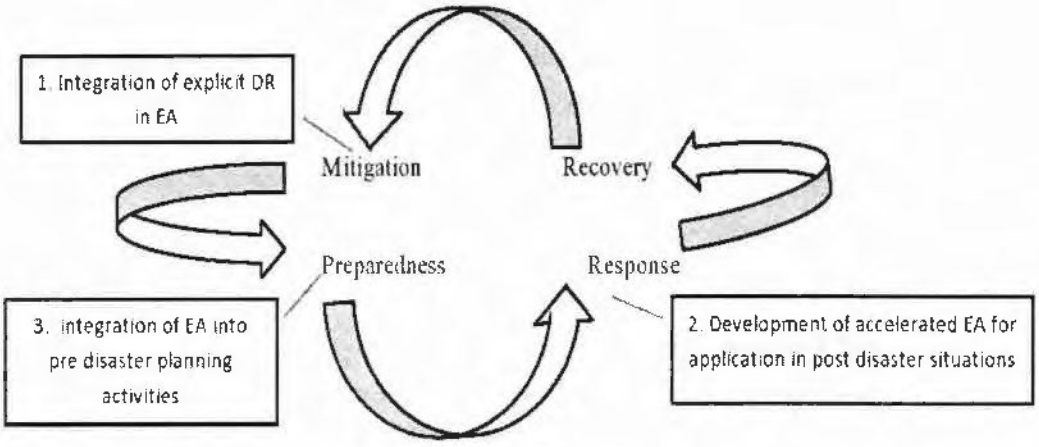


Figure 3.2: EA mapped into DM cycle (Tajima et al., 2014)

Table 3.3: EPI and DM - Content Document Analysis (Research Objective -3)

A: - EPI across country DM policy documents	
DM documents	**Evaluation Themes**
National DRR Framework 2007-12 (GoP, 2007)	EPI in mitigation phase EPI in the pre-disaster phase (Preparedness) EPI in post-disaster phase (Response) ▪ Environmental Consideration in a generic statement
Provincial DRM Plans (GoPB, 2008, GoGB, 2008, GoAJK, 2017b, GoBA, 2008, GoSD, 2008)	
DRR Plan. Northern Areas (GoGB, 2008)	
DM Plan. Azad Jammu and Kashmir (GoAJK, 2008a)	
National DM Plan 2012-2022 (GoP, 2012f)	
National Human Resource Development Plan (GoP, 2012c)	
Multi-hazard Early Warning System Plan 2012-22(GoP, 2012a)	
National DM Plan Guidelines on community-based DM 2012-2022 (GoP, 2012e)	
National CC Policy 2012 (GoP, 2012d)	
National Climate Change Policy 2021(GoP, 2021c)	
National DM Act (GoP, 2010a) Azad Jammu & Kashmir DM Act, 2008 (GoAJK, 2008b).	
B. Environmental Policy Instruments	**Evaluation themes**
Pakistan EP Act 1997 (GoP, 1997a)	▪ EA Integration ▪ Disaster Consideration
Punjab EP (Amendment) Act,2012 (GOPB, 2012)	
KP EP Act, 2014 (GOKP, 2014b)	
Sindh EP Act, 2014 (GOSD, 2014a)	
Baluchistan EP Act, (GoBA, 2012)	
Gilgit – Baltistan EP Act, 2014 (GoGB, 2014)	
Azad Jammu and Kashmir (AJ&K) EP Act, 2000 (GOAJK, 2000)	
Pakistan CC Act 2017 (GoP, 2017c)	
Policy and Procedure for the EIAs (GoP, 1997b)	
National SD Strategy 2017 (GoP, 2017b)	

3.1.2.2. Methods / approaches for research objective-2

A mixed-methods model approach was used with data collection through an in-depth literature review, content document analysis (CDA) of government policies, and legislative instruments linking to country environmental & CC governance i.e., CC adaptation and mitigation, EP; and sectoral development policies related to the long term the CPEC plan 2017-2030. CDA was used to analyze the selected key sectoral policy documents and legislative instruments (see Table 3.4 & 3.5) to understand the contextual use of policy coordination and coherence (Hsiu-Fang and Shannon, 2005). Additionally, thematic analysis was used (Terry et al., 2017) to describe & evaluate data gathered from CDA. CDA depicts a family of approaches for analysis of the text to identify themes, objectives, and patterns (Creswell and Creswell, 2017, Hall and Steiner, 2020). To achieve research objective -2, both the conventional content analysis (CA) approach and summative CA were carried out. Conventional CA is an inductive approach that concentrates on text data analysis, whilst summative CA includes evaluations of keywords or content, followed by the explanation of core context (Hsiu-Fang and Shannon, 2005). Sketch from (Hall and Steiner, 2020) approach for CA this analysis encompasses the following four steps with the purpose to identify policy developments, describing policy implications innovations and recommendations for addressing environmental and CC concerns while implementing the CPEC plan.

a) Searching and gathering Federal and Provincial policies and legislative documents related to CC, EP, and CPEC development plan related sectoral documents from the internet, government websites
b) Establishment, identification, and search of keywords (i.e. EG evaluation criteria factors) and CPEC key cooperative areas in policy targets (e.g policy planning cycle i.e policy measures, objectives, goal, implementation, monitoring, and evaluation section) via qualitative content analysis reading of texts
c) Describing policy attributes and policy development trends using keywords governance criteria factors themes.
d) Evaluating the keywords spectrum i.e key EG policy coordination criteria themes by qualitative approach, comparison and discussion with existing literature e.g technical reports, research articles, media outlets, government official statements, newspaper articles, policy papers and expert opinions recommendations. The systematic reading content analysis approach (Hsiu-Fang and Shannon, 2005) provides an alternative viewpoint to concurrently reflect upon the validity of findings and assess policy innovation measures relevant to the experts' recommendations.

Policies instruments and legislative documents related to CC, EP, and sectoral policies related to CPEC development areas were collected and identified through searching on relevant government departments and ministries' websites. For this purpose, an internet search was conducted to collect documents, for example, the environmental and CC government policies documents, strategies, bills, and acts were collected from the Federal Ministry of CC, Pakistan EP Agency, Provincial EP Agencies, and DM Authority websites (see Table 3.4). Similarly, CPEC Key development areas policy documents such as Energy, Agriculture, Transport, Trade and Industries, Tourism development, Information network infrastructure development related policies,

Financial Cooperation, and National Security Policy documents were searched, retrieved, and sorted from relevant Departments and Ministries websites (see Table 3.5). Those do not present on the website were collected from personnel via email, WhatsApp, and personal visits to relevant Departments/Ministries.

Numerous steps were followed for the content analysis of policies and legislative instruments. Initially, a list of keywords i.e., EG evaluation criteria factors and CPEC key cooperative areas were recognized and established to allow standardized analysis. For this purpose, an integrated EG Framework (see Table 3.6) by Morales-Giner et al. (2021) was used to establish keywords related to EG policy coordination, and CPEC's key development areas were selected from CPEC 2017-30 plan. The main keywords related to EG criteria were used to analyze policy coordination among selected environmental policy instruments and country-sectoral policy instruments related to CPEC development.

- Direction /mandate,
- Capacity,
- Access to information/Knowledge,
- Coordination,
- Accountability/Legitimacy,
- Inclusion,
- Participation,
- Justice/ Rights,
- Innovation/ Adaptation,
- Multi-level,
- Transparency.

In addition to this, the following CPEC development areas and related CC and EP policy measures were explored across selected policy instruments that include;

- Transport infrastructure,
- Technology Transfer /Development,
- Energy Sector,
- Trade Industrial development,
- Agricultural Development,
- Tourism Sector Development,
- Financial Cooperation,
- CPEC Plan Integration

Policy instruments related to the construction and development of Gwadar city and port; Gwadar development, cross-border optical fibre cables; submarine cable landing station; poverty alleviation; People's Livelihood cooperation areas and non-governmental exchanges; industrial policies of Sindh, Baluchistan, and GB were not found; therefore, these were not considered.

The analysis started with explorations (search) and occurrences of the known keywords, examining the context of the searched keywords in each selected document. The policy documents where the keywords are mentioned were thoroughly read and analyzed the text to verify the context in which the word is used.

A multi-criteria EG evaluation framework by Morales-Giner et al. (2021) is used to analyze policy coordination among environmental policy instruments and country sectoral policy documents related to the CPEC development cooperative area. In the framework, criterion descriptions were modified according to the study objective. For example, this framework mainly emphasizes EG and stakeholders' roles. However, in this study, the integrated EG criteria of Morales-Giner et al. (2021) were used to examine how those good EG evaluation criteria (keywords) were considered in policy level planning i.e. to assess integrated EG criteria consideration in Pakistan's environmental policy instruments, CPEC plan related development policies for integrated planning.

As a first step, key EG criterion framework factors (keywords) of (Morales-Giner et al., 2021) were established and defined (see Table 3.6 & 3.7) to analyze Pakistan's environmental and CC policy instruments, and CPEC-related development policies (see Table 3.4 & 3.5) to establish policy implications.

In the second step, policy instruments related to the Environmental and CC Governance of Pakistan, and CPEC development areas policy documents against the governance criteria factors (keywords) were depicted. These policy documents were analyzed to develop an understanding of; a) whether and how these policy documents consider EG criteria (keywords); b) whether and to what extent these EG-related government documents consider environmental and CC-related policy measures for key cooperative areas of the CPEC plan (see Chapter 4 Table 4.3) and; c) to what extent CPEC plan and government policy documents related to CPEC plan's key cooperative areas considered EG evaluation criteria and policy measures to address environmental, CC concerns (see Chapter 4 Table 4.4) and CPEC plan consideration. The basic definitions of the criteria keywords Morales-Giner et al. (2021) used to assess and evaluate policy EG coordination are depicted in Table 3.7.

3.1.2.3. Methods /approaches for research objective-3

A qualitative research design as put forward by (Cheung et al., 2010, Tajima et al., 2014) was used and adopted, comprising four main steps; a) collection of relevant documents; b) analysis and evaluation of national DRR policy and NEP, and disaster-environmental linkages; c) evaluation of EPI in-country DM policies, plans and the legislative framework; and d) assessment of DRR integration in the country's environmental policies, plans and legal instruments. An internet search was initially conducted to obtain country-relevant policies, plans and legal instruments on DM and EA. The relevant documents are summarized and evaluated for EPI and DRR/DM integration in Table 3.3. Furthermore, national DRR policy 2013 and NEP 2005 were analyzed by using Cheung et al. (2010) criteria framework. Ellahi and Zaka (2015) used this criteria framework to analyze higher education policy frameworks while Mumtaz (2018) evaluated the NCCP 2012 of Pakistan. In a third step, EPI in-country DM documents and DRR integration in environmental policy documents were analyzed based on Tajima et al. (2014) approach (see Figure- 3.2). Finally, stakeholder/expert views were established by sending out a questionnaire via email, WhatsApp, and

LinkedIn messages to relevant stakeholders/experts (practitioners, academics and policymakers) to establish their views on; a) EPI in DM; b) development-disaster-environmental linkage; c) current country DM, EA system and CPEC development, and also d) to identify and prioritize critical factors that might reduce EPI in the country's DM system. The questionnaire was developed using a majority of closed-ended questions (Rea and Parker, 2014) with some open-ended questions being added to allow the respondents to express their opinions freely (Ghiglione and Matalon, 1993). For the closed-ended questions, nominal or ordinal response scales were used with a predominance of a five-response option including "Yes/ No" options (Giles, 2002); see Chapter 5 Table 5.3). The anonymity of respondents and confidentiality of the responses was assured. The data retrieved from questionnaires were analyzed in a descriptive statistics manner (see Chapter 5 Tables 5.3, 5.4 and 5.5).

Table 3.4: Pakistan environmental and CC policy and legal instruments (Research Objective -2)

Government Environmental and CC Policy Instruments	
▪ National Environmental Policy 2005 (GoP, 2005b) ▪ Punjab Environmental Policy 2015 (GoPB, 2015) ▪ National CC Policy 2012 (GoP, 2012d) ▪ National CC Policy 2021 (GoP, 2021c) ▪ KP CC Policy 2016 draft (GoKP, 2016b) ▪ Punjab CC Policy 2017 (GoPB, 2017b) ▪ Sindh CC Policy draft 2017(GoSD, 2017) ▪ AJ& K CC Policy 2017 (GoAJK, 2017a) ▪ National Forest Policy 2015 (GoP, 2015a) ▪ National Wildlife Policy 2021 (GoP, 2021a) ▪ GB CC Strategy and Action Plan - 2017(GoGB, 2017c) ▪ National CC Policy Implemented Framework 2014-2030 (GoP, 2013a) ▪ National SDGs Framework for Pakistan 2018 (GoP, 2018e) ▪ National SD Strategy 2017 (GoP, 2017b) ▪ National Operational Strategy 2006; Clean Development Mechanism (CDM) (GoP, 2006)	▪ Pakistan 2025 One Nation- One Vision (GoP, 2014) ▪ Pakistan: Updated NDC 2021(GoP, 2021f) ▪ Pakistan EP Act 1997(GoP, 1997a) ▪ Punjab EP Act, 1997 (Amended 2012) (GoPB, 2017c) ▪ KP EP Act, 2014 (GOKP, 2014b) ▪ Sindh EP Act 2014 (GOSD, 2014a) ▪ Balochistan EP Act, 2012(GoBA, 2012) ▪ Gilgit- Baltistan EP Act 2014 (GoGB, 2014) ▪ Azad Jammu & Kashmir EP Act 2000 (GOAJK, 2000) ▪ Pakistan CC Act 2017 (GoP, 2017c) ▪ GBForest Act, 2019 (GoGB, 2019) ▪ National DM Act 2010 (GoP, 2010a) ▪ National DM KP (Amendment) Act, 2012(GoKP, 2012) ▪ GB DM Act,2017 (GoGB, 2017d) ▪ KP Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015 (GoKP, 2015b) ▪ CPEC Authority Act, 2020 (GoP, 2020a)

Table 3.5: CPEC's plan key cooperative areas, and related government policy instruments (Research Objective -2)

CPEC plan (2017-30) key development areas and relevant government policy document	
1. Construction of an integrated transport system	National Transport Policy 2018 (GoP, 2018f)
	National Electric Vehicle Policy 2019 Final (GoP, 2019e)
	Electric Vehicles Policy 2020-2025 draft (GoP, 2020d)
	Railways Act 1980 (GoP, 1980)
	National Maritime Policy of Pakistan 2002 (GoP, 2002)
2. **Information network infrastructure**	Pakistan IT Policy & Action Plan 2000 (GoP, 2000)
	Telecommunications Policy 2015 (GoP, 2015d)
	Digital Pakistan Policy 2018 (GoP, 2018a)
	Balochistan Digital Policy 2021(GoBA, 2021)
3. Energy field	National Power Policy 2013 (GoP, 2013d)
	National Power Generation Policy 2015 (GoP, 2015b)
	Alternative & Renewable Energy Policy 2019 (ARE Policy 2019) (GoP, 2019a)
	National Electricity Policy 2021 (GoP, 2021d)
4. Trade and industrial development	National Automotive Development Policy (ADP) 2016-21 (GoP, 2016a)
	Punjab Industrial Policy 2018 (GoPB, 2018d)
	KP Industrial Policy (draft) 2020-2030 (GoKP, 2020)
	Strategic Trade Policy Framework 2020-25 (GoP, 2020c)
	Trade-Related Investment Policy Framework draft (2015-23) (GoP, 2015e)
	Investment Policy 2013 (GoP, 2013b)
	National Tariff Policy 2019-24 (GoP, 2019f)
	E-Commerce Policy of Pakistan 2019 (GoP, 2019d)
	SEZs Act, 2012 (Amended up to 31st December 2015) (GoP, 2016c)
5. Agriculture sector development	National Food Security Policy 2018 (GoP, 2018b)
	KP Agriculture Policy (2015-25)(GoKP, 2015a)
	Sindh Agriculture Policy (2018-2030) (GoSD, 2018)
	Punjab Agriculture Policy 2018 (GoPB, 2018b)
	Agriculture Sector Policy Gilgit Baltistan 2018 (GoGB, 2018)
	National Water Policy 2018 (GoP, 2018d)
	Punjab Water Policy 2018 (GoPB, 2018e)
6. Tourism sector	National Tourism Policy 1990 (GoP, 1990)

	Punjab Tourism Policy 2017 Draft (GoPB, 2017d)
	Sindh Tourism Policy 2014 draft (GoSD, 2014b)
	KP Tourism Policy 2013 (Pakistan, 2013)
	KP Tourism Policy 2015 (GoKP, 2015c)
	Gilgit-Baltustan Tourism Policy 2017 (GoGB, 2017e)
	Azad Jammu and Kashmir Tourism Policy 2018 (GoAJK, 2018)
7. **Financial cooperation**	Pakistan Economic Survey 2020-21 (GoP, 2020b)
8. Security	National Internal Security Policy 2018-2023(GoP, 2018c)
	National Security Policy of Pakistan 2022 -26 (GoP, 2022b)

Table 3.6: Integrated framework of EG evaluation criteria

Themes	Environmental Governance Criteria					Integrated Governance Criteria for EG analysis (Morales-Giner et al.,
Effectiveness	1.1. Direction	1.1. Clear Institutional mandates				1. Direction /mandate
	1.3. Capacity	1.6. Efficient	1.3. Capacity			2. Capacity
	1.4. Informed	3.1. Learning	1.4. Monitoring Information	2.1 Access to information		3. Access to info. /Knowledge
Robustness	1.2. Coordination	4.2. Connected	4.3. Nested	4.4. Polycentric	1.2 Coordination	4. Coordination
	1.5. Accountable	4.1. Legitimate	4. Accountability			5. Accountability/Legitimacy
Equity	2.1. Recognition	2. Inclusion	3.1 Rights to freedom (e.g expression)			6. Inclusion
	2.2. Participation	1. Participation	2.2 participation			7. Participation
	2.3. Fair	2.4 Just	3.2 Rights of environmental defenders	4.1 dispute resolution	4.2Effective judicial remedies & enforcement	8. Justice/ Rights
Responsiveness	3.2. Anticipatory	3.3. Adaptive	3.4. Innovative			9. Innovation/ Adaptation
	3.5. Flexible					10. Multi-level
	3. Transparency	1.5. Transparency & Accountability				11. Transparency
	Bennett and Satterfield (2018)		Waddington et al., 2019		Vizeu Pinheiro et al. (2020)	

The EG evaluation and analysis framework of Bennett and Satterfield (2018) and the multi-criterion EG evaluation framework by Morales-Giner et al. (2021) is adopted to explore research objective 4&5. The integrated criteria framework of Morales-Giner et al. (2021) is a comprehensive EG evaluation framework, that listed nearly twenty EG evaluation criteria recognized in the EG analysis and evaluation framework of Bennett and Satterfield (2018), four governance criteria framework of Waddington et al. (2019), and ten EG criterion indicators recognized of Vizeu Pinheiro et al. (2020) framework. The integrated EG criteria of Morales-Giner et al. (2021) make complementary contributions it permits the application of a common list of criteria to multiple cases for policy coordination analysis. Table 3.7 provides basic definitions of the criterion keywords used to explore research objectives -3 & 4 and related research questions.

Table 3.7: Environmental Governance evaluation criteria

Integrated governance criteria	**Description**
1. Direction/mandate	Stakeholders have clear goals for good EG. The scope, goals, and aims are comprehensive, clearly articulated, and clear boundaries on action and scope exist.
2. Capacity	The stakeholders can contribute effectively to governance. Cleared policy measures and mechanisms are in place for the capacity building of stakeholders.
3. Access to information/knowledge	Stakeholders have or can gain access to information and knowledge. The policy recognizes measures and mechanisms to access knowledge and information
4. Coordination	The stakeholders can communicate and collaborate in the governance process. The roles, functions, and mandates of different governments, agencies, and organizations are coordinated. A coordinating body or unit is present to resolve trade-offs and conflicts.
5.Accountability/legitimacy	Stakeholders may face consequences for contravenes or failing to comply with policy provisions Procedures are present for accountability for the performance of the system. Mechanisms are in place to ensure that means and rationales for making decisions are transparent.
6. Inclusion	Marginalized stakeholders (e.g farmers, women, and local communities) can participate. Policies and processes ensured acknowledgement of, respect for and incorporation of diverse perspectives, values, cultures and rights and views of marginalized and vulnerable groups are considered.
7. Participation	Stakeholders can provide input that is incorporated into decisions
8. Justice/ Rights	The rights of stakeholders are respected, and violations are prosecuted
9. Innovation/ adaptation	The governance process may be revised over time
10. multi-level	Stakeholders operating on different scales can participate.
11. Transparency	Clear policy measures, processes and mechanisms are articulated for transparent policy implementation, monitoring and evaluation.

3.1.3. Step III: Questionnaire survey

Questionnaires can provide high-quality usable data which increases the validity of the research (Williams, 2003). In addition to content document analysis, three detailed questionnaires were developed, to survey experts and stakeholders for the following purposes.

- To establish views of relevant stakeholders/experts (i.e., practitioners, academics, and policymakers) about; a) EPI in DM; b) development-disaster-environmental linkage; c) DM and EA system of Pakistan, and CPEC development, and d) Environmental and CC concerns of CPEC plan **(Research Objective-3)**.
- To assess and evaluate the expert/stakeholder knowledge awareness and understanding of development-environmental degradation- and disaster linkage; to establish opinions about the importance of EPI in DM, EA, and disaster risk consideration; to evaluate the sustainability of the CPEC plan in the current DM system and EA setup of Pakistan; and, to explore critical factors that might reduce EPI in the country's DM system **(Research Objective-3).** In this context, experts were asked to evaluate each criterion factor of EPI in DM on a 5-point Likert Scale. Where 1-5 denotes 1 "not at all," 2 "a little bit," 3 "to a moderate extent," 4 "to a considerable extent," and 5 "to a large extent," respectively. See **questionnaire survey -I Annexure A.**
- To explore stakeholder's perceptions about Pakistan's current EG, and CPEC sustainability; to evaluate EG themes criterion factors by the Multi-Criteria Decision Making Analysis Best West Method; to validate whether identified EG themes and criterion factors are important and representative for environmental sustainability of CPEC plan in specific, and SD in general **(Research Objective-4).** See **questionnaire survey -II Annexure B.**
- To evaluate criterion factors related to Strengths, Weaknesses, Opportunities, and Threats to the sustainability of CPEC development, and to establish an improved strategy policy implications through a combination of SWOT Analysis and Multi-Criteria Decision Making Analysis Best Worst Method **(Research Objective-5)** see **questionnaire survey -III Annexure C.** A Likert-Type scale of 1–9 was adopted for the questionnaire used for research objectives 4 &5 (see Table 3.9).

Questionnaire Participants

The Experts working in Federal and Provincial level institutions in the field of environmental planning assessment and management, CC DM, public policy, environmental economics, and engineering were contacted via email, LinkedIn message, WhatsApp, and Twitter to fill out the questionnaires. These experts/stakeholders were of (i) the government officials of the national and provincial institutes, (ii) personnel of academic research institutions, (iii) Environmental consultants, and (iv) experts from NGOs and INGOs.The name and status of each institution whom experts filled questionnaire is given as:

i. **National Institutions:** Ministry of CC, National Ozone Unit, Ministry Of CC; Ministry of Planning Development and Special Initiative, Project Management Unit (CPEC-ICDP; Ministry of Water Resources; Pakistan Environmental Protection Agency, National DM Authority (NDMA), National Institute of DM (NIDM), National Pakistan Meteorological Department, CPEC Authority, World Bank Pakistan; Global Change Impact Studies Centre (GCISC); WAPDA; and International Centre for Integrated Mountain Development; Pakistan Council of Research in Water Resources.
ii. **Provincial Institutions:** Provincial DM Authority (PDMA KP), Provincial Environmental Protection Agencies (e.g., EPA GB, EPA Punjab, EPA AJK,); Forestry, Environment and CC Expert working with Forests, Parks and Wildlife Department GB; Planning and Development Department GB; Department of Tourism KP; Local Government Gilgit Baltistan; Pakhtunkhwa Energy Development Organization.
iii. **Academic Institutions:** Centre for Disaster Preparedness and Management University of Peshawar; Pakistan Institute of Development Economics Islamabad; Institute of Business Administration Karachi; University of Poonch Rawalakot; the University of Azad Jammu and Kashmir; Fatima Jinnah Women University Rawalpindi; Muhammad Nawaz Shareef University of Agriculture, Multan; University of Gujrat, Gujrat, Pakistan; University of Malakand; University of Balochistan; University of Baltistan Skardu Pakistan; Bahria University Islamabad; Kohat University of Science and Technology; and Centre for Climate Research and Development – COMSATS University Islamabad.
iv. **NGOs and INGO;** IUCN-Pakistan; WWF- Pakistan, Health Curators Private Limited; KFW-Bank; ACTED Pakistan.
v. **Environmental Consultants:** GCEC/GYBN-Pakistan; Geo-Tech Consultancy Services; Green Engineering Consultant; Project Procurement International; Institute of Urbanism; Green Environ Sol (Private) Limited; and Green crescent environmental consultants/GYBN-Pakistan.

To obtain high-quality responses, an effort was made to simplify the questions asked that could easily be understood, appropriate in wording, ethically correct, and feasible (Glasow, 2005). A total of 300 experts /stakeholders were contacted to fill out the **questionnaire survey -I Annexure-**A related to research objective -3. 175 respondents completed and submitted the survey 1. This response rate is 58%, which is higher as a typical response rate for a self-administered mail survey (typically around 15 to 20%; (Bhattacherjee, 2012). The second questionnaire **(questionnaire survey -II Annexure B.)** was related to research objective -4.

The third questionnaire **(questionnaire survey -III Annexure C.)** was developed for research objective-5. Both, second and third questionnaires were circulated among 130 experts/ stakeholders with 77 responding to the second questionnaire **(questionnaire survey -II Annexure B.)**, and 62 completing the third questionnaire **(see questionnaire survey -III Annexure C.)**. In a follow-up to completed questionnaires, some experts avoided commenting on the geo-economic and political nature of CPEC development. While some were willing to fill out a questionnaire once they got the free time.

For analysis, respondents were categorized as Academics (AC) working on, for example, CC, DM, environmental planning and assessment, policy analysis, stakeholders /experts from Environmental Protection Agencies (EPAs), Environmental Consultants (EC) working in national firms and International Institutions e.g World Banks Pakistan, Asian Development Bank; DM authorities (AU), Ministries (MI) e.g Ministry of CC Ministry of Planning Development & Special Initiatives; National Government Organizations (NGOs) e.g Institute of Urbanism, International Organizations (INGOs) (e.g IUCN Pakistan, WFF Pakistan), Research Scholars (RS); and others (OT) e.g research institutions such as Global Change Climate Impact Center, Pakistan Meteorological Department, Planning and Development Department GB; Department of Tourism KP; Centre for Climate Research and Development – COMSATS University Islamabad, Thinktank - civil society. The collective response of each respondent category is depicted in Table 3.8. The questionnaires were developed in the official language (English) and efforts were made to get a response from a maximum number of institutes contributing to EA and development planning at the national and provincial levels.

Table 3.8: Overall stakeholders / experts' feedback on the questionnaire surveys

Questionnaire	Respondent Category									Questionnaire		Research Objective
	AC	EPAs	EC	AU	MI	NGOs	INGOs	RS	OT	Circulated	Received	
Q-I (Annexure-A)	83	13	33	8	7	-	7	-	24	300	175	2
Q-II (Annexure-B)	24	7	17	-	3	2	4	5	15	130	77	3
Q-III (Annexure-C)	20	4	12	-	2	1	2	5	16	130	62	5

The interviews and questionnaire-based data were collected according to the research ethics policies of the International Islamic University, Islamabad. A certificate of ethical approval was obtained for this PhD research work from International Islamic University, Islamabad Institutional Ethical Review/Ethics Committee. An ethics

reference number is: No. IIUI/ORIC/Bioethics/110-331). Pseudonyms will be given to participants to protect their anonymity. It is explained to the participants that participation in the survey and interview of this research work is voluntary. The findings of this research will be disseminated to audiences through publication in peer-reviewed international journals. This research also becomes part of PhD thesis.

3.1.4. Step IV. Key informant interviews

In addition to the questionnaire survey, semi-structured key informant interviews with experts/practitioners were conducted to collect information/relevant knowledge for an honest response in an open-ended format to allow the interviewees to share knowledge more freely on the subject without being directed. For this purpose, the Key Informant Interviews conducted TIPS of USAID (1996), the guideline of Briggs (1986), the Practical Guide to Surveys and Questionnaires of Slattery et al. (2011), and standardized instructions developed by SAGE Publications Limited for social science students and researchers were consulted and followed (Tashakkori and Teddlie, 2021, Ritchie et al., 2013, Skott and Ward, 2013). Pakistan had introduced SEA as part of its EA acts without any formal SEA legislation and guidelines. In this context, questionnaire surveys and key informant interviews from government departments, analysis of the EA and institutional framework, and examination of EA legislation were employed to achieve the aim and objectives of the thesis. Similarly, developing countries e.g Botswana Makaba and Munyati (2018) and Bangladesh Shammi et al. (2022) conducted Key Informant Interviews for SEA implementation and effectiveness. The use of a mixed-method approach allowed the validation Antwi-Agyei et al. (2013) research data.

Purpose and content of interviews

Using an interview guide, the key informant experts/practitioners and relevant government officials were interviewed. The purpose of the interviews was to verify how relevant departments, organizations, and institutions (e.g EPAs, MoCC, CPEC Authority, Planning Commission Pakistan officials, and Environmental Consultants) involved in EA and CC adaptation and mitigation process, and to obtain their point of view about the works as well as the capacity of those departments/organizations/and institutions to address environmental and CC concerns in general and specifically related to CPEC development; to establish gap analysis for SEA theory and practice; to explore knowledge about SEA, and the need to conduct SEA for CPEC plan in the presence of EIA tool. In addition to awareness of SEA, the interview guide asked for the interviewees, knowledge of the place of SEA in the legal framework, and the effectiveness of SEA in preventing ecological degradation and CC concerns of CPEC. The interviewees were carefully chosen based on their relevant employment experience of at least five years in the fields of EA; CC; DM; public policy analysis regardless of current organization/institution or different organizations. Some are experts who retired from organizations/ agencies such as EPA and WWF at the position of Director and

Director General and are currently involved in Environmental Consultancy with National and International Firms.

To obtain maximum information and to maintain neutrality, a suitable relaxed and encouraging relationship Rapley (2004) with interviewees was created. Therefore, all of the interviewees were free to provide their own views, opinions, and comments based on their personal work experiences. Interviewees were not bound to give the point of view of their organization/institution and department where they are working or had worked for. Their comments were mainly used to discuss what experts think about CC PC; the need for EPI in DM; the importance of SEA for CPEC development in the presence of the EIA tool; SWOT linked with CPEC; Pakistan's current EG; institutional and EIA system capability to address environmental and CC concerns in general and especially of CPEC development.

CPEC development is very important in the context of social, geoeconomics, and geopolitics (Freddy, 2018, Azhar et al., 2019, Ahmed, 2019, Hussain and Jamali, 2019, Ul Hassan, 2020, Verma, 2022, Rajmil et al., 2021, Hussain et al., 2021a), and regional strategic power development both for China and Pakistan. Therefore, interviewees, and in particular Government, officers avoided sharing information and data related to CPEC development. However, to protect participants from any risk, all the interview data and expert opinion statements were anonymized (See **Annexure-D**). The ethical conduct of this PhD research work is approved by International Islamic University, Islamabad (Institutional Ethical Review/Ethics Committee) No. IIUI/ORIC/Bioethics/110-331. The specific questions explored during the interview were.

i. In your opinion, development projects under CPEC Plan will have significant impacts on the environmental climate?
ii. Many CPEC projects will require the preparation of an EIA and a question arising is whether EIA currently takes CC disaster risk into account in a satisfactory manner?
iii. In your opinion, an effective framework of EG is in place in Pakistan for environmental and social safeguards during the implementation of CPEC projects?
iv. Do you think that relevant institutions are capable of effectively implementing relevant policies and plans by enforcing rules and regulations to make CPEC as a sustainable plan? and if you think that institutional capacity is weak, what are the reasons?
v. Do you think that in the existing Institutional Framework of CPEC Authority (Joint Cooperation Committee) a working group on "Environment, Climate and Sustainability" should be included?
vi. Do you think that CC Policy is coherent across sectoral development policies, and CPEC plan (2017-30) to address environment and CC concerns of the country in general and for climate-resilient development under in particular under the CPEC portfolio?

vii. In your opinion what are key strengths, potential weaknesses, opportunities, and possible threats in the implementation of the CPEC plan as a green development within the existing CC DM and EA /governance setup?

viii. Your recommendations and suggestions about the role of the SEA planning tool to make CPEC development a green and climate-resilient development.

The interviewees were conducted in both Urdu and English with representatives of government ministries, policymakers, practitioners, implementers, environmental consultants, university professors, NGOs, and INGOs, engaged to deal with CC and Environmental issues. Due to the pandemic, the respondents were interviewed via Skype, phone calls, micro soft team, and emails. The expert interviews and a prior literature review, help to establish environmental scanning, scenario planning, and expert-based knowledge for the sustainability of the CPEC plan.

3.1.5. Step V. Multi-criteria decision-making (MCDM) analysis

The EG framework introduced by Bennett and Satterfield (2018) and the multi-criteria EG evaluation framework of Morales-Giner et al. (2021), and the Best-Worst Method (BWM)

and modified Vlsekriterijumska Optimizacija I Kompromisno Resenje (m-VIKOR) Wang et al. (2021) methods are adopted to explore research objective -4, and its related research questions. As a first step, established a goal of the study to analyze Pakistan's environmental policy legal instruments, and key themes of EG to establish policy implications (see Figure 3.3). Those key EG themes are; effectiveness, robustness, equity,

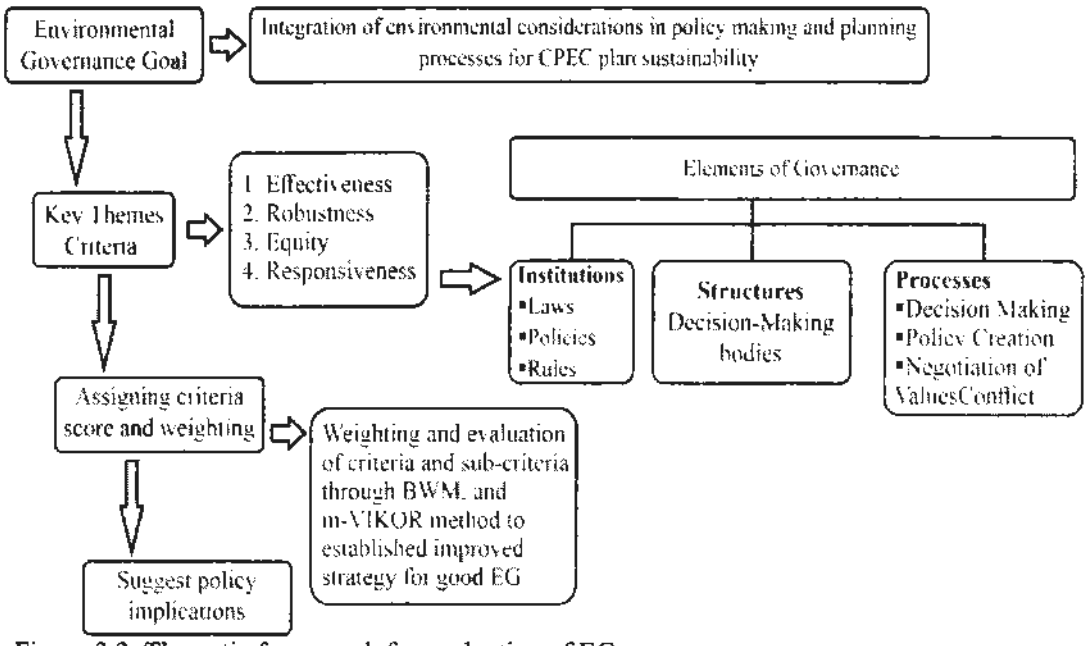


Figure 3.3: Thematic framework for evaluation of EG

and responsiveness. These are evaluated against the integrated governance evaluation criteria established by (Morales-Giner et al., 2021) (see Table 3.6 & 3.7). In the second step, relevant institutions, and key legal policy instruments (see Figure 3.4) related to the EG of Pakistan are depicted to understand an overall picture of the country's EG. For EG-related description see Chapter 2, Section 2.17, and 2.18 respectively.

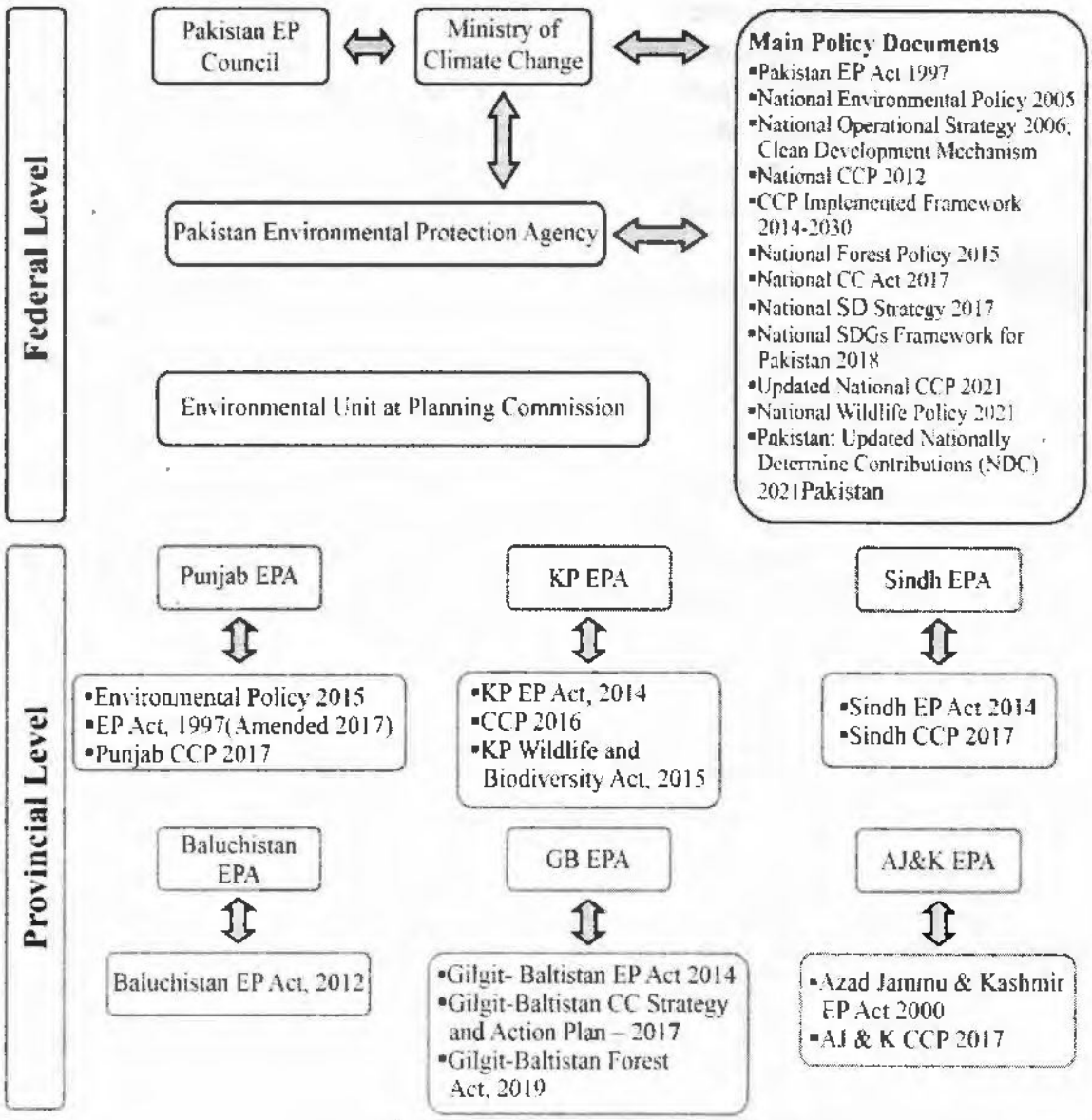


Figure 3.4: An overview of Pakistan's key EG policy instruments and institutional framework

In the third step, a questionnaire was developed based on the multi-criteria EG framework of Morales-Giner et al. (2021), and distributed among relevant stakeholders/experts with the purpose to establish a) their perceptions about the current EG setup and CPEC sustainability; b) to evaluate the EG themes and criteria related to the current EG Framework of Pakistan and the sustainability of the CPEC plan; and c) to validate whether EG themes and criteria are important to achieved CPEC sustainability. For example, in this context, the experts were asked to respond to

research questions -1 & 2 on the 5 Likert Scale. Where 1 indicates "very effective," 2 "somewhat effective," 3 "not very effective," 4 "not effective at all," and 5 "don't know,".

However, survey question-3 was an open-ended question to know experts/ stakeholders' opinions about the institutional capacity of EG and the sustainability of CPEC development. Similarly, experts were asked to evaluate the most important- best criteria/ theme dimension, and least important-the worst criterion /theme dimension, based on a 1-9 linguistic scale Best Worst Method. Where 1 represents "equally important" and 9 is "extremely more important" (see Table 3.9), to determine an improved criterion/theme strategy policy implication for EG and CPEC sustainability. The criteria were chosen based on questionnaire research, and governance criteria of Morales-Giner et al. (2021) including mandate/ direction, capacity building, access to information, coordination, accountability/legitimacy, justice/rights, innovation/adaptation, and transparency (see **Annexure-B**).

The Best-Worst Method (BWM) and modified Vlsekriterijumska Optimizacija I Kompromisno Resenje (m-VIKOR) method, an MCDM approach established on linear programming Method of Wang et al. (2021) were adopted to analyzed data, to provide policy implications for EG and sustainability of CPEC development. The BWM is used to give weight and rank to each EG criterion, while (VIKOR) is used to determine the distance between each criterion and the best state, which is referred to as the gap (Lu et al., 2016, Xiong et al., 2017). Decision-makers find room for improvement in every criterion in accordance with identified gaps (Xiong et al., 2017).

This approach has been chosen because the most significant aspect of the modified VIKOR reveals room for improvement of each criterion (Qu et al., 2019, Lin et al., 2019a). This model is used not only for the assessment of criteria but also for the advancement of each criterion factor (Wang et al., 2021). In addition to this, an advantage of this modified model is that it can give criteria importance ranking with a certain degree of accuracy (Mohammadi and Rezaei, 2020, Wang et al., 2021). In this connection, the BWM-mV model effectively provides recommendations for improvements to decision-makers who are under time and financial constraints (Wang et al., 2021).

The BWM- m-VIKOR consists of the following eight steps

1. The first step is the identification of a set of assessment criteria for decision-making.
2. The second step is the determination of the best (e.g. most desirable, most important) and the worst (e.g. least desirable, least important) criteria. At this stage, the experts identify the best and worst criteria from step-1 based on their competence, experience, and expertise i.e. the most important, i.e., best criterion, and the least important, i.e., worst criterion.
3. Step -3 is about the pairwise comparison between the best criterion and others to determine which criterion should be preferred over all the others. Table 5 presents the linguistic scale for pairwise comparison for BWM. The scale of pairwise comparison uses numbers between 1 and 9, where 1 shows that the compared criteria have the same importance, while 9 presents extreme importance.

4. Step - 4 is about the determination of preferences of each criterion on a scale of 1 (equally important) to 9 (extremely important) to conduct pairwise comparisons between the worst criterion and the other criteria.
5. Step 5 is about the determination of optimal weights of criteria and consistency index (CI) value, the maximum and minimum absolute differences.
6. At step 6, steps 1–5 are repeated to obtain the local weight of each theme and criterion. Next, the local weight of each theme is used to obtain the global weight of each criterion, namely individual weight.
7. At step -7 the best value is defined as an aspired level for the nth criterion and the worst value is defined as worst for all criteria. Performance scores ranging from 0 to 10 (very bad ← 0, 1, 2, . . . , 9, 10 → very good) are used; the highest score for the aspiration level is 10, and the score for the worst value is 0. Hence, an aspired = 10 is defined as the aspiration level, and 0 is defined as the worst value.
8. At step -8 the mean group utility for the gap is defined, after which the priority improvement strategy is established.

The systematic step involved in the BWM is depicted in Figure 3.5.

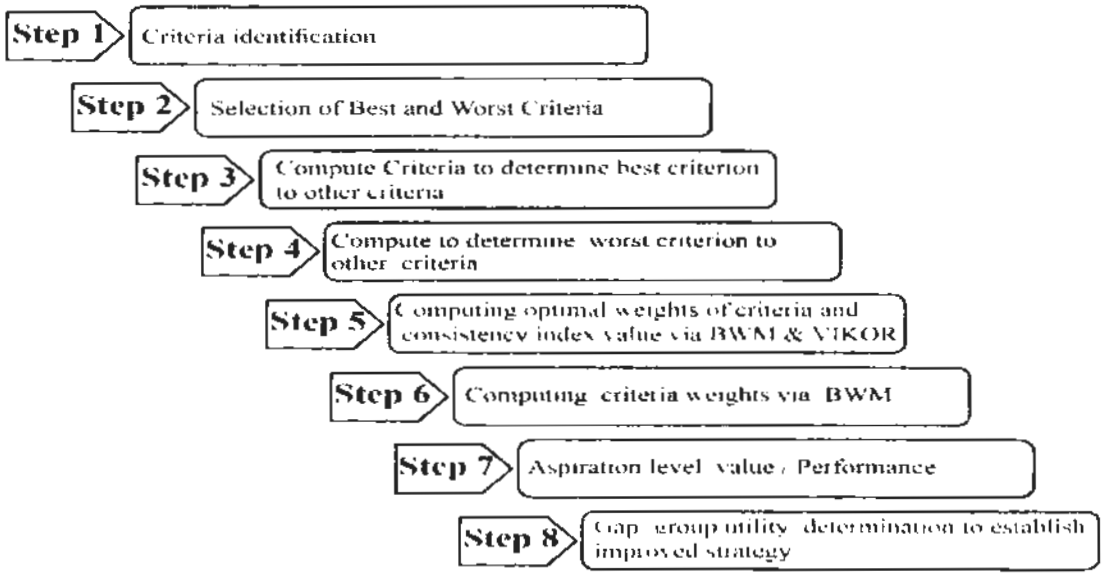


Figure 3.5: Systematic steps of BWM -mV M

Adopted Bennett and Satterfield (2018) modified by the author according to the research requirements. The effectiveness governance refers, to what extent the environmental and sectoral policy instruments considered policy measures /attributes to maintain EG system integrity and functionality of environmental sustainability. The policy instruments articulate comprehensive and clear institutional mandate direction, aims, objectives scope, and goals. It identifies what effective policy actions are considered to achieve set milestones. The policy considered measures for capacity building of relevant stakeholders, recognizing conflict resolution mechanisms, and stakeholders' engagement. It recognizes that information is generated, recorded, and communicated with stakeholders to promote informed planning and management, and

highlights policy measures and mechanisms to disperse and access information for stakeholders' feedback. Processes are considered to hold on accountability for governance performance, the mechanism to ensure means and rationales for transparent decision-making and policy implementation. In addition to this, policy instruments articulated clear measures and processes for efficient management actions, policy monitoring, and evaluation.

Responsiveness governance enables adaptation to diverse contexts and changing conditions. In this context, it states how well policy instruments consider anticipatory-long-term planning, known and unknown risks and opportunities are planned for, enhance new knowledge and capacity (Adaptation), and policy-mentioned measures related to innovations in general and specifically in the context of CC adaptation, mitigation, environmental safeguard, and recognize the flexibility of downscale environmental management and conservation.
The robustness of the governance theme ensures functioning institutions persist, maintain performance, and cope with perturbations and crises. It states that government policy instruments considered comprehensive measures for institutional coordination and connection to maintain governance performance and cope with crises, for example, CC and environmental disasters. Policy highlights roles, functions, and mandates of relevant stakeholders, i.e government ministries, departments, agencies, and organizations and coordination mechanism A coordinating body or unit, and a forum of discussion, debate, negotiation, and resolving trade-offs are considered in policy measures. Recognized policy measures related to accountability and legal support for implementation.
Equitable governance engaged inclusive processes to produce fair outcomes. In this context, to what extent policy documents recognize measures for stakeholders' inclusion in decision-making, policy measures related to fair and equal stakeholders' participation in the decision--making process, and measures to access justice on policy implementation violations are considered. The policy recognizes the responsibilities of relevant stakeholders highlights laws, and policy measures to protect vulnerable community rights recognizes the right to freedom, highlights policy measures related to the participation of CC vulnerable groups such as formers and women in decision-making processes, and their access to justice.

3.1.5.1. Multi-criteria decision analysis questionnaire survey -III

This survey's purpose is to explore relevant stakeholders/experts' views on Pakistan's current EA system and the sustainability of the CPEC plan (2017-30). For this purpose, key themes of SWOT-linked criterion factors related to CPEC development and EG were established to investigate the **research objective 5.** The experts /stakeholders were asked to evaluate those SWOT criteria factors/themes on a Best Worst Method (BWM) 1-9 linguistic scale (see Table 3.9), to identify the most important, i.e., best criterion/ theme factor, and least important, i.e., the worst criterion/theme, to determine improved criterion/theme strategy policy implications for CPEC sustainability (see

Annexure C). The data were analyzed in a combination of an integrated SWOT Analysis and the Best Worst Method approach. The SWOT analysis is frequently applied to strategic planning (Phadermrod et al., 2019). The Strengths and Opportunities are considered a positive development while Weaknesses and Threats are taken as a negative aspect of CPEC and the country's EA Governance. Similarly, Strengths and Weaknesses are of internal origin, while Opportunities and Threats are of external origin. The SWOT analysis is commonly used as a tool to examine the strengths and weaknesses (internal factors) together with opportunities and threats (external factors) of the marketplace environment (Görener et al., 2012).

The SWOT Analysis is carried out in combination with a multicriteria decision analysis tool of BWM. A comprehensive literature review was conducted (see Chapter 2 Section V), to examine the country's EA system and CPEC development. Furthermore, CPEC development-related criterion factors of SWOT were dug out through literature review, discussion with experts, questionnaire-based stakeholders/ expert opinions regarding country EG setup, and sustainability of CPEC plan. The scientific literature reveals numerous SWOT related to CPEC development and Sustainability. However, those studies are lacking to give weight and rank to SWOT criterion factors. The identified SWOT criterion factors related to CPEC development will be weighted and ranked through a combination of SWOT and BWM, for an improved and informed decision-making strategy for CPEC development. The data gathering was split and processed into two parts. The first part is about the operating process of the BWM. In this connection, BWM -mV Model (Wang et al., 2021), a multiple-criteria decision-making tool (Liu et al., 2018) comprised of two modules, and BWM-PROMERHEE (Brans and De Smet, 2016, Behzadian et al., 2010, Farooq et al., 2021) and SWOT Analysis of (Farooq et al., 2021) were carried out to recognize improved and informed decision-making for CPEC development.

The first part of the BWM multicriteria decision-making method was established by (Rezaei, 2015, Rezaei, 2016, Rezaei et al., 2015, Rezaei et al., 2016) to determine the importance and weights of each predefined criterion factor, based on a linear programming scale (see Table -2.10). In this context, the most important criterion is called best, while the least important criterion is of the opposite role, is called worst criteria, identified by the expert to make a pairwise comparison of criteria factors.

It is worthwhile to note that BWM multicriteria decision analysis is used in various decision-making areas such as logistics (Rezaei et al., 2015, Rezaei et al., 2016) economics (You et al., 2016), and transport and engineering (Gupta, 2018), to quantify eco-environmental vulnerability (Kamran et al., 2021) due to its easy applicability and reliable results. In addition to this, BWM-SWOT Analysis is used in numerous developmental areas such as tourism development (Asheghi-Oskooee and Ramezanzadeh, 2021), transportation (Stoilova, 2020), sustainable energy system distribution and conservation (Lin et al., 2019b), information systems (Motevali Haghighi and Torabi, 2018), water security management (Chitsaz and Azarnivand, 2017). The SWOT analysis is a strategic planning technique used to determine strengths, weaknesses, opportunities, and threats. Furthermore, a combination of both methods— SWOT analysis and PROMERHEE —has been used in other research fields

and decision-making activities. The PROMERHEE II method is one of the most frequently used multicriteria methods to rank alternatives (Hillier and Price, 2001, Behzadian et al., 2010). The second component of BWM is the modified Vlsekriterijumska Optimizacija I Kompromisno Resenje (VIKOR) to determine the distance between each criterion and the best state, which is called a gap (Lu et al., 2016, Zhu et al., 2017). Decision-makers identify room for improvement in each criterion according to the gap (Xiong et al., 2017). Similarly, researchers used this model to evaluate alternative criteria (Kumar et al., 2020, Cheraghalipour et al., 2018, Garg and Sharma, 2020, Parhizgarsharif et al., 2019). However, the modified VIKOR, reveals room for improvement for each criterion (Lin et al., 2019a, Qu et al., 2019). In this context (Wang et al., 2021) suggested using the BWM-mV Model not only for criterion evaluation but also to provide suggestions for the improvement of alternative criteria. Moreover, BWM gives criteria importance ranking with a certain degree of accuracy (Mohammadi and Rezaei, 2020). The overall approach is shown in Figure 3.6.

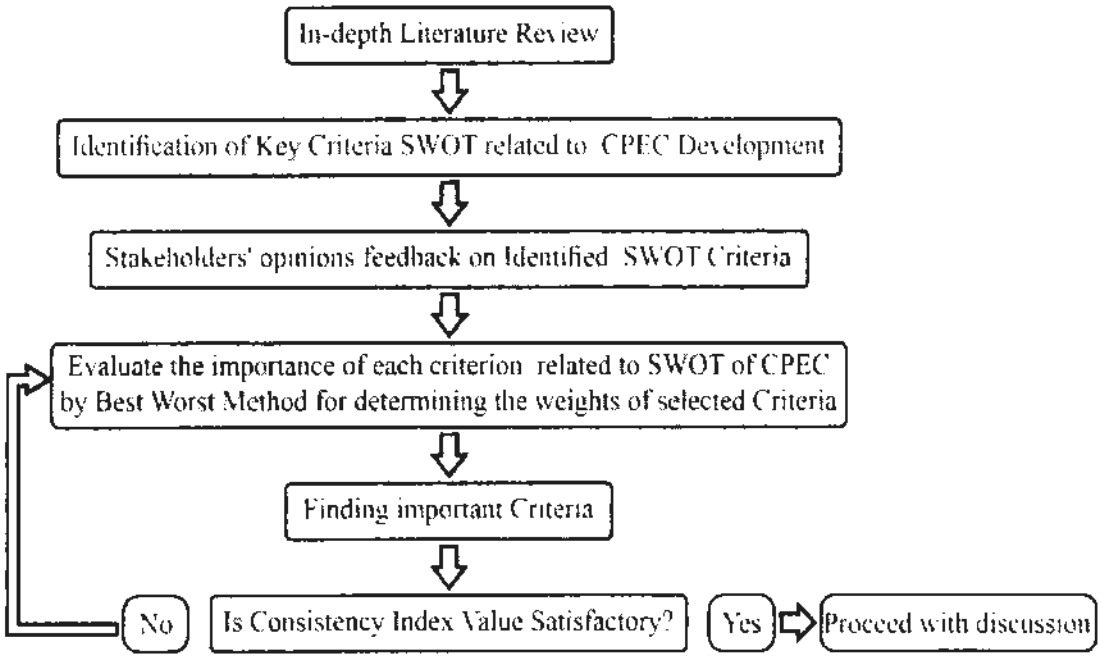


Figure 3.6: BWM- SWOT Method overview

Criteria weighting determination using BWM

Sixty-two experts /stakeholders were involved to rank criterion themes using a Likert scale of 1- 9. In this connection, first, we calculated the mean value of the response of all the experts for each criterion by applying the sum formula in excel. The best criteria will be the one with the highest mean value. The worst will be the one with the lowest mean. For example, in the case of Internal Strength Criteria (ISC), ISC 1.10 with the highest mean value of 6.355 is the best criterion (BC) whereas ISC 1.6 with the least mean value of 5.452 is the worst criterion (WC) . A high mean score means that the

respondents /experts have a positive perception of these potential criteria factors. To find the best to other vector, first, compute the percentage gap between best criteria (BC) and other criteria (OC), that is (BC- OC)*100 to establish a preference for best over other.

Having a large group of experts based on the evaluation, preference grades between 1 to 9 were assign where a); 1 only for preference of best to itself, in this case ISC 1.10 to ISC1.10 is 1 (see Annexure H, Table 2). b); for the rest greater number will be assigned to those having large distance from ISC 1.10. The rule is simple e.g if the value for ISC 1.1 is X and ISC 1.10 is 5 times more important than ISC 1.1, then we will assign 5. c); Key for preference grade, see Table 3.10 (that can change be as per choice, keep in mind greater number for larger distance)

Similarly, to determine the other to worst vector, find the percentage gap between worst and other criteria by the rule (Other criteria- worst criteria)*100. Using the same key to scale the preference. In this way, a pairwise comparison was made for the main criteria and sub-criteria. The main criteria strengths (IS) were chosen by the experts as the best criteria and the criterion weaknesses (IW) as the worst criteria respectively.

3.2. Structure of the questionnaire

This section describes questionnaire survey structure and Multi-Criteria Decision-Making (MCDM) approach used for data analysis.

3.2.1. Questionnaire survey – I (Research Objective-3)

This questionnaire comprises four key parts. The first part is about the introduction followed by a brief background of the research, and its purpose (second part). The third section is about the basic information of respondents for internal use. Similarly, section fourth is about the respondent and feedback. Out of a total of sixteen questions, two questions had "Yes" and "No" options and one question had three options i.e., "Economic", "Social" and "Environmental". Similarly, two open-ended questions were developed to allow experts to add suggestions about EPI in DM and CPEC sustainability; and to comment on the questionnaire. While the other eleven questions were formulated to respond on a 5-Likert assessment scale. The Likert scale enables the comparison of alternatives for decision-making and analytical purposes (Thompson et al., 2013). Similarly, a 5-point Likert-type scale was used to investigate stakeholders' perception of urban environmental challenges (Ameen and Mourshed, 2017), and the legal framework of forest landscape restoration (Schweizer et al., 2021).

In this context, for example, the question related to the environmental sustainability of CPEC development within the existing country DM and EA setup, the 5 Likert Scale is as 5 represents "high," 4 "medium," 3 "poor," 2 "no sustainability" and 1 "no knowledge,". Similarly, other questions were also developed on the Likert scale approach to get high-quality data and analysis. Question number 14 comprises 11 factors and 47 sub-factors that could reduce EPI in DM for CPEC sustainability. The experts were asked to rate them on the 5 Likert Scale method i.e., 5 "to a large extent,

4 "to a considerable extent," 3 "to a moderate extent," 2 "a little bit," and 1 "not at all,". The feedback from all 175 respondents was laid out in a wide data sheet for concluding analysis and explanation. The questionnaire content summary is under heading 3.3, and the detailed questionnaire structure is in **Annexure -A**, at the end of the dissertation.

3.2.2. Questionnaire survey-II & III (Research Objective-4&5)

This survey aims to evaluate stakeholders' perceptions about:

a) current EG setup of Pakistan and CPEC plan sustainability.
b) to analyze and evaluate identified EG themes and criteria through the Best Worst Method approach for improved governance and CPEC sustainability.
c) to validate whether the proposed EG themes and criteria achieved the goal of EP and CPEC sustainability.

The questionnaire comprised four main questions. In questions -1 and -2, the respondents were requested to rate the effectiveness of EG of Pakistan to implement the CPEC plan in a green and sustainable manner, based on the 5 Likert Scale method. Where 1 indicates "very effectively," 2 "somewhat effectively," 3 "not very effectively," 4 "not effectively at all," and 5 "don't know,". The Q -3 is an open-ended question to know stakeholder opinion about institutional capacity and CPEC development. Similarly, question -4 comprised of eleven EG criteria with 39 sub-criterion factors. In the context of Pakistan, the experts were asked to opt appropriate number in order to evaluate the most important (i.e., the best criterion), and least important-the (i.e., worst criterion factor), based on a 1-9 scale Best Worst Method. Where 1 represents "equally important," 2 is "equal to moderately more important", 3 "moderately more important," 4 "moderately to strongly important," 5 "strongly more important", 6 "strongly to very strongly important," 7 "very strongly more important," 8 "very strongly to extremely more important," and 9 "extremely more important", respectively (see Table 3.9).

The purpose of Best Worst Method Analysis is to establish policy implications and determine improvement in-country EG and CPEC sustainability. The criteria were chosen based on questionnaire research, and a combination of the EG framework of see (Bennett and Satterfield, 2018, Waddington et al., 2019, Vizeu Pinheiro et al., 2020, Morales-Giner et al., 2021) with key criteria themes, for example, mandate/direction, capacity, access to information, coordination, accountability/legitimacy,justice/rights, innovation/adaptation, and transparency. The stakeholders /experts, questionnaire-based response data were evaluated by using integrated multi-criteria decision-making (MCDM) Best-Worst Method (BWM) modified Vlsekriterijumska Optimizacija I Kompromisno Resenje (m-VIKOR) method Wang et al. (2021), to determine policy implications for environmental and CPEC sustainability.

Table 3.9: Scale to identify best and worst criterion for BWM

Scale	Score
Equally important	1

Equal to moderately more important	2
Moderately more important	3
Moderately to strongly important	4
Strongly more important	5
Strongly to very strongly important	6
Very strongly more important	7
Very strongly to extremely more important	8
Extremely more important	9

The questionnaire survey-III is related to analysing and evaluating key strengths, potential weaknesses, opportunities, and possible threats related to Pakistan's EG and implementation of the CPEC plan as green development. In this context, strengths, potential weaknesses, opportunities, and possible threats are considered themes. Similarly, critical criteria were recognized against each theme. For example, 13 criteria were recognized for strengths theme, while twenty criteria for weaknesses and twenty-four criteria were recognised for the opportunities and threats theme. The expert was asked to rank themes and their criteria based on the 9 Likert Scale (i.e. 1 represents equally important and 9 extremely more important) to determine the best and worst theme and criteria by using the MCDM-BWM approach to establish policy implications for the sustainability of CPEC plan. The questionnaire also includes open-ended questions for respondents to know their opinions, ideas and thoughts on the subject.

Table 3.10: Preference scale for pairwise comparison for BWM

Percentage	**Value**
1	1
1-20	2
21-40	3
41-50	4
51-60	5
61-70	6
71-80	7
81-90	8
Greater than or equal to 91	9

3.3. Questionnaire survey content summary

The detailed content of all three questionnaire surveys is annexed at the end of the dissertation (see **Annexures A, B, and C**). However, a summary of the survey's content is given in the following section.

3.3.1. Questionnaire survey Annexure – A (Research Objective -3)

The experts /stakeholders were asked the question to assess their knowledge and awareness about development - environmental degradation-disaster linkage and to know their understanding of the development – environment – disaster nexus. In this context, for example, stakeholders/experts were asked questions i.e. Are you aware of development-environmental degradation-disaster linkage? And how well do you think you understand this nexus? Similarly, they were requested to rate the importance of EA in DM and sustainability of the CPEC plan, and disaster potential threats to CPEC development. In addition to this, questions were inquired to know whether EIA sufficiently addresses disaster risk, their opinion about which component of sustainability is at risk due to CPEC development, and to rate the socio-economic and environmental sustainability of CPEC within the existing country (Pakistan) DM and EA set up on Likert scale. Similarly, in addition to open-ended questions, experts were asked to rate factors that reduce EPI in DM for CPEC Sustainability on a 5 Likert scale i.e., 5 = to a large extent. 4 = to a considerable extent; 3 = to a moderate extent; 2 = a little bit. 1 = not at all. In this context, the main factors included political commitment and leadership, technological, structural, procedural, international obligation, policy coordination, integrated approaches, policy effect, public participation, peace and conflicts, and monitoring & evaluation.

3.3.2. Questionnaire survey Annexure-B (Research Objective -4)

This questionnaire survey was made to assess and evaluate stakeholder's / expert's perceptions about the country's current EG and CPEC sustainability. Stakeholders/ experts were asked to respond on the Likert scale method i.e., 1 for "very effectively", 2 "somewhat effectively", 3 "not very effectively", 4 for "not effectively at all", and 5 for, don't know". In this context, for example, experts were asked (a), Is effective environmental governance is in place in Pakistan for environmental and social safeguards while implementing the projects under CPEC? b). Are the relevant institutions capable of effectively implementing relevant policies and plans by enforcing rules and regulations for sustainable and green CPEC development?
Similarly, experts were asked to evaluate EG criteria and themes for best criteria/ theme and worse criteria/ theme, based on the 1-9 Likert Scale i.e., 1 is "equally important", 2 "equal to moderately more important", 3 is "moderately more important", 4 "moderately to strongly important", 5 "strongly more important", 6 "strongly to very strongly important", 7 "very strongly more important", 8 "very strongly to extremely more important", and 9 "extremely more important". In this context, the main EG criteria were including direction/mandate, capacity building, access to information/knowledge, coordination, accountability/legitimacy, justice/rights, innovation/adaptation, and transparency along with key themes of effectiveness, robustness, equity, and responsiveness. In addition to this, opened-ended questions were also asked, for example, opinions about the current EG System of Pakistan and CPEC sustainability, and institutional capacity to implement relevant policies and plans by enforcing rules and regulations for sustainable and green CPEC development.

3.3.3. Questionnaire survey -C (Research Objective -5)

In this questionnaire survey, key themes i.e. strengths, potential weaknesses, opportunities, threats, related criteria/factors in the context of Pakistan's EG, and implementation of the CPEC plan as green development were explored. The experts/stakeholders were asked to evaluate them on 1-9 Likert-type scale (see Table-3.9). The main key criteria/factors related to the theme "Strength" were for example; infrastructure development, trade cooperation, energy demand fulfilment, technology diffusion, foreign investment enhancement, centralized planning, decentralized implementation practice, and dedicated leadership (e.g. Ten Billion Tree Tsunami Programme); Similarly, experts were asked to evaluate theme "Weakness" related factors such as political instability, lack of good governance in general and EG governance specifically, increase environmental and health issues, weak institutional setup for EP and CC, CC and environmental concerns, technological inefficiencies, lack of a mechanism to transform SEZs into eco-Industrial Park, and long waited for policy document revision/update. Likewise, experts/stakeholders evaluated "Opportunity and Threats" related factors for CPEC environmental sustainability.

In this context, some of the "Opportunities," theme-related criteria were, for example, economic stabilization, less transportation cost, transportation development, time-saving, direct access to trade through sea route, overcoming energy shortfall, industrial development, advancement in technology, development of Gwadar (Maritime economic development), capacity-building initiatives, to promote cooperation in infrastructure, transportation, industrial collaboration, and energy security. Similarly, criteria factors related to "Threat" were, for example, corruption, environmental impacts, natural resources exploitation, CC disaster concerns (e.g. potential threat to the ecosystem, biodiversity, and northern area glaciers melting, incoherent policies, intra-regional conflict, interprovincial dispute on CPEC route and environmental concerns, 18th Constitutional Amendment and EP (e.g marine resource conservation and Marine Pollution), overlapping mandate of the Federal and Provincial authorities to tackle marine pollution and Life below water, inconsistencies in EG, mistrusted inter-provincial and federal harmony in CPEC plan implementation.

CHAPTERS 4-7
RESULTS & DISCUSSIONS

Chapter-4

4. POLICY COHERENCE ACROSS POLICIES, PLANS AND STRATEGIES IN PAKISTAN – IMPLICATIONS FOR CHINA PAKISTAN ECONOMIC CORRIDOR PLAN

4.1. Introduction

Climate Change adaptation and mitigation measures PC across development sectors is essential to effectively address CC challenges and support synergies. In this context, this chapter is divided into two sections to analyze PC in Pakistan. The first section is to assess the extent to which Pakistan's national and provincial water, agriculture and energy sector policies, development plans and strategies are aligned in a CC policy coherent manner is established. For this purpose, a qualitative content document analysis (Altheide et al., 2008, Steve, 2001) (see Chapter 3, Section 3.1.2.1) with associated assessment scoring criteria (Le Gouais and Wach, 2013) (see Chapter 3, Table 3.2) is used to assess government documents (see Chapter 3, Table 3.1). Furthermore, implications of the CPEC development plan (CPEC; 2017) the biggest infrastructure investment programme ever in Pakistan, are analyzed and discussed. In this context, this section presents results related to research objective 1. The analysis of results is interpreted in (4.2), followed by discussion (4.3) and finally, conclusion and recommendations are made for sustainability of CPEC plan.

The second section of this chapter presents an assessment of PC in the context of CPEC plan (2017-2030), country environmental policies and sectoral policy instruments i.e., CPEC key cooperative areas policies to determine sustainability of CEPC. For this purpose, integrated EG criterion factors and CPEC plan (2017-2030) key cooperative areas sectoral policies and environmental policy instruments are taken into account to establish policy implications for sustainability of CPEC plan. An integrated EG framework established by Morales-Giner et al. (2021) was used to analyze government sectoral, environmental policy instruments and CPEC plan 2017-2030 (see Chapter 3, Section 3.1.2.2.). In this context, this section intends to discuss result analysis, discussion, policy implications and conclusion related to research objective-2 and its related research question. The results are depicted in section II see Table 4.3 followed by Table 4.4 and finally, discussion conclusion and policy implications for the sustainability of CPEC plan are drawn respectively.

Section: I Climate Change Policy coherence in Pakistan: Implications for China Pakistan Economic Corridor plan (2017-2030)

4.2. Results (Research Objective -1)

4.2.1. Climate change adaptation and mitigation mainstreaming in sectoral policies, development plans, strategies and DM plans

4.2.1.1. Water sector policies

National Water Policy aims at restoring and maintaining the health of the environment and water related ecosystems. Associated planning principles include that environmental sustainability must be ensured, and EIA studies be carried out concurrently with project feasibility studies for water resources. Consistency with economic viability, social acceptability and environmental sustainability also needs to be ensured. CC mitigation and adaptation assessment should be carried out "for sustainable water resource development and management" to address water, energy and food security and climate driven disasters. Although water is a national responsibility, agriculture and irrigation, environment and water related sub-sectors are provincial subjects under the 18th constitutional amendment (GoP, 2018d). KP and GB have still not developed their own policies for water management, with GB having adopted the National Water Policy, and KP having formulated a drinking Water Policy in 2015. This highlights the need for water resource conservation and commits to "Measures [that] will be taken to identify, protect, develop, and conserve surface and ground water resources in line with Provisions of NEP 2005 and KP Environmental Act 2014". It is also stated that "Due consideration will be given to the adverse impacts of CC, vulnerability and fragility, in planning and development of water supply scheme" (GoKP, 2015d). However, adaptation and mitigation measures for water resource management are not mentioned.

PB's Water Policy states that "policy measures related to water resources applicable to Punjab in line with the National CC Policy (NCCP) 2012 [should] be adopted" but clear delivery mechanisms are missing. The policy recognizes adaptation but does not highlight CC mitigation measures and strategies. It is stated that adaption measures be worked out to mitigate impacts of CC. PB's Water Policy (2018) highlights environmental hazards and its EPA recognizes the environment as a policy objective, aiming to "ensure effective enforcement of regulations for managing the health of acquirers in collaboration with EPA". CC adaptation and mitigation mainstreaming are not detailed in any water sector policy.

4.2.1.2. Energy sector policies

Pakistan's energy sector contributes 51% to the country's total GHGs emissions (Ashfaq, 2017). Federal and provincial governments' energy policy documents mention the need for EP but fail to consider CC adaptation and mitigation. The Federal Power Policy (2013) focuses on energy affordability, efficiency, financial viability (GoP, 2013d) and the need of a green building code. However, it too fails to mention CC. The

same is the case for the Power Generation Policy 2015, which does recognize environmental safeguards as one of the policy objectives, though (GoP, 2015b).
None of the provincial policies considers CC. The PB Power Generation Policy includes EP as a policy objective and states that all the "requirements as related to EIA and NEQS will be met."(GoPB, 2009). Furthermore, the KP Hydropower Policy 2016 recognizes that "requirements laid down by KP EPA and rules and regulations thereunder relating to NEQS and EIA shall have to be met" (GoKP, 2016a), but fails to address inter-provisional environmental problems. The Government of GB has not formulated their own policy for power generation. Rather, it has adopted the Federal Power Generation Policy 2015.

4.2.1.3. Agriculture sector policies

The agriculture sector in Pakistan accounts for 43 percent of total national GHGs emissions (GoP, 2018b). The National Food Security Policy states that the sector needs to "flexibly adapt into CC and be resilient enough to quickly recover from shocks and emergencies" (GoP, 2018b ,p.25). Furthermore, whilst it recognizes policy measures for environmental biodiversity conservation and development of climate smart crops, it fails to highlight CC. Whilst CC adaptation measures are mentioned in PB's Agriculture Policy 2018, KP's Agriculture Policy mentions both, CC adaptation and mitigation measures and strategies for water, agriculture and energy sectors (GoKP, 2013). The GB Agriculture Sector Policy finally is quiet about CC (GoGB, 2018).

4.2.1.4. Climate change policies

Pakistan's first NCCP 2012 recognized the need to integrate CC adaptation and mitigation measures into sector planning, including water, agriculture, energy, transport, forestry, vulnerable ecosystems, and industrial sectors. It called for a development of plans at federal and provincial levels for effective NCCP implementation (GoP, 2012d). The policy aims at integrating CCP with other inter-related national policies "to ensure water security, food security and energy security of the country in the face of the challenges posed by CC"(GoP, 2012d). The NCCP implementation framework (2014 -2030) provides a mechanism to mainstream CC concerns into national planning to promote climate-compatible development at the federal and provincial levels (GoP, 2013a). However, neither NCCP 2012 nor its implementation framework identify a mechanism to evaluate CC adaptation and mitigation progress. Similarly, provisional governments have no approved CCPs yet, while draft CCPs are failing to consider PC with policies of water, agriculture, and energy sectors. PB's CC policy draft (2017) recognized the need to be in line with the NCCP (2012), its implementation framework (2013) and PB's growth strategy (2018) (GoPB, 2018c).
The policy objective is to "integrate climate compatible development paradigm through climate resilient, low carbon, and water-energy-food nexus related measures into key relevant sectors policies, strategies, and plan" (GoPB, 2017b). However, it fails to mention coordination mechanisms with cross-sector policies. Similarly, KP Province's CCP (2016) aims to "Integrate adaptation and mitigation measures into key relevant

sectors policies, strategies, and plans" (GoKP, 2016b) to "ensure water, food and energy security for KP province in the face of a CC". In addition to CC adaptation for agriculture, water resources, forestry, and disaster preparedness, the KP CCP also recognizes CC mitigation measures for energy, transport, waste, industries and urban planning(GoKP, 2016b). The need to work in line with NCCP is acknowledged, but no coordination mechanisms with sector policies are mentioned. Similarly, the GB CC strategy and action plan (2017) recognize the hydropower potential of the region, and CC impacts on glaciers, agriculture and energy sectors (GoGB, 2017c). Policy objectives, strategies, and actions to adopt and mitigate CC are acknowledged, but no implementation coordination mechanisms with other sectors are mentioned.

4.2.1.5. Development plans and strategies

Federal and PB's development plans consider CC adaptation and mitigation measures and introduce projects to address CC along with EP. Similarly, the development plans of GB (GoGB, 2017b) and KP (GoKP, 2018a) recognize some schemes and measures for flood and environmental management but fail to integrate CC. The National SD Strategy takes into consideration the three pillars of SD; economic, social and environmental, recognizes 17 SD goals with strategic objectives and targets, and commits to integrating CC and the environment into national and provincial sectoral polices, plans and strategies (GoP, 2017b).

PB's growth strategy for 2023 integrates the environment and CC and recognizes SDG-13 (Climate Action) which is about "[taking] urgent action to combat CC and its impacts" and SDG-12 "ensuring sustainable consumption and production patterns" structural and non-structural adaptation and mitigation measures but lacks an implementation framework (GoPB, 2019). Similarly, the KP development strategy considers CC adaptation and mitigation measures, environmental security, and the mainstreaming of environmentally friendly strategies to reduce environmental hazards (GoKP, 2014a, GoKP, 2019a). The SD strategy of GB recognizes flood disasters and aims at ensuring the environment is considered in planning. Furthermore, it commits to conducting SEA in the water and energy sectors but fails to explicitly consider CC (GoP and IUCN, 2003).

4.2.1.6. Disaster [risk] management plans (DMPs)

The Federal Government's DMP 2012-22, Punjab's DMP 2008 (GoPB, 2008) and GB's DMP 2008 (GoGB, 2008) consider CC and the environment and recognize structural and non-structural adaptation and mitigation measures for CC, DRR and EP. KP has not developed a DMP yet. However, there are monsoon contingency plans (GoKP, 2017, GoKP, 2018b, GoKP, 2019b), focusing on flood disasters. Environment, CC structural and non-structural adaptation, mitigation measures and DRR strategies are mentioned for vulnerable sectors (not including the energy sector).

4.2.2. Policy coherence across policies, plans and strategies at federal and provincial levels

Policy coherence is not explicitly addressed in most policy documents. The Federal water policy considers NEP 2005 and NCCP 2012 but lacks coherence with agriculture and energy sector policies (GoP, 2018d). Similarly, PB's water policy highlights the need to adopt the national water policy measures and NCCP but fails to establish working coordination with energy sector policies. Likewise, the KP drinking water policy highlights the need to adopt national drinking water policy and to align this with NEP 2005 but fails to mention policy coordination with CC, agriculture, and energy sector policies.

The Federal national food security policy states that "there is a need to implement NEP 2005 and NCCP 2012 in letter and spirit" (GoP, 2018b, p. 17, 19), but fails to consider policy coordination with energy sector policies. Likewise, the agriculture policies of PB and KP fail to state coordination with sectoral policies of water, energy, and CC policy. Also, the KP agriculture policy does not mention environmental policy. Similarly, although the agriculture sector policy of GB establishes a need to harmonize sectoral policies, it fails to mention water and energy, environmental, CC policies and coherence mechanisms.

The Federal and PB's power sector policies fail to mention coordination with policies of water, agriculture, CC and environmental sectors. PB's CC policy recognizes the NCCP and national energy policy and is committed to a centralized provincial water policy. It also asks for PB's power generation policy to be updated (GoPB, 2017b). However, it fails to consider coordination with agriculture policy. Similarly, the KP CC policy highlights the need to work in line with NCCP (GoKP, 2016b), but fails to consider coordination with water, agriculture and energy policies. The GB CC strategy recognizes the need to develop an energy policy, highlights NEP, and follows NCCP guidelines (GoGB, 2017c). However, sectoral policies of water, agriculture and energy are not considered. Similarly, federal and provincial governments' development plans fail to consider environmental and CC policies.

PB's Growth Strategy (GoPB, 2019) does not consider CC policy while the SD strategy of KP province fails to mention agriculture policy (GoKP, 2019a). Similarly, the GB strategy for SD 2003 fails to mention CC policy. Furthermore, there is no coordination with water, agriculture, and energy sector policies. The DMP of federal and provincial governments, of PB, GB and KP fail to mention environmental, water, food, and agriculture, as well as energy sectors policies.

4.2.3. Policy coherence across CPEC and sectoral policies, development plans and strategies

The federal and provincial governments' agriculture policies and development strategies consider the CPEC plan as an opportunity. For example, PB's agriculture policy recognizes that CPEC connectivity enhances competitiveness with global and

domestic markets but fails to mention coordination and implementation mechanisms. Similarly, the national food security policy recognizes the establishment of agricultural economic zones along CPEC routes, enhancing agricultural economic cooperation under CPEC, but is missing a policy coordination mechanism.

The water and energy sector policies miss integration with the CPEC plan 2017-2030. Likewise, Federal and KP development plans recognize development projects under the CPEC portfolio. The CPEC plan recognizes opportunities and possible implementation challenges, highlighting that industrialization and urbanization in Pakistan will speed up, whilst also acknowledging environment and CC concerns. The CPEC plan 2017-2030, whilst neither mentioning CC policies, nor CC adaptation and mitigation measures, highlights the need to optimize sourcing and technology development of the coal industry, and the promotion of river planning for hydropower, wind, solar energy development, and water-efficient technology for irrigation. Moreover, the plan also recognizes the need for social environment safeguards for CPEC projects. For industrial cooperation, the CPEC plan highlights the need to promote environmentally friendly processes without referring to NEP 2005 and the national operational strategy 2006 for clean development mechanisms. Similarly, although it highlights measures in sectoral policies, it does not mention sectoral policies of water, agriculture, and energy, DRR and CC PC mechanism

Table 4.1: Coherence in policy documents with respect to five key subjects and adaptation and mitigation keywords for Federal, Punjab, Gilgit- Baltistan, & KP governments

Key subjects Federal	**WP**	**AP**	**EP**	**CCP**	**DP**	**DS**	**DMP**
Water	N/A	✓	⇔	✓✓	✓	✓✓	✓
Agriculture	✓	N/A	✖	✓✓	✓	✓✓	✓
Energy	✓	✓	N/A	✓	✓	✓✓	✓
Water - agriculture- energy inter-sectors alignment for CC adaptation and mitigation	✓	✓	⇔	✓✓	✓	✓✓	✓✓
CC adaptation and mitigation	✓	✓	⇔	✓	✓	✓✓	✓
Total	8	8	3	13	10	15	11
Mean	2	2	0.75	2.6	2	3	2.2
%	●	●	⊙	□	●	■	●
Punjab	**WP**	**AP**	**EP**	**CCP**	**DP**	**DS**	**DMP**
Water	N/A	✓	⇔	✓	✓	✓	✓
Agriculture	⇔	N/A	✖	✓	✓	✓	✓
Energy	✖	✓	N/A	✓	✓	✓	✖
Water-agriculture-energy inter-sectors alignment for CC adaptation and mitigation	⇔	✓	⇔	✓	✓	✓	⇔
CC adaptation & mitigation	✓	✓	⇔	✓	✓	✓	⇔
Total	4	8	3	10	10	10	6
Mean	1	2	0.75	2	2	2	1.2
%	⊙	●	⊙	●	●	●	⊙
KP	**WP**	**AP**	**EP**	**CCP**	**DP**	**DS**	**DMP**
Water	N/A	✓	⇔	✓	✓	✓	⇔
Agriculture	✖	N/A	✖	✓	⇔	✓	⇔
Energy	✖	⇔	N/A	✓	⇔	⇔	✖
Water-agriculture-energy inter-sectors alignment for CC adaptation & mitigation	⇔		⇔	✓	✓	✓	⇔
CC adaptation & mitigation	⇔	✓	⇔	✓	✓	✓	⇔
Total	2	5	3	10	8	9	4
Mean	0.5	1.25	0.75	2	1.6	1.8	0.8
%	○	⊙	⊙	●	●	●	⊙

Gilgit-Baltistan	WP	AP	EP	CCP	DP	DS	DMP
Water	N/A	✓	⇔	✓	⇔	⇔	✓
Agriculture	✓	N/A	×	✓	⇔	⇔	✓
Energy	✓	⇔	N/A	⇔	⇔	⇔	⇔
Water -agriculture-energy inter-sectors alignment for CC adaptation and mitigation	✓	✓	⇔		⇔	⇔	⇔
CC adaptation and mitigation	✓	✓	⇔	✓	⇔	×	✓
Total	8	7	3	9	5	4	8
Mean	2	1.75	.75	1.8	1	0.8	1.6
%	●	●	⊙	●	⊙	⊙	●

Key Words: - Water Policy (WP), Agriculture Policy (AP), Energy Policy (EP), Development Strategy (DS), Climate Change Policy (CCP), Development Plan (DP), Disaster Management Plan (DMP).

Symbols: - ✓✓ = 3 indicates high coherence i.e. The policy document aligns across water, agriculture, and energy sectors, and statements for climate change. Policy documents offer attention to water-agriculture-energy inter-sector alignment to adapt to and mitigate CC, activities, strategies, plans and implementation framework.

✓= 2 indicates partial coherencies i.e. though water-agriculture-energy inter-sector alignment is considered in policy documents to adapt and mitigate CC, mechanisms to achieve it are not well defined. A few activities strategies, & implementation frameworks are incorporated but fail to incorporate comprehensive activities strategies, & implementation frameworks.

⇔ = 1 indicates limited coherence i.e. policy document in general statements (i.e. no specific approaches or plans) support water- agriculture-energy inter-sector alignment to adapt and mitigate CC. But no details are provided about activities, plans and implementation framework.

×= 0 No Coherence i.e. no evidence found that sectoral policy statements are harmonized and/or aligned

■ = 100%; □ = 75 -99%; ● = 50-74%; ⊙ = 25-49% O = less than 25%

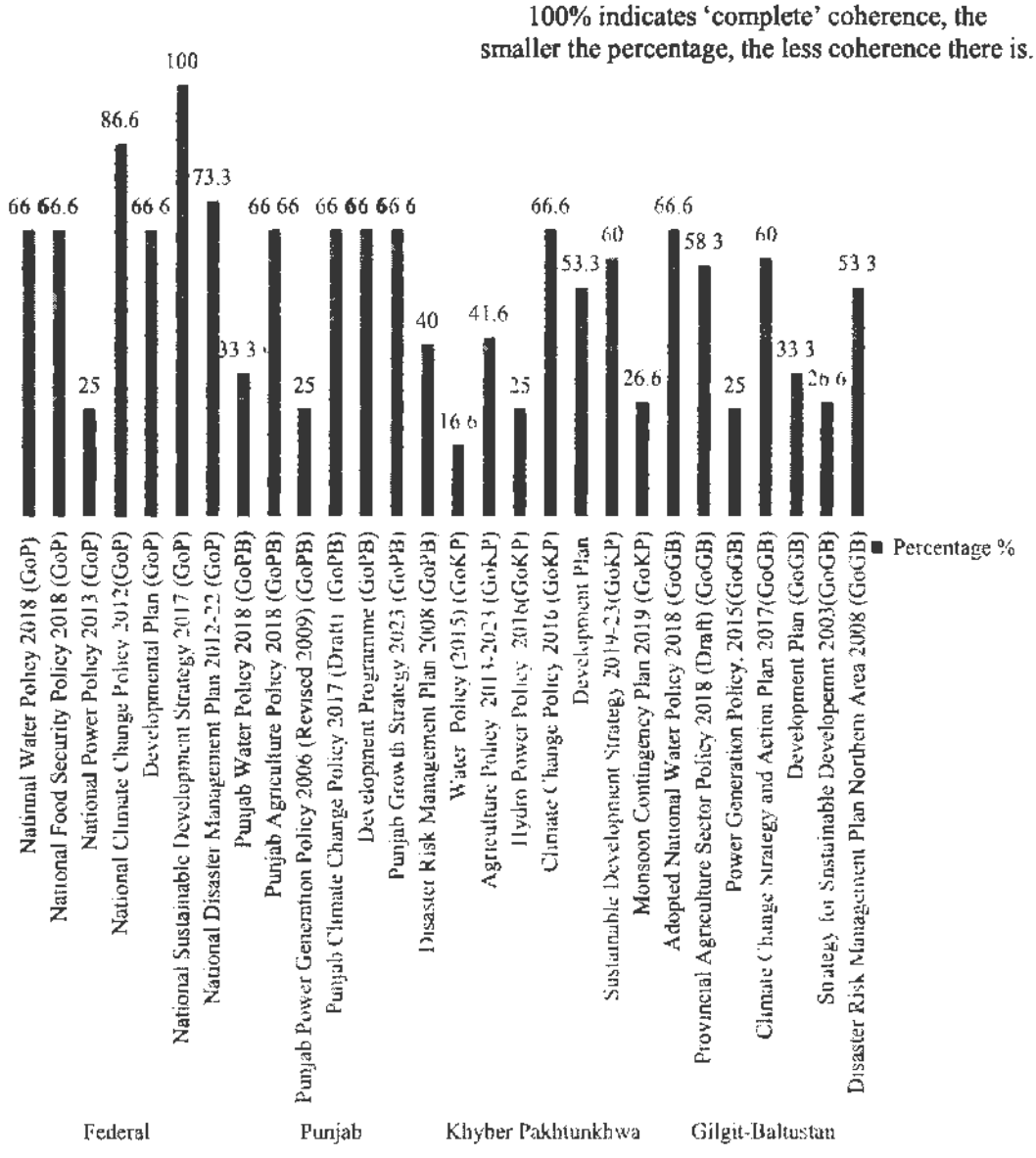


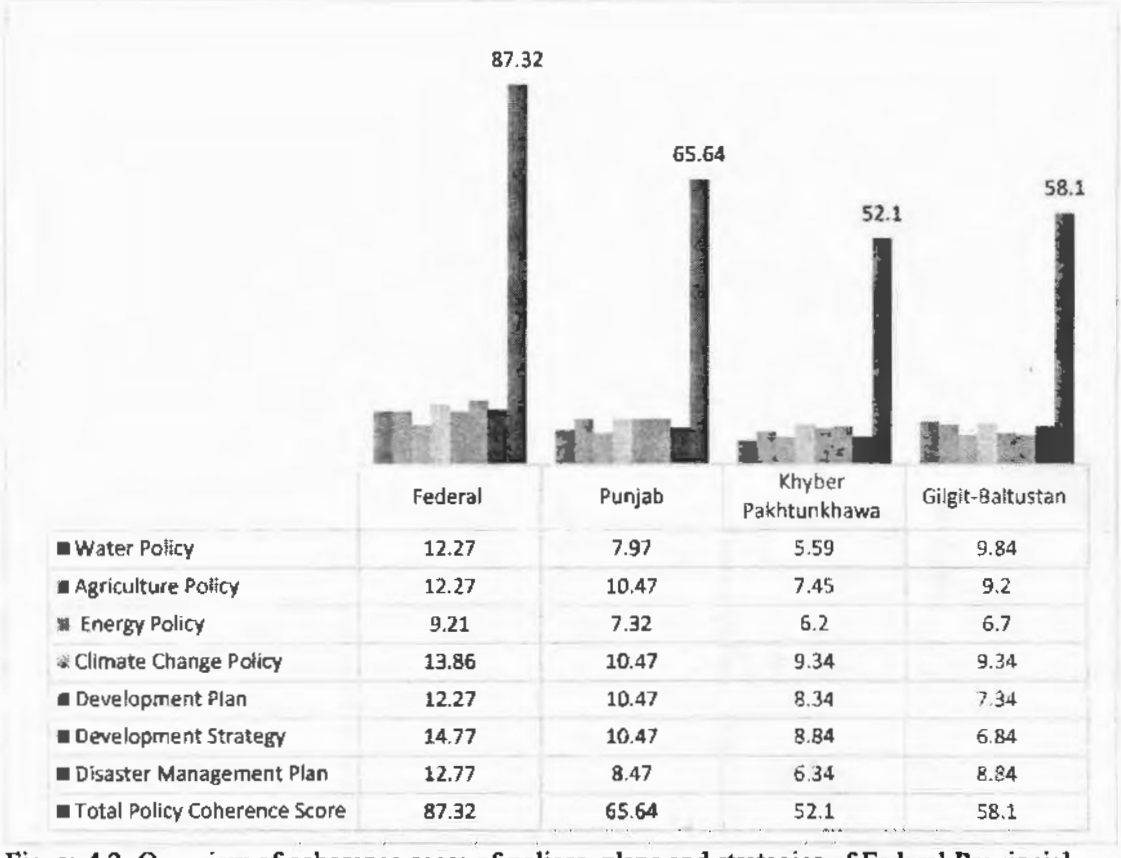
Figure 4.1: Coherence across polices, plans and strategies for five selected themes

Analysis indicates that Federal, PB and GB water and agriculture policies were the most coherent (Table 4.1). For example, the percent coherence score of the Federal Water Policy (2018) is 66.66% (see Table 4.1). The results of coherence analysis at federal and provincial levels across sectoral policies, CC policies, development strategies and plans, and DM plans are shown in Table 4.2 and Figures 4.1-4.3.

Table 4.2: Coherence score of policies with one another and within each province/territory calculated by taking an average of two values (mean of means) from Table 4.1

Sectoral Policies/ Strategies/ Plans		Water Policy	Agriculture Policy	Energy Policy	Climate Change Policy	Development Plan	Development Strategy	Disaster Management Plan	Total Coherence Score	Maximum Possible Coherence Score
Federal	National Water Policy 2018 (GoP)		2	1.37	2.3	2	2.5	2.1	12.27	18
	National Food Security Policy.2018 (GoP)	2		1.37	2.3	2	2.5	2.1	12.27	18
	Energy Policy 2013 (GoP)	1.37	1.37		1.76	1.37	1.87	1.47	9.21	18
	National CC Policy 2012(GoP)	2.3	2.3	1.76		2.3	2.8	2.4	13.86	18
	Annual Developmental Plan 2018-19(GoP)	2	2	1.37	2.3		2.5	2.1	12.27	18
	Natinnal SD Strategy 2017(GoP)	2.5	2.5	1.87	2.8	2.5		2.6	14.77	18
	DM Plan 2012-2022(GoP)	2.1	2.1	1.47	2.4	2.1	2.6		12.77	18
	Total Coherence Score	12.27	12.27	9.21	13.86	12.27	14.77	12.77	87.32	126
	%	●	●	●	□	●	□	●	●	■
Punjab	Water Policy 2018 (GoPB)		1.5	.87	1.5	1.5	1.5	1.1	7.97	18
	Punjab Agriculture Policy 2017(GoPB)	1.5		1.37	2	2	2	1.6	10.47	18
	Power Generation Policy 2006 revised in 2009 (GoPB)	.87	1.37		1.37	1.37	1.37	0.97	7.32	18
	CC Policy 2017(Draft) (GoPB)	1.5	2	1.37		2	2	1.6	10.47	18
	Development Programme 2018-19(GoPB)				2		2	1.6	10.47	18
	Punjab Growth Strategy 2023(GoPB)	1.5	2	1.37	2	2		1.6	10.47	18
	Disaster Risk Management Plan 2008(GoPB)	1.1	1.6	0.97	1.6	1.6	1.6		8.47	18
	Total coherence score	7.97	10.47	7.32	10.47	10.47	10.47	8.47	65.64	126
	%	⊙	●	⊙	●	●	●	⊙	●	■
Kh ybe	Water Policy 2015(GoKP)		0.87	0.62	1.25	1.05	1.15	0.65	5.59	18
	Agriculture Policy (2013-2023) (GoKP)	0.87		1	1.62	1.42	1.52	1.02	7.45	18

	Hydro Power Policy 2016(GoKP)	0.62	1		1.37	1.17	1.27	0.77	6.2	18
	CC Policy 2016(GoKP)	1.25	1.62	1.37		1.8	1.9	1.4	9.34	18
	Annual Development Programme 2019-20(GoKP)	1.05	1.42	1.17	1.8		1.7	1.2	8.34	18
	SD Strategy 2019-23(GoKP)	1.15	1.52	1.27	1.9	1.7		1.3	8.84	18
	Monsoon Contingency Plan 2019(GoKP)	0.65	1.02	0.77	1.4	1.2	1.3		6.34	18
	Total coherence score	5.59	7.45	6.2	9.34	8.34	8.84	6.34	52.1	126
	%	⊙	⊙	⊙	●	⊙	⊙	⊙	⊙	■
Gilgit-Baltistan	National Water Policy 2018 (GoP) Adopted		1.87	1.37		1.5	1.4	1.8	9.84	18
	Agriculture Sector Policy2018 (GoGB)	1.87		1.25		1.37	1.27	1.67	9.2	18
	Power Generation Policy, 2015(GoGB)	1.37	1.25		1.27	0.87	0.77	1.17	6.7	18
	CC Strategy and Action Plan 2017(GoGB)	1.9		1.27		1.4	1.3	1.7	9.34	18
	Annual Development Plan 2017-18(GoGB)	1.5	1.37	0.87	1.4		0.9	1.3	7.34	18
	Strategy for SD 2003(GoGB)	1.4		0.77	1.3	0.9		1.2	6.84	18
	Disaster Risk Management Plan Northern Area 2008	1.8		1.17	1.7	1.3	1.2		8.84	18
	Total coherence score	9.84		6.7	9.34	7.34	6.84	8.84	58.1	126
	%	●	●	⊙	●	⊙	⊙	⊙	⊙	■
Symbols: - ■ = 100%; □ = 75 -99%; ● = 50-74%; ⊙ = 25-49% ○ = less than 25%										



	Federal	Punjab	Khyber Pakhtunkhawa	Gilgit-Baltustan
Water Policy	12.27	7.97	5.59	9.84
Agriculture Policy	12.27	10.47	7.45	9.2
Energy Policy	9.21	7.32	6.2	6.7
Climate Change Policy	13.86	10.47	9.34	9.34
Development Plan	12.27	10.47	8.34	7.34
Development Strategy	14.77	10.47	8.84	6.84
Disaster Management Plan	12.77	8.47	6.34	8.84
Total Policy Coherence Score	87.32	65.64	52.1	58.1

Figure 4.2: Overview of coherence score of polices, plans and strategies of Federal Provincial Governments

With regards to PC on CC, the maximum possible coherence score would be 126. CC adaptation and mitigation mainstreaming in sectoral policies and other selected documents remains partial, with no scores of 3 for any Federal and Provincial policies being achieved. The analysis also indicates that energy sector policies at federal and provincial levels have the lowest policy coherence scores to address CC.

The higher the score, the greater the coherence

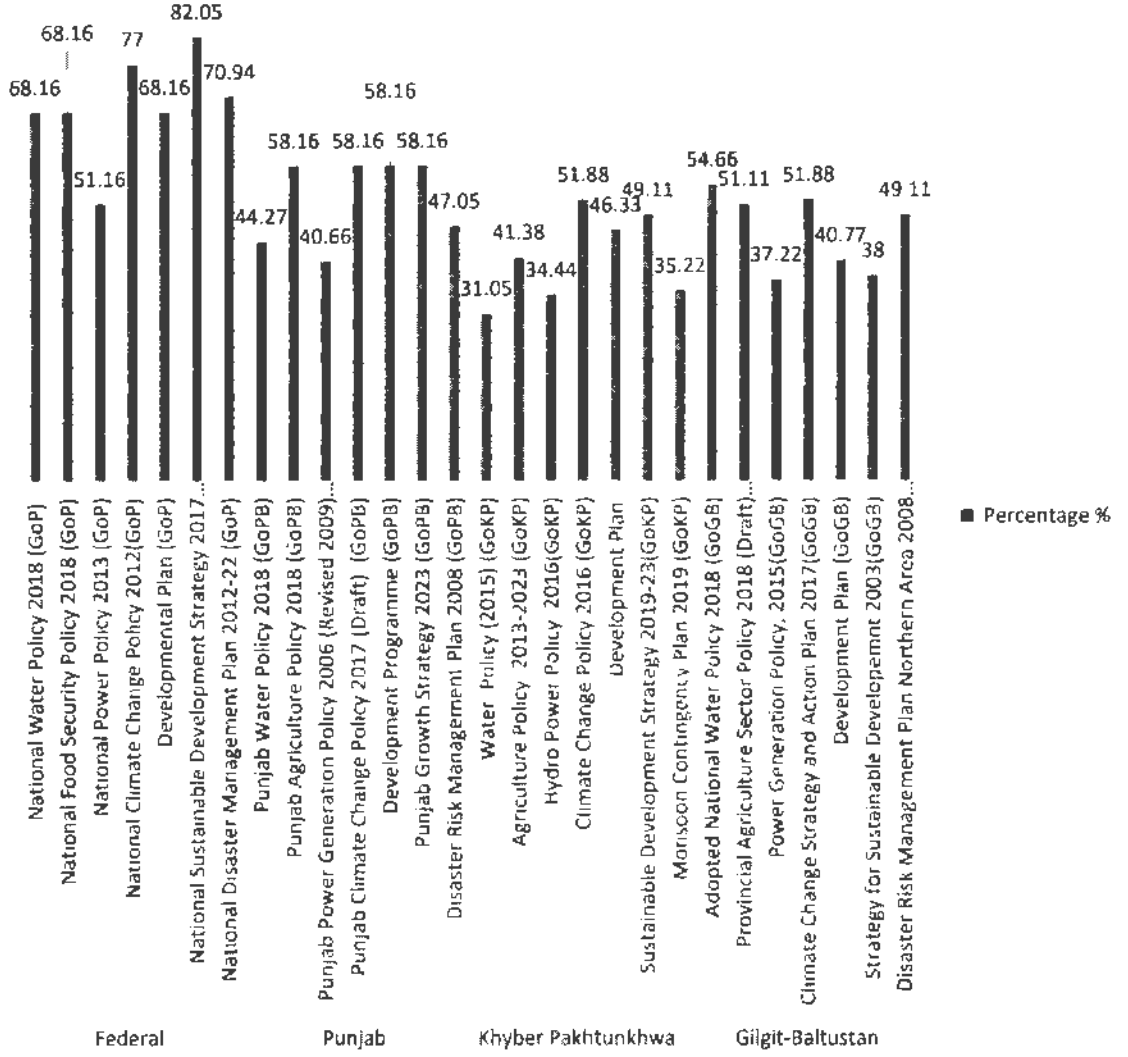


Figure 4.3: Coherence score across sectoral policies documents, strategies and plans of Federal and Provincial level

Analysis indicates that Federal water and agriculture sector policies were the most coherent documents, followed by Punjab, KP and GB region. These coherence scores across policies are established by calculating the percent coherence value of each policy document (Table 4.2). For example, the percent coherence score of the Federal Water Policy (2018) across policies is 68.16 % (see Table 4.2).

4.3. Discussion

Climate Change (Janjua et al., 2017, Kouser et al., 2020), as well as environmental impacts (e.g. air and water quality), are the key challenges of Chinese FDI in Pakistan (Huang et al., 2017). Most energy projects of CPEC are coal-based (Mirza et al., 2019).

Northern Pakistan, a gateway to CPEC has highly vulnerable and sensitive ecosystems (Dadwal and Purushothaman, 2017) that are threatened, in particular by CPEC funded highways (Nabi et al., 2018). Glaciers in Northern Pakistan cover an area of 5,218 km2 (Gilany and Iqbal, 2016). These glaciers are regulating local and global climate functions (Kääb et al., 2012). Glaciers in the region are currently receding rapidly (Gilany and Iqbal, 2016) at a rate of 0.66 ± 0.09 meters per year (Kääb et al., 2012). CPEC is likely to accelerate the melting of these glaciers (Nabi et al., 2018).

Generally speaking, CPEC is expected to lead to a transition from rural to urban economies. Currently, the water demands of urban lifestyles are much higher than those of rural settings and CPEC projects are predicted to lead to an increased water demand for development that could exceed 2467 Mm^3 by 2025 and 4317 Mm^3 by 2050 (Amir and Habib, 2015).

Pakistan's energy sector contributes significantly to GHG emissions. It is projected that GHG emissions (in million tons CO_2 eq.) will increase from 347 to 4621 in 2050 under a Business as Usual (BAU) scenario (GoP and UNFCC, 2011), and the energy sector will contribute almost 60% by the middle of the century (Khan et al., 2016). This is a challenge to CPEC development and could partly be addressed through CC mainstreaming in energy policies and PC, which is currently missing. The urbanization and industrialization agendas under the CPEC plan portfolio further enhance environmental degradation and CC impacts. CC PC is essential for synergies and SD (Di Gregorio et al., 2017) and the CPEC plan fails to consider environmental sustainability and CC PC, mainly because it fails to highlight ways of mitigating CC and environmental impacts. There is a multidimensional interrelationship linkage between development, environmental degradation, and climate-driven disaster events (Gore and Fischer, 2014). Therefore, challenges from the CPEC plan include CC and interlinked environmental degradation, as well as climate-driven disasters.

Whilst the CPEC plan recognizes the multi-dimensional aspects connected with the economic cooperation with China (and with other regional countries), it fails to establish PC mechanisms to deal with environmental and CC global issues. However, the country has legal instruments for the implementation of environmental and CC policies, including the Federal and provincial environmental acts and Pakistan's CC Act 2017. It means the country is progressing with regard to its institutional and legal framework but lacks CC PC. In this context, SEA, a tool to promote CC PC and CC mainstreaming of PPPs (Barker and Fischer, 2003) is included in provincial environmental acts only. CC PC is challenging for Pakistan in particular when considering that currently, the government is spending just 0.00028 % of GDP on EP (Khan, 2016).

The Federal Power Policy (2013) plans for coal-based energy production of 6000 -7000 MW, and also mentions medium and long-term plans for hydro, solar and wind projects, including 2,726 MW of wind electricity, 341MW of solar energy and the possibility for hydropower projects of Bunji (7,100 MW potential) and Diamer-Bhasha (4,500 MW potential) (GoP, 2013d). The Diamer-Bhasha dam is meant to mitigate floods (APP, 2020) and provide low-cost and clean electricity (Gul, 2020). The federal government has set a target of 30 percent of renewable energy generation by 2030 (GoP, 2019a), in

line with an international obligation to reduce GHG emissions. The federal power policy 2013 failed to establish targets for renewable energy generation. Similarly, PB's Power Policy and KP's Hydropower Policy (2016) recognize the hydro potential and aim at generating hydropower of 600 MW at the Federal (GoPB, 2009) and 30,000 MW (GoKP, 2016a) at provincial levels. Pakistan has a hydropower potential of 100,000MW (Qazilbash, 2015) and whilst the government recognizes this potential there is currently no coherent mechanism for implementation.

In context of CC PC across sectoral development policies and CPEC plan (2017-30) an interviewee **(PC-02)** stated that

"Although Pakistan has Ministry of CC and Pakistan Environmental Protection Agency at the Federal level. Similarly, Provincial Environmental Protection Agencies are also established in each Province including Gilgit Baltistan and the State of Azad Jammu and Kashmir to ensure environmentally friendly development in the country. Ironically EPAs failed to implement their policies, laws, and guidelines because as a developing country, Pakistan's sectoral development policies including the CPEC plan 2017-2030 are economic oriented, hence CC and environmental protection challenges are not a priority of decision makers."

Pakistan has been portrayed as a country with low CC adaptive capacity (Abid et al., 2015) contributing only 0.8% to the world's emissions (Hussain et al., 2018, Butt and Khan, 2022) and has committed to reducing carbon emissions by 20% as part of 'Intended Nationally Determined Contributions' (GoP, 2016b). To address CC, Pakistan has CC policies at the federal and provincial levels. The Federal NCCP (2012) highlights CC mitigation measures for sectors such as energy, forestry, agriculture, and livestock. The main CC mitigation targets focus on GHGs emissions reduction in the energy and agriculture sectors, with special attention given to energy efficiency, while other highlighted mitigation areas include changes to the energy mix, renewable energy resource development and increased share of nuclear and hydroelectric power. The country also recognizes that if it wants to tap into its coal resources of 185 billion tons, clean coal technologies will be needed (GoP, 2012d). Green fiscal reforms in the energy and water sectors to reduce carbon emissions are also anticipated.

In the PB CCP 2017, a "Triple Win" strategy is advocated where the need for carbon-compatible and climate-resilient development is stressed and where co-benefits (water-energy-food nexus) are considered. The policy recognizes the need to implement CC adaptation and mitigation measures for National CCP projects. The policy highlights a 4000 MW demand-supply gap (GoPB, 2017b) which needs to be addressed through energy efficiency gains and by supporting renewable power plants. The policy also establishes that coal-based power plants need to adopt pollution control technologies. The KP CCP highlights CC adaptation policy measures for agriculture and water resources. Similarly, it recognizes the hydropower potential of the province and highlights climate mitigation policy measures, for example, indigenous renewable

energy resources and zero-emission strategies, use of solar water heating technologies, and financial incentives, including carbon taxes, subsidies, and tax reforms. Other measures include energy efficiency standards and measures, the promotion of energy efficiency technologies, and awareness-raising for energy-saving measures. The GB CC strategy and action plan (2017) recognizes the need to mainstream CC mitigation and adaptation, highlighting strategies, objectives, and action plans for thematic areas. These include e.g., infrastructure resilience, CC mitigation and adaptation for water and power sectors. It highlights that the current energy demand of GB is more than 500 MW while the hydropower generation potential in GB is more than 40,000 MW (GoGB, 2017c).

In context of CC PC and CPEC Plan, an interviewee **(CA-01)** stated that
"Pakistan has well-established CC policy instruments and a CC policy implementation framework to ensure climate resilience development and promote SD *in the country. In this context, authorities/agencies responsible for the planning and implementation of the CPEC Plan are committed to compliance with the International CC partnership, especially of Chinese partners. CC PC is important to* achieving SD goals. *In the context of the sustainability of CPEC development, there is a dire need to integrate CC policy in key CPEC development areas of energy and agriculture sector policies".*

Pakistan is ranked 7th internationally regarding coal reserves (Khosa and Malkani, 2016) with about 186 billion tons of coal (Ghaznavi et al., 2016) resources in all provinces (Malkani et al., 2016). Coal is currently the most significant and cost-effective energy source in Pakistan (Satti et al., 2014). Thar coal alone has the potential for 100,000 MW of electricity generation (Tribune, 2020). KP province and GB have about 76 percent of the country's total hydro generation potential of 45,861 MW, while PB and AK have a potential of 7,291MW and 6,450MW, respectively (Wajsal, 2015). However, 89 percent of this potential still remains unexploited. In addition to the wind energy potential of more than 300,000 MW (Wajsal, 2015), Pakistan has 2.9 million MW of solar energy potential (Wajsal, 2015, Tribune, 2017b). About 40,000 remote villages will receive solar energy-based electricity (Khan et al., 2014). Solar energy is the best renewable energy option for Pakistan in terms of maintenance cost, operations and life span (Irfan et al., 2019). The country receives solar radiation of 1,500-2,500 hours annually (Kiani, 2019) and Baluchistan alone has an annual mean sunshine duration of 8-8.5 hours per day (Kiani, 2019), the highest solar potential in the world. With regards to PC around CC adaptation and mitigation, Federal Government has the most coherent set of policy documents in place with a total coherence score of 87.32, followed by PB (65.64), GB (58.1) and then KP (51.1) (see Table-4.2). At the Federal level, the National SD Strategy 2017 has the highest PC score (14.77), followed by NCCP 2012 (13.86) and DMP 2012-22 (12.77). The National Water Policy 2018, National Food Policy Security Policy 2018, and Development Plan have a PC score of 12.27. The Energy Policy has the lowest PC score (9.21).

It is important that in Pakistan, entire policy documents are simply copied. For example, GB has adopted federal water and energy sector policies. The problem with simply using federal policy is that they were not developed in consultation with the relevant stakeholders. Such adopted policies are bound to fail to establish coherence with other sector policies. Dependency on policies developed by external stakeholders reduces opportunities for consultation across relevant departments and ministries, meaning that opportunities for greater coherence are being missed. Policies remaining in draft form for a long time have been found to reduce PC throughout the world. Policy evaluation and revision are key for effective PC development (Picciotto, 2005). A common issue in developing countries is infrequent and delayed policy revisions, as well as missing designated specific review dates. Most of the sectoral policies have rarely been revised. For example, Tanzania's national water policy was first developed in 1991 and revised in 2002, while its national agriculture policy was first produced in 2013 (England et al., 2018). In the case of Pakistan's policy documents, they are also rarely updated and approved. Water sector policy formation and approval processes are very slow in Pakistan. The country's first national water policy was approved as recently as 2018 (after many years of having draft status (Khalid, 2017), while Malawi's, Tanzania's and Zambia's National Water Policies are from 2005, 2002 and 1994, respectively.

4.4. Conclusions and recommendations

Pakistan's national SD strategy (2017) recognizes the necessity to enhance PC as a strategic objective. However, this chapter has shown that only some policies, strategies, and plans are being coordinated with other sectoral policies and plans. An effective mechanism of maintaining coherence is missing in Pakistan. CC adaptation and mitigation are covered in all water and agriculture sector policies but not in energy sector policies. This has implications for the CPEC Plan (2017-2030), which has remained a standalone document as it does not consider the country's CC policies, sectoral policies, and PC mechanisms. When a mega-development plan of power generation and infrastructure development projects with expected significant environmental impacts are being executed under the CPEC, there should be coherence with CC, water, agriculture and energy sector policies and plans. Provincial draft CC policies and the GB regional strategy for SD 2003 need revisions with a PC approach in mind. After the 18th constitutional amendment, environment and DM have become provincial matters. Therefore, the NEP 2005 and Provincial DRR plans of 2008 and of the GB region need to be updated and revised. (Janetschek et al., 2020) suggested that active engagement of stakeholders is essential for effective PC for development and mutual benefits in national policies. This is currently missing in Pakistan (Ghani, 2014, Husain, 2013). There is a need to conduct effective stakeholder consultation in policy formation and for existing sectoral policies and CPEC plan revisions to ensure CC mainstreaming and PC for development. It is recommended that CC and environmental concerns need to be integrated into energy sector policies as most of the power generation projects under CPEC are coal-based and are likely to contribute significantly

to GHGs emissions. The government should establish an inter-ministerial committee or a similar body for devising mechanisms at federal and provincial levels for PC to address CC and environmental impacts. In general terms, in Pakistan, the environment and CC remain subject to a supply rather than a demand-driven agenda. The CPEC act as a bridge for BRI development. In January 2021, 140 countries of Asia, Europe, Africa and beyond joined the BRI initiative (Nedopil, 2021). CC and environmental degradation are substantial challenges to BRI development (Hu et al., 2017, Fang et al., 2021, Deng and Du, 2020). CC PC has important implications for countries along the BRI with regards to carbon reduction targets and with regards to achieving coordinated socio-economic and ecological development.

Section: II Environmental Policy Coherence in Pakistan: Implications for CPEC plan (2017-2030).

4.5. Results (Research Objective -2)

This section presents PC analysis results in the context of integrated EG criteria framework, CPEC plan and sectoral policy instruments and country environmental policies.

Table 4.3: Pakistan environmental and CC policy & legal instruments, environmental governance (EG) criteria factors consideration, CPEC development areas, and CPEC plan integration

Policy Instruments	EG evaluation criteria factors consideration											Policy documents consider CPEC's plan (2017-30) related to key development areas, related CC adaptation, mitigation, and EP measures, and CPEC plan integration								
	Direction /Mandate	Capacity Development	Access to info. /Knowledge	Coordination	Accountability/ Legitimacy	Inclusion	Participation	Justice/ Rights	Innovation/ Adaptation	Multi-level	Transparency	Transport infrastructure	Technology Transfer /Development	Energy Sector	Trade	Industrial development	Agricultural Development	Tourism Sector Development	Financial Cooperation	CPEC Plan Integration
National EP 2005 (GoP, 2005b)	✖	✓	✓	✓	✓	◆	✓	◆	✓	✖	◆	●	●	●	●	●	●	●	◉	□
Punjab EP 2015 (GoPB, 2015)	✖	✓	✓	✓	✓	◆	✓	◆	✓	✖	◆	●	●	●	●	●	●	●	◉	□
NCCP 2012 (GoP, 2012d)	✖	✓	✓	✓	□	✓	✓	◆	◆	✖	□	●	●	●	⊙	●	●	■	●	N/A
NCCP2021(GoP, 2021c)	✖	✓	✓	✓	□	✓	✓	◆	✓	✖	✓	●	●	●	⊙	●	●	●	●	□
Punjab CC Policy 2017 (GoPB, 2017b)	✖	✓	✓	✓	◆	✓	✓	◆	✓	✖	□	●	●	●	●	●	●	●	●	□
Sindh CC Policy draft 2017(GoSD, 2017).	◆	✓	✓	✓	◆	✓	✓	◆	✓	◆	◆	●	●	●	■	●	●	⊙	●	✓
AJ& K CC Policy 2017 (GoAJK, 2017a)	◆	✓	✓	✓	◆	✓	✓	✓	✓	◆	✖	●	●	●	⊙	●	●	●	●	□
National Forest Policy 2015 (GoP, 2015a)	◆	✓	✓	✓	□	□	◆	◆	✓	◆	◆	⊙	■	◉	●	⊙	⊙	◉	●	□

National Wildlife Policy 2021 (GoP, 2021b)	✓	✓	✓	✓	◆	◆	✓	◆	◆	✓	◆	⊙	■	◎	●	◎	◎	●	●	□
GB CC Strategy and Action Plan - 2017(GoGB, 2017c)	✓	✓	✓	◆	■	✓	✓	◆	✓	✓	□	●	●	●	●	■	●	●	●	✓
National CC policy implemented Framework 2014-2030 (GoP, 2013a)	✓	✓	✓	✓	□	◆	✓	◆	✓	✓	□	●	●	●	⊙	●	●	●	●	□
National SDGs Framework for Pakistan2018(GoP, 2018e)	◆	✓	✓	✓	◆	✓	✓	✓	✓	◆	◆	●	●	●	■	●	●	■	◎	□
National SD Strategy 2017(GoP, 2017b)	✓	✓	✓	✓	◆	✓	✓	✓	✓	✓	◆	●	●	●	●	●	●	●	●	✓
National Operational Strategy 2006-CDM (GoP, 2006)	✓	✓	◆	◆	□	◆	◆	□	◆	◆	◆	●	●	●	◎	●	●	■	●	□
Pakistan 2025 one nation- one vision (GoP, 2014)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	●	●	●	●	●	●	●	●	✓
Pakistan: Updated NDC 2021 (GoP, 2021f).	✖	✓	✓	✓	✓	✓	✓	□	✓	✖	✓	●	●	●	●	●	●	●	●	✓

PEPA 1997(GoP, 1997a)	✓	□	✓	✓	✓	✓	✓	✓	◆	✓	◆	●	⊙	⊙	●	●	●	■	●	N/A
Punjab EPA (Amendment) Act 2017 (GoPB, 2017c)	✓	□	✓	✓	✓	✓	✓	✓	◆	✓	◆	●	⊙	⊙	●	●	●	■	●	N/A
KP EPA, 2014(GOKP, 2014b)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	◆	●	⊙	●	●	●	●	●	●	N/A
Sindh EPA 2014 (GOSD, 2014a)	✓	□	✓	✓	✓	□	✓	✓	◆	✓	◆	●	⊙	⊙	●	●	●	■	●	N/A
Balochistan EPA, 2012(GoBA, 2012)	✓	✓	✓	✓	✓	□	✓	✓	◆	✓	◆	●	⊙	●	●	●	●	■	●	N/A
GB- EPA 2014 (GoGB, 2014)	✓	□	✓	✓	✓	□	✓	✓	◆	✓	◆	●	⊙	⊙	●	●	●	■	●	N/A
AJ&K EPA 2000 (GOAJK, 2000)	✓	◆	✓	✓	✓	□	✓	✓	◆	✓	✓	●	⊙	●	●	●	●	●	●	N/A
Pakistan CC Act 2017 (GoP, 2017c)	✓	✓	*	✓	□	□	◆	□	✓	✓	□	⊙	⊙	⊙	■	○	◎	■	●	□
GB Forest Act, 2019 (GoGB, 2019)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	◆	●	■	●	●	●	●	●	●	N/A
National Disaster Management Act 2010(GoP, 2010a)	✓	✓	✓	✓	□	□	◆	◆	◆	✓	□	●	■	■	■	■	■	■	●	N/A
National DM (KP)Amendment Act, 2012 (GoKP, 2012)	✓	✓	✓	✓	✓	□	◆	□	◆	✓	□	●	■	■	■	■	■	■	●	N/A

GB DM Act, 2017 (GoGB, 2017d)	✓	✓	✓	✓	✓	□	◆	□	□	✓	□	■	■	■	■	■	◆	■	●	N/A
KP Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015 (GoKP, 2015b)	✓	✓	✓	□	✓	◆	◆	◆	◆	✓	□	●	■	■	●	■	■	■	●	N/A
CPEC Authority Act, 2020 (GoP, 2020a)	✓	□	✓	✓	◆	✓	□	□	□	✓	◆	■	■	■	■	■	■	■	●	✓

Policy document considered	**Symbol**
Detailed cleared and comprehensive policy measures related to the governance criterion factors	✓
In general statements (i.e., no specific policy measures) considered the governance evaluation criterion factor.	×
Failed to consider the comprehensive governance criteria factor	◆
Failed to highlight the governance criteria factor	□
CPEC plan (2017-30) development areas i.e transport infrastructure development, technology development/transfer energy sector, agriculture, trade, industrial development, tourism development, and financial cooperation. The policy measure related to CC adaptation mitigation and environmental protection for these CPEC development areas is recognized and highlighted.	●
Recognized/highlighted CPEC plan (2017-30) related development areas but failed to consider policy measures of CC adaptation mitigation and environmental sustainability for CPEC-related areas.	○
Failed to recognize clear CPEC plan (2017-30) development areas but highlighted CC and environmental protection related measures	⊙
Failed to recognize clear CPEC development areas and related policy measures to address CC and environmental concerns	◎
Failed to recognize the CPEC development area and related policy measures to address CC and environmental concerns	■

4.5.1. Pakistan environmental and CC policy & legal instruments, environmental governance (EG) criteria factors consideration and CPEC development areas

Analysis indicates that CC policy documents lack to consider comprehensive accountability and transparency-related policy measures for effective governance, and mandate /direction of relevant stakeholders in policy development and implementation. In this context, for example, the national EP 2005 and Punjab EP 2015 failed to recognize policy measures related to inclusion, justice/ right and transparency. Similarly, the CC policy documents e.g NCCP 2012 and NCCP 2021 lack consideration of comprehensive accountability and transparency-related policy measures, and Punjab CC (Transparency).

In the context of Federal and Provincial governments, EP acts lack the provision for marginalized stakeholder involvement in the decision-making process. Similarly, except for Balochistan Province and KP Provincial EP Act, Federal and all other Provincial governments, EP acts including CPEC authority act 2020 failed to consider the provision of capacity building of relevant stakeholders. Although Federal and Punjab government EP policies recognize establishing and operationalising SD funds but lack highlight policy measures for international financing such as Global Environment Facility, Climate Investment Funds, and Green Climate Fund.

Tourism development is one of the main CPEC development areas. Except, National and Punjab Province Environmental policies, National CC policy 2021, Vision 2025, NDC 2021, KP & AJK EP act, and GB forest Act 2015 considered tourism sector and eco-tourism development, while other policies and legal instruments like National SDGs Framework 2018, clean development mechanism 2006, EP acts of Federal and Provincial Government of Punjab, Sindh, Balochistan and GB, including National CC Act, National, and Provincial DM Acts, and KP Wildlife Act failed to consider tourism sector.

Similarly, policy documents developed after the CPEC initiation of 2013 lacked to mention of CPEC as an integral part of the document. In this context, Environment and CC Policies, such as Punjab EP 2015, National CC Policy Implemented Framework 2014-2030, KP CC policy 2016, Punjab CC Policy 2017, and AJ&K CC Policy failed to consider the CEPC plan. Similarly, other policies, for example, National Forest Policy 2015, National SD Strategy 2017, National SDGs Framework 2018 and the recently approved National Wildlife Policy 2021 failed to mention the CPEC plan.

Table 4.4. CPEC's Plan key cooperative areas and linked sectoral policy instruments, EG Criteria and CPEC plan consideration

CPEC Plan (2017-30) key development areas	**Government Policy Document**	**EG evaluation criteria factors consideration, policy measures for CC Adaptation/Mitigation Environmental Protection, and CPEC plan Integration**											
		Direction /Mandate	Capacity Development/ Building	Access to information /Knowledge	Coordination	Accountability/ Legitimacy	Inclusion	Participation	Justice / Rights	Innovation/Adaptation	Multi-level	Transparency	CPEC plan Consideration
Construction of an integrated transport system	National Transport Policy 2018 (GoP, 2018f)	✓	✓	✓	✓	✖	◆	✓	◆	✓	✓	✖	✓
	National Electric Vehicle Policy 2019 Final (GoP, 2019e)	✓	✖	□	✓	□	□	✓	□	✓	✓	□	✓
	Electric Vehicles Policy 2020-2025 draft (GoP, 2020d)	◆	□	□	✓	□	✖	◆	□	✓	◆	□	□
	Railways Act 1980 (GoP, 1980)	✓	□	✖	□	✓	□	□	◆	□	◆	◆	N/A
	National Maritime Policy of Pakistan 2002 (GoP, 2002)	✓	✓	◆	✓	□	◆	◆	◆	✓	◆	□	□
Information network infrastructure	Pakistan IT Policy & Action Plan 2000 (GoP, 2000)	✓	✓	✓	✓	□	◆	✓	◆	✖	✓	✓	□
	Telecommunication Policy 2015 (GoP, 2015d)	◆	✓	✓	✓	◆	□	✖	✖	✓	□	□	□
	Digital Pakistan Policy 2018 (GoP, 2018a)	✓	✓	✓	✓	◆	✓	✓	✓	✓	◆	◆	□
	Baluchistan Digital Policy 2021 (GoBA, 2021)	✓	✓	✓	✓	◆	✓	◆	✓	✓	✓	✓	□
Energy fields	National Power Policy 2013 (GoP, 2013d)	✓	✓	✓	✓	✓	✖	◆	□	✓	✓	✓	□

	National Power Generation Policy 2015(GoP, 2015b)	✓	□	✓	✓	□	✖	✓	◆	□	✖	□	□
	Alternative & Renewable Energy Policy 2019 (ARE Policy 2019) (GoP, 2019a)	✓	✓	✓	✓	□	□	✓	✓	✓	✓	✓	□
	National Electricity Policy 2021 (GoP, 2021d)	✓	✓	✓	✓	✓	◆	✓	□	✓	✓	✓	□
Trade and industrial	National Automotive Development Policy (ADP) 2016-21 (GoP, 2016a)	◆	□	□	□	□	□	◆	□	□	□	□	□
	Punjab Industrial Policy 2018 (GoPB, 2018d)	◆	✓	✓	◆	□	✓	✓	◆	✓	◆	✓	✓
	KP Industrial Policy (draft) 2020-2030 (GoKP, 2020)	✓	✓	✓	✓	□	✓	✖	✓	✓	◆	□	✓
	Strategic Trade Policy Framework 2020-25 (GoP, 2020c)	✓	✓	✓	✓	□	✓	✓	✖	✓	✓	✓	✓
	Trade-Related Investment Policy Framework draft (2015-23) (GoP, 2015e)	✖	✖	□	✖	□	✖	□	□	✖	✖	◆	✓
	Investment Policy 2013 (GoP, 2013b)	✓	✓	✓	✓	◆	✓	◆	✓	✓	✓	✓	□
	National Tariff Policy 2019-24(GoP, 2019f)	✓	□	□	□	□	□	□	◆	✓	✓	◆	□
	E-Commerce Policy of Pakistan 2019 (GoP, 2019d)	✓	✓	✓	✓	◆	◆	✓	✓	✓	✓	✓	□
	SEZs Act, 2012 (Amended up to 31st December 2015) (GoP, 2016c)	✓	□	□	✓	✓	□	□	✓	□	✓	□	□
Agricultural development	National Food security Policy 2018 (GoP, 2018b)	✓	✓	✓	✓	◆	✓	◆	✓	✓	✓	◆	✓
	KP Agriculture Policy (2015-25) (GoKP, 2015a)	✓	✓	✓	✓	◆	✓	✓	✓	✓	✓	◆	□

	Sindh Agriculture Policy (2018-2030) (GoSD, 2018)	✓	✓	✓	✓	□	◆	✓	✖	✓	✓	◆	□
	Punjab Agriculture Policy 2018 (GoPB, 2018b)	✓	✓	✓	✓	◆	✓	✓	✖	✓	✓	✓	✓
	Agriculture Sector Policy Gilgit Baltistan 2018 (GoGB, 2018)	✓	✓	✓	✓	□	✓	✓	✓	✓	✓	✓	✓
	National Water Policy 2018 (GoP, 2018d)	✓	✓	✓	✓	✖	◆	✓	✓	✓	✓	◆	□
	Punjab Water Policy 2018 (GoPB, 2018e)	✓	✓	✓	✓	□	◆	✓	□	✓	◆	□	□
Tourism development	National Tourism Policy 1990 (GoP, 1990)	✖	✖	✓	✓	□	□	□	□	◆	✓	□	□
	Punjab Tourism Policy 2017 Draft (GoPB, 2017d)	✓	✓	✓	✓	◆	✓	✓	□	□	✓	✖	✓
	Sindh Tourism Policy 2014 draft (GoSD, 2014b)	✖	✓	✓	✓	✓	✓	✓	✖	✓	✓	□	◆
	KP Tourism Policy 2013 (Pakistan, 2013)	✓	✓	✓	✓	✖	◆	✓	✖	◆	◆	□	□
	KP Tourism Policy 2015 (GoKP, 2015c)	✖	✓	✓	✓	✓	□	✖	✖	✖	✓	□	□
	Gilgit-Baltustan Tourism Policy 2017 (GoGB, 2017e)	✓	✓	✓	✓	✖	✓	✓	□	□	✖	□	✓
	Azad Jammu and Kashmir Tourism Policy 2018 (GoAJK, 2018)	✓	□	✓	✓	✓	◆	✓	✓	□	✓	◆	□
Financial Cooperation	Pakistan Economic Survey 2020-21 (GoP, 2020b)	✓	✓	✖	✓	◆	◆	✓	✓	✓	✓	✓	✓
Security	National Internal Security Policy 2018-2023 (GoP, 2018c)	✓	✓	✓	✓	✖	✓	✓	✓	✖	✓	✓	✓
	National Security Policy of Pakistan 2022 -26 (GoP, 2022b)	✓	✓	✓	✓	✖	✓	✓	✓	✓	✓	✖	✓

Plan	CPEC Plan 2017-30 (GoP, 2017a)	✖	✓	✓	✓	☐	✖	✓	✖	✖	✓	☐	what

Policy document considered	Symbol
Detailed cleared and comprehensive policy measures related to the governance criterion factor	✓
In general statements (i.e., no specific policy measures) considered the governance evaluation criterion factor.	✖
Failed to consider the comprehensive governance criteria factor	◆
Failed to highlight the governance criteria factor	☐

4.5.2. CPEC's plan key cooperative areas, linked government policy instruments, environmental governance criteria factors and CPEC Plan consideration

The key results are categorized in two main headings

4.5.2.1. CPEC plan consideration in legal and sectoral policy instruments

The basis of CPEC started way back in 1990 (Kousar et al., 2018). However, the initial MoU of CPEC development between China and Pakistan was signed in July 2013. In the context of the CPEC consideration in the policy document, an important result is that the policies related to energy sector development, for example, National Power Generation Policy 2015, Alternative & Renewable Energy Policy 2019 and National Electricity Policy 2021 failed to mention the CPEC plan. Agriculture development is an important sector of the CPEC plan. Analysis indicates that agriculture and water sector policies, for example, KP Agriculture Policy 2015-25, Sindh Agriculture Policy 2018-2030, National Water Policy 2018, and Punjab Water Policy 2018 lack to consider CPEC.

With regards to industrial and transport sectors' development policies for example Punjab Industrial Policy 2018, KP Industrial Policy 2020-30, Strategic Trade Policy Framework 2020-25, Trade Policy Framework draft 2015-23, and National Transport policy 2018 mentioned CPEC. However, the policies, for example, National Tariff Policy 2019-24, E-Commerce Policy 2019, and SEZs Act Act, 2012 failed to consider the CPEC plan.

Likewise, the tourism sector development is an important component of CPEC plan 2017-30. In this context, except for Punjab Tourism Policy 2017, Sindh Tourism Policy 2014 and GB Tourism Policy 2017 consider CPEC's role. However, other tourism sector policies, for example KP Tourism Policy 2015 & AJ&K Tourism Policy 2018 failed to mention the CPEC plan.

Similarly, other sectoral policies related to the CPEC development plan areas, for example, National Automotive Development Policy 2016-21, Electric Vehicles Policy 2020-25, Telecommunications Policy 2015, Digital Pakistan Policy 2018, Baluchistan Digital Policy 2021 also failed to consider CPEP Plan. The dearth of CPEC plan consideration in CPEC linked sectoral policies indicates a lack of synergy and policy coordination among existing developmental policies and the CPEC plan.

4.5.2.2. Environmental governance criterion factors consideration in sectoral policy instruments

In the context of good governance criterion factors the sectoral policies, for example, energy sector policies such as National Power Policy 2013 lack to consider / mention good governance criteria policy measures related to (i.e justice/ rights); National Power Generation Policy 2015 (i.e. capacity building, accountability/legitimacy, innovation/ adaptation, multi-level); Alternative & Renewable Energy Policy 2019 (i.e. accountability/legitimacy inclusion); National Electric Vehicle Policy 2019 (i.e access

to information knowledge, accountability/legitimacy, inclusion, justice/right and transparency); and National Electricity Policy 2021 (i.e justice/ rights).

In the context of the agriculture, water and transport sector, the policies, for example, Sindh Agriculture Policy 2018-30 failed to consider policy measures for (i.e., accountability/legitimacy); Baluchistan Agriculture Policy 2021 (i.e., accountability/legitimacy, transparency); GB Agriculture Policy 2018 (i.e., accountability/legitimacy); Punjab Water Policy 2018 (i.e., accountability/legitimacy, justice/ rights and transparency). The transport sector policy instruments, for example, electric vehicle Policy 2020-25 lack mention of policy measures (i.e capacity building, access to information/knowledge, accountability/ legitimacy, justice/right and transparency); and the Railways Act 1980 (i.e. accountability/legitimacy, multi-level). Similarly, industrial development related policies for example National Automotive Development Policy 2016-21 failed to consider policy measures for (i.e. capacity building, access to information/knowledge, coordination, accountability/legitimacy, inclusion, justice/ rights, innovation/adaptation, multi-level); Punjab Industrial Policy 2018 (i.e. Accountability/legitimacy); KP Industrial Policy 2020-30 (i.e. Accountability/legitimacy and transparency); Strategic Trade Policy Framework 2020-25 (i.e. accountability/legitimacy); Trade Related Investment Policy Framework 2015-23 (i.e. access to information/knowledge, accountability/legitimacy , participation, Justice/ Right, transparency); National Tariff Policy 2019-24 (i.e. capacity building, access to information/knowledge, coordination, accountability/legitimacy, inclusion and participation); and SEZs Act, 2012 (i.e. capacity, access to information/knowledge, inclusion, participation , innovation/ adaptation and transparency).

In the context of tourism sectors, analysis indicate that the Pakistan National Tourism Policy lack to mentioned accountability/legitimacy, inclusion, participation, justice/ rights, and transparency-related policy measures. Similarly, Provincial Punjab Tourism Policy 2017 failed to mention justice/ rights, and innovation / adaptation-related measures; while Sindh Tourism Policy 2014, KP Tourism Policy 2015, and GB Tourism Policy 2017 lack transparency-related policy measures.

Similarly, other CPEC development-linked areas policies such as Pakistan IT Policy & Action Plan 2000 failed to mention policy measures (i.e. accountability/legitimacy); and Telecommunications Policy 2015 (i.e. inclusion, innovation/ adaptation, multi-level). In the context of the CPEC plan, analysis indicates that it failed to consider policy measures related to accountability/ legitimacy and transparency interventions. Similarly, analysis indicates that CPEC Authority Act, 2020, lacks consideration for provisions related to capacity building, stakeholder participation, justice/rights, and innovation/ adaptation of CPEC development. The GoP has considered CPEC Authority as a parallel setup and decided to abolish it by arguing that "It is a redundant organization with a huge waste of resources which has thwarted speedy implementation of the CPEC" (Rana, 2022 p, 11). In context of security, the analysis indicated the country's national's security policies for example mentioned comprehensive governance criterion factors including CPEC plan consideration except accountability and innovation related policy measures.

4.6. Discussion

Globally SDGs have a central focus on promising impacts on human health, environmental sustainability, enhancing the quality of life, and economic development (Agirreazkuenaga, 2019, Raszkowski and Bartniczak, 2019, Gambetta et al., 2019). The Chinese 6-trillion-dollar multi-decadal BRI (Salman et al., 2022) is a developmental agenda for enhancing fiscal collaboration and development among developing nations including Pakistan. Emerging economies needed to address environmental concerns to promote SD by sharing emission-reduction technologies (He et al., 2022). The increase in carbon dioxide pollution is associated with growing economic growth (Jin et al., 2022) and a rise in energy consumption.

The countries contributing to BRI are mostly developing nations, different from the developed countries in terms of science and technology, efficiency, and resource consnmption. The developing nations mainly have extensive economies, with high resource consumption and great environmental challenges. BRI have a considerable environmental footprint that may deteriorate the sustainable production and consumption of BRI countries (Salman et al., 2022). In this context, key mechanisms and coordinated policies are needed to achieve a common goal (He et al., 2022) and fast-track sustainable growth in line with the SDGs, and mitigate the inequalities between

BRI countries and China support green and sustainable BRI (Wang et al., 2022). In terms of CPEC development, Chinese Companies are shifting and dumping their old technology in Pakistan. For example, globally, coal-based power generation is becoming obsolete and countries are moving towards renewable energy sources, while China under the CPEC portfolio is establishing coal-fired power plants (Bansal, 2021). Similarly, Graceffo (2021) emphasized that China is cutting down on GHGs emissions, fixing green energy and solar in its home country, and transferring pollution to other BRI host countries. e.g, China transferred a coal-based fired utility plant to Cambodia. The net international emissions will stay the same, however, the emissions charges of this plant have been shifted from China to Cambodia. In such a way China is profiting by transferring its GHGs emission to BRI countries. Host countries are using up their carbon budget on BRI projects—this makes China richer and increases the debt of host countries.

In this context, Gallagher and Qi (2021) highlighted that the Chinese government's environmental policies governing national investments are more rigorous than those overseeing foreign investments. From the analysis, it seems that policy coordination is an important concern of sustainable and green CPEC development. Socio-economic development cooperation and technology transfer a key cooperative areas CPEC plan (GoP, 2017a). However, there is a lack of policy coordination in Pakistan. For example technology transfer is an important tool to mitigate the CC and environmental impacts related to the BRI project Chen et al. (2020) and to enhance environmental sustainability in the regions.

In this context, CPEC Chinese investment provides opportunities for technology transfer to address Pakistan's Agriculture related issues (Khan, 2020) and to bring a trade revolution to the country (CRI and PCI, 2021). In context of industrial cooperation and nine Planned SEZs of CPEC Plam-2017-2030. The revised SEZs Act-2016 offers incentives for all investors to attract FDI and technological transformation in Pakistan (Khan, 2017). Additionally, the Provincial investment promotion authorities are responsible "*to facilitate developers and enterprises in complying with environmental regimes and social development (GoP, 2016c p.10).*" The Intergovernmental Panel on CC (IPCC), define technology transfer as " *....a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to CC amongst different stakeholders such as governments, private sector entities, financial institutions, non-governmental organizations (NGOs) and research/education institutions ...*"(GFF, 2019).

Literature reveals that China is shifting the old and pollution generation technology in BRI Countries. In this context, Gu et al. (2019) concluded that the image of BRI providing neat technical and financial solutions to countries' development is often contradicted by social and political issues and interests. Effective knowledge and technology transfer are vital mechanisms of SD (Verkhovets and Karaoğuz, 2022). BRI Countries' environmental policies and legal instruments lack provisions to address FDI related projects Technology transfer and CC and Environmental Concerns. For example, National EP 2005 and Punjab Government EP 2015 highlighted policy measures such as "provide financial and other incentives (reduction/elimination of tariffs, low-interest loans, appreciation certificates and awards) for technology up-gradation, adoption of cleaner technology, implementation of pollution control measures and compliance with environmental standards".

In addition to this National EP 2005 section, cross-sectoral guidelines on trade and environment highlighted that the government may build the capacity of public and private organizations in areas such as Technology Transfer, laboratory certifications and testing. However, both NEP and Punjab Environmental Policy failed to recognize FDI related technology transfer policy measures. Similarly, in the context of technology development, the country's EP Acts of Federal and Provincial Governments, for example, the Pakistan EP Act 1997 provision under section (6) subsection (j) recognizes that the EPA shall "take measures to promote research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and SD "(GoP, 1997a p. 9). However, Country EP Acts lack to consider Provisions related to Technology transfer especially FDI related development project technology transfer and Environmental concerns.

The BRI increases emissions among nations, especially BRI countries. Graceffo (2021) recognize that there is a lack of transparency in BRI project funding. In this context, Zubedi et al. (2022) concluded that China needs to adopt rigorous policy improvement to enhance transparency, to mitigate ecological, social, and corruption risks. The bigger issue in the execution of CPEC is greater transparency related to the disclosure of the terms in public on which the project is being negotiated (Malik, 2017). In this perspective, there have been legitimate concerns around CPEC developmental projects

and transparency standards. The state can only allay these by engaging with the stakeholders and giving them an accurate picture of the actual costs, the work done on each project, the audits carried out and similar information (Dawn, 2022). Transparency in the decision-making process and consistency of good governance are essential to moving ahead on the avenue of success (Shabbir et al., 2021). Numerous transparency related issues are highlighted in BRI projects. In the case of CPEC, for example, Waheed (2020) identified that poor transparency and project connectedness are impacting the performance of the CPEC project.

According to Transparency International, Pakistan has declined 16 marks on the global Corruption Perceptions Index for 2021 and is ranked 140th out of 180 countries (Ahmed, 2022). In this context, Pakistan National Accountability Bureau and China Government have signed a memorandum of understanding to ensure transparency in CPEC projects (Report, 2021) to end corruption. Analysis indicates that Pakistan policy instruments, for example, CC, EP policies, energy sector, trade and industrial sector, and agriculture development policies, lack mentioned comprehensive policy measures of transparency and accountability for policy implementation. Transparency can be explained in different approaches. Nelson (2003) for example, states that transparency means fullness of disclosure of knowledge and information, documents accessibility, timely readiness of knowledge information and processes for corrective actions. In this context, (Waheed, 2020) explained that freedom of information for citizens and fighting corruption remain the key components of transparency. The lack of public provision and institutional coordination in Pakistan is accompanied by poor transparency in the effectiveness and success of CEPC projects.

Similarly, in the context of CC and environmental sustainability, transparency and strict policies keep industries on track to accomplish a reduction in GHGs emissions (Dawson et al., 2022). Environmental transparency is a vital component for stakeholders and investors to streamline environmental responsibility (Giannarakis et al., 2017, Lister, 2018). Country policies for example environmental, and CC policy instruments failed to mention comprehensive policy measures related to transparency and accountability of policy implementation. In the context of CPEC development, there is a lack of a communication strategy and stakeholder engagement in decision-making (Gu et al., 2019). SD not only expands the socio-economic and cultural improvement but also gets to the rights of the future generation and social justice (Ghasemi et al., 2016). The government policy documents need to consider policy measures related to justice and rights for ensuring social sustainability. For example, CC policies need to consider policy measures for the socio-economic sustainability of CC vulnerable communities such as farmers and women.

In context of CC PC, Policy Coordination across sectoral development policies, and CPEC development and interviewee (**Min-02**) stated that

"*The CC policy finds coherence with education, industry, agriculture, energy and other cross-sectoral policies. It is my personal view, that in the real term, there is a disconnect and no coherence is found, the capacity issues are very much there, also the adaptation and mitigation aspect of CC into the other relevant policies is of great concern.*

Similarly, the capacities of provincial governments and respective departments are either weak or do not exist"

Shawoo and McDermott (2020) concluded that Pakistan's overarching CC strategy highlights justice among nations while disguising national disparities, poverty, and vulnerability, which are only addressed by non-state actors through isolated activities rather than in a coordinated manner within national policy. In this context (Butt, 2021a) highlighted that environmental regulations lack effective execution and coordination amongst and across the provincial and federal departments or authorities. Similarly, the policies e.g National Water Policy 2018 had overlapping responsibilities for both federal and provincial governments, lacked a coherent framework and failed to suggest an effective policy execution mechanism to cater to institutional governance issues (Khayyam and Tariq, 2022). Innovation is considerably recognized as a major driver of fiscal growth (Andergassen et al., 2009, Bae and Yoo, 2015, Santacreu, 2015) to reduce inequality within and between countries. It impacts global competitiveness, quality of life, infrastructure development, employment and trade openness, leading to high economic growth (Maradana et al., 2017) and sustainable economic development. Similarly, inclusive innovations and the transfer of technologies from developed countries considerably address urgent developmental challenges (Shkabatur et al., 2022).

Economic growth made an abrupt consequence on environmental degradation. The innovation is considered an instrument to comply with the 2030 Agenda and the Paris Agreement (Samaniego et al., 2022). There is a need to integrate innovation measures into the decision-making process related to CPEC development. The analysis indicates that Pakistan EP and CC policy instruments for example NCCP 2021, National Wildlife Policy 2021, National SD strategy 2017 and country EP acts, and National DM Act lack to consider comprehensive policy measures related to innovations to address CC and environmental degradation. In this context (Chen et al., 2022b) concluded that policymakers required to encourage green technological innovations to mitigate energy consumption and to promote co-friendly projects in BRI regions.

In the context of PC and CPEC Plan 2017-2030, an interviewee **(CA-02)** stated that "*I would say CC is not integrated but the environment and environmental impacts are embedded in CPEC-related policies of energy, industrial, and agriculture sectors. CC is a more recent phenomenon. This time more because of the floods, otherwise, the CC as such is not reflected but the environment is considered* ".

The tourism sector is the biggest trade industry in the world Zeng et al. (2020) including Pakistan due to CPEC development. The global tourism sector is overwhelmed by CC impacts (Abbas et al., 2019). CC and tourism development are interlinked (Becken and Hay, 2012) and offer a significant policy dilemma for numerous countries (Gössling et al., 2009) like Pakistan. CC is a key development issue Kok et al. (2008), while the tourism sector has the potential to boost financial growth (Hall and Lew, 2009, Telfer and Sharpley, 2015). However, tourism may contributes to and is deeply concern by CC and environment.

In perspective of Pakistan, CPEC development will boost tourism and grow trade and commerce (Manzoor and Wei, 2018). GB is the gateway to CPEC development (Alam et al., 2019). The infrastructure development under CPEC will boost the tourism sector in Pakistan (Baig and Zehra, 2020) and especially in the GB region. The resulting inflow of visitors and transport infrastructure development has its effects on the biodiversity, local culture, natural environment and climate of the GB region. In this context, Baig et al. (2021) highlighted that GB's mountainous ecosystem is very sensitive, vulnerable and endangered to CC. The GB's existing tourism policy concentrates explicitly on fiscal sustainability, however, ignores the sociocultural and ecological concerns(Nazneen et al., 2019).

The governance has a robust considerable direct and indirect impact on tourism development (Baig and Zehra, 2020). In the context of good governance criteria factors, analysis indicates that Pakistan National Tourism Policy failed to consider accountability/legitimacy, inclusion, participation, justice/ rights, and transparency-related policy measures. Similarly, other Provincial Government policies, for example, Punjab Tourism Policy failed to mention justice/ rights, and innovation/adaptation related measures; while Sindh Tourism Policy, KP Tourism Policy, and GB Tourism Policy lack transparency related policy measures. In this context, an important policy implication is to revise the country's existing tourism policies in the context of missing good governance criteria factors and CPEC plan integration.

Finally, policy continuation is a challenge in Pakistan. Developmental policies changed with changing government tenures. In the context of CPEC, for example, in 2019 the government has established CPEC authority through an ordinance to accelerate the pace of CPEC related activities, find new drivers of growth, unlock the potential of the interlinked production network and global value chains through regional and global connectivity (News, 2019). Similarly, Ali (2021a) recognizes that the CPEC Authority establishment is for the planning, facilitation, coordination, monitoring and evaluation of CPEC projects; to act as a one-point interface to the Chinese counterparts on all CPEC matters.

In this connection, in 2021 the government gave legal cover to CPEC Authority through CPEC Authority Act 2020. The opposition political parties strongly protested the Bill, when it was hurriedly passed without debate, and without taking other stakeholders into confidence (Ahmed, 2021). However, the newly changed government has decided to abolish the CPEC authority . The government refer it as a redundant authority that wasted resources and is a parallel set-up to the multibillion-dollar CPEC project (Desk, 2022). In this context, an expert **(AC-05)** stated that
"Due *to political clashes in Pakistan, the uptake of the developmental project by one's government is always neglected by the next government this makes the implementation unsuccessful.*"

4.7. Conclusion

Globally, environmental and CC impact are deemed as a hindrance in the path of sustainable economic development. Key socio-ecological challenges related to environmental agenda (e.g., CC, biodiversity conservation, SDGs) are hindered by a lack of policy coordination in decision-making instruments. The policy integration and coordination have a dynamic significant positive impact on the project's competitive advantage. BRI aims to include policy coordination, infrastructure connection, smooth trade and capital flow as well as friendship among people (Yang and Li, 2019).

In this context, CPEC plan 2017-30 highlighted that "national development strategies will facilitate policy coordination between China and Pakistan" (GoP, 2017a p.6) and to establish and strengthen multi-level cooperation mechanisms and policy coordination among both countries. Pakistan is a signatory of the UN 2030 Agenda for SDGs, 2015 Paris Agreement and Sendai Framework for DRR 2015-2030. These are key important international frameworks committed to enhancing policy coordination to promote SD. The SDGs promote interconnected policies to address governance and policy-implementation issues (Koga et al., 2020) for example policy capacity. Similarly, (Farmery et al., 2019) concluded that policy coordination enables the establishment of transparency and accountability in the decision-making process.

In this context, Pakistan National SD Strategy 2017 under SDG-17, Target 17.13 recognize "enhance global macroeconomic stability, including through policy coordination and policy coherence" (GoP, 2017b p.103). The CPEC plan linked sectoral policy coordination is important for the sustainability and climate resilient green CPEC development. Policy revision is an important element to ensure policy coordination. CPEC development linked area policies, for example, the National Maritime Policy of Pakistan 2002 (GoP, 2002) and National Tourism Policy 1990 failed to integrate accountability/legitimacy and transparency-related policy measures and CEPC integration. Additionally, policy lack consideration of comprehensive governance criteria factor related to access to information/knowledge, participation, and justice/right innovation/adaptation measures. After the 18th Constitution Amendment of Pakistan, tourism became purely a provincial subject (Fatima, 2020). These long-waiting National Tourism Policy 1990 and National Maritime Policy 2000 need to be updated in the context of CPEC development areas and good governance criteria factors. Similarly, draft policies, for example, Punjab Tourism Policy 2017, and Sindh Tourism Policy 2014 need to be revised and approved. Marine security development is an important component of CEPC, Chang and Khan (2019) to achieve the geostrategic objectives, and to enhance marine product export, for example, fisheries products (Ali et al., 2020).

In this context, Ullah et al. (2021b) recognize that CPEC development resulted in the industrialization and urbanization of the marine and coastal areas. The marine ecological safety policies that regulate coastal and marine areas EP are either inadequate or entirely missing. There is a lack of CPEC plan consideration in sectoral policies related to information network development; energy policies; industrial

development (i.e., investment policy, national tariff policy, and SEZs act); agriculture and tourism sector development policies. These sectoral policy documents need to be updated in context of the policy coordination mechanism and highlight CPEC's contribution and coordination. Similarly, country's current environmental and CC acts failed to provide provisions to deal FDI related environmental and CC concerns. This analysis comes up with the conclusion that at present there are no well-established policy coordination and coherence mechanism between the CPEC development plan, country environmental and CC policy instruments and CPEC-related sectoral development area polices

4.8. Policy Implications

Based on the document analysis, following policy implications were made for the sustainability of the CPEC plan. The analysis indicates that comprehensive transparency-related policy measures are lacking in the CPEC plan and related sectoral development policies. Transparency is a key element of EG to promote public trust, generosity, and integrity in ecological decision-making processes (Deane et al., 2017). In Pakistan, numerous transparency, accountability, and corruption-related issues in general and specifically for CPEC development are reported in media and scientific literature. In this context, it is recommended to develop comprehensive transparency and accountability mechanisms procedures in CPEC plan and related sectoral policies. It will help to enhance transparency, increase trade and sustainability, to adopt and mitigate CC, ecological, and corruption risks.

In context of capacity building of relevant stakeholders, analysis indicates that capacity development-related policy measures are recognized in CPEC plan and related sectoral policy documents. However, the country's EP acts lack recognized provisions related to capacity building/development. In this context (Butt, 2021a) recognize the lack of capacity building, proficiency and technical expertise in executing ecological legal frameworks. Literature reveals that relevant stakeholders' capacity building issues are key concerns of CPEC implementation and sustainability see (Umar et al., 2017, Waheed, 2020, Jahangir et al., 2020, Gu et al., 2019). In this context, the government must develop a coordinated strategy related to strengthening policy coordination to address environmental and sustainability and capacity building issues in CPEC implementation. Results reveal that cross-jurisdiction policy coordination coherence and national policy coordination need to be enhanced. Furthermore, concrete actions to deal with inequities, along with more comprehensive approaches for CC adaptation mitigation and environmental sustainability of the CEPC plan is required.

Chapter -5

5. INTEGRATION OF ENVIRONMENT AND DISASTER MANAGEMENT IN CPEC PLAN FOR SUSTAINABILITY

5.1. Introduction

The EPI in DM is an approach that seeks to align environmental policies with DM policies to promote SD and disaster resilience development. This integrated approach recognizes the interconnectedness of environmental and sectoral policy instruments in a coordinated and integrated manner. In the context of CPEC, integrating environmental policy into DM is critical for promoting the sustainability of CPEC plan. In this context, EPI into DM in CPEC is critical to establish environmental, social and DRR safeguards for all CPEC projects. These safeguards include requirements for conducting environmental and social impact assessments, developing mitigation and DRR measures, and establishing monitoring and evaluation mechanisms with effective stakeholder engagement and consultation.

The CPEC projects on implementation have potential environmental and disaster vulnerability concerns, it is important to integrate environmental and DM considerations into the CPEC plan to ensure sustainability. One way to do this is to conduct EIAs and DRR assessments for CPEC projects. The EIAs identify potential environmental risks and help to design suitable mitigation measures. Similarly, DRR assessments identify potential hazards and vulnerabilities, design appropriate risk reduction and preparedness measures. The other way to integrate environmental and DM to promote green infrastructure and low-carbon technologies, stakeholder engagement, and capacity building. This includes the use of, for example, renewable energy sources, and green buildings. Green infrastructure reduces the risk of natural disasters, such as floods and landslides. Meaningful community engagement and effective stakeholder participation are important during the planning and implementation of CPEC projects. The environmental and DM integration into the CPEC plan, provide valuable insights to address potential environmental and social impacts of CPEC projects, as well as their vulnerability to natural disasters. By doing so, CPEC can help to promote SD and disaster resilience. This can help to minimize the negative impact of CPEC projects on environment and local communities, while also promoting disaster resilience by addressing potential vulnerabilities.

Economic and social development, the state of the environment and a propensity for disasters are closely intertwined. Therefore, EPI across development and DM policies and plans are important. Pakistan as a country is highly vulnerable to CC induced environmental changes and associated disasters. In this chapter, the extent to which Pakistan's national environmental and CC policy, DRR policy, as well as DM plans, are aligned is established, based on a review of government documents (see Chapter 3, Table 3.3), questionnaire survey expert opinions. In this context, a particular emphasis

is put on China's BRI led CPEC plan (CPEC; 2017–2030). A qualitative research design framework as put forward by (Cheung et al., 2010, Tajima et al., 2014) is adopted and used to analyze the policy instruments. This Chapter intend to present results and discussion related to research objective -2, and its related research questions. The analysis and results are presented under (5.2) followed by discussion (5.3) and finally, conclusions, recommendations and policy recommendations are drawn in (5.4).

5.2. Results

A. Policy document analysis and evaluation

i) Accessibility

The National DM Authority (NDMA) and the Pakistani Environmental Protection Agency (Pak-EPA) are the focal bodies for DM activities and EP. The Ministry of CC is the main institution at the federal level responsible for climate-related disasters and environmental issues. The national DRR policy 2013 document is available on the NDMA website (GoP, 2013c), and the NEP is available on the Pak-EPA website.

ii) Policy background information on the national DRR policy

The foreword and preamble explain why the national DRR policy document was prepared, highlighting overarching policy challenges and disaster impacts. Whilst the policy background is broadly outlined, no systematic listing of relevant documents is provided. It does not provide any reference resource materials used to set policy objectives/goals.

iii) Policy goals of the national DRR policy

The national DRR policy has policy principles, objectives and a vision statement. These mention CC, disasters, development, and the environment. Similarly, NEP also highlights the development and environmental issues in both, policy goals and objectives but fails to consider DRR integration with policy goals and objectives. Whilst the national DRR policy and NEP identify strategies for achieving the vision, the "who, what, when, and how" are not specified.

iv) Resources from the national DRR policy

The national DRR policy highlights human resource development, institutional capacity, and incentives for DRR. It recognizes financial resources for effective DRR, including public and private channels' funds, and national and provincial DM funds. However, the policy fails to mention financial cost requirements for the DRR. All measures and strategies are generic without any statistical data and reference material being provided. Whilst the NEP recognizes that government will provide resources for EP it fails to specify this further.

v) Monitoring and evaluation through the national DRR policy

The national DRR policy recognizes the need to develop a monitoring and evaluation (M&E) framework to evaluate the status of national DRR policy, national DM plans,

as well as DRR/DRM activities. The NDMA and some provincial DMAs will undertake M&E activities to revise policy every three years. However, a standardised methodology and set criteria for policy revision, monitoring and evaluation, and outcome measures for policy objectives/goal are currently missing. After the 18th constitutional amendment in 2010, provincial governments had to develop their own policies to deal with disasters and environmental issues. However, this raises the question of how national DRR policy and NEP can be implemented, monitored and evaluated. In this context, it is concerning that both policies are silent on data collection methods before and after policy implementation, monitoring, and evaluation. Similarly, the NEP fails to establish a comprehensive policy monitoring and evaluation mechanism.

vi) Community involvement in the national DRR policy

It is claimed that the national DRR policy involved wider stakeholder consultations. However, there is no explanation with regards to the extent of consultations, concerns raised and how they were addressed. The awareness programs for DRR, community engagement in vulnerability assessment, and community-based DM are a great opportunity for the public to deal with disasters in a proactive manner. Similarly, the NEP is committed to public-private-civil partnerships, highlighting a participatory approach to SEA and EIA. However, EA is not established for DM.

vii) Obligations of the national DRR policy

The national DRR policy recognizes the need to formulate action plans for policy implementation and suggests revising the policy every three years with multi-stakeholder consultations. DM funds are established, as mentioned in the NDM Act 2010 in order to integrate DRR into country policy and planning processes. Similarly, NEP is committed to ensuring multilateral environmental agreements' implementation, as well as environmental integration into the planning, and execution of Pakistan's EP Act 1997. The NEP stated that all relevant ministries would devise their own plans, strategies, and programs for policy implementation. A mechanism of NEP implementation is missing, though. Similarly, the NEP focuses on the development and implementation of a DM strategy, and on the establishment of DM institutions. However, both, the national DRR policy and NEP fail to provide institution coordination mechanisms for EP and DM.

B. DM and EA policy instruments and policy integration

In this section, EPI and DRR consideration in-country DM and EP instruments are analysed and evaluated see (Table-5.1 and Table-5.2.

Table 5.1: EPI across country DM policy documents

DM documents	Evaluation Theme			
	EPI in mitigation phase	**EPI in the pre-disaster phase**	**EPI in post- disaster phase (Response)**	**Environmental Consideration**
National DRR Framework 2007-12 (GoP, 2007)	MoE need to: • Develop capacities of staff to conduct disaster risk assessment (DRA)/ activities in environmental sector. • Incorporate Natural DR Assessment in EIA guidelines.	MoE need to: Develop DRM plan in relation to MoE mandate.	MoE need to: Develop mechanisms for EA losses and damages in the aftermath of disasters and their rehabilitation.	• Recognize environmental degradation. • The vision statement explicitly recognizes development-environmental-disaster linkage.
Provincial DRM Plans(GoPB, 2008, GoBA, 2008, GoSD, 2008)	Provincial Environment Protection Department (PEPD) need to: Incorporate Natural DRA in the EIA guidelines.	PEPD need to: Provide Ambient Air Quality Testing & Monitoring facilities.	PEPD need to: Develop mechanisms for EA losses and damages in the aftermath of disasters and their rehabilitation.	• Consider the environment in basic terms and concepts used in DRM,e.g: hazard. • Highlight to implement provisions of EP Acts.
DRR Plan. Northem Areas (GoGB, 2008); Recognize environmental degradation. Lack to consider environment and EA during DM.				
DM Plan. Azad Jammu and Kashmir (GoAJK, 2017b, GoAJK, 2008a)	• Recognize environmental degradation. • Highlight in generic statement to develop sewage and waste management plans but lack to consider environment during DM (GoAJK, 2008a). State DRM plan recognize EP as a mission and plan objective (GoAJK, 2017b).			
National DM Plan. 2012-2022 (GoP, 2012f)	Ministry of CC (MoCC) need to: • Incorporate natural DRA in the EIA guidelines. • Develop mechanisms for EA losses.	National DM Plan. 2012-2022 (GoP, 2012f)	Ministry of CC (MoCC) need to; incorporate natural DRA in the EIA guidelines. • Develop mechanisms for EA losses.	National Disaster Management Plan. 2012-2022 (GoP, 2012f)

National Human Resource Development Plan (GoP, 2012c)	• Fail to recognize EA with DM. • Highlight disaster and environment linkage. • Recognize environment and environmental degradation while defining terms like disaster etc.
Multi-hazard Early Warning System Plan 2012-22(GoP, 2012a)	• Recognise environmental degradation. • Mentioned deforestation, water scarcity, and strategies like water conservation and reforestation etc but fails to mention clearly about environment during DM phases.
National DM Plan Guidelines on community-based DM 2012-2022 (GoP, 2012e) Recognize environmental degradation but lack to consider EA during DM phases.	
National CC Policy 2012 (GoP, 2012d)	The policy recognizes policy measures about disaster preparedness, IEE, EIA and CDM. For example, the policy is committed. • To take necessary measures to redesign administrative structures and procedures of Federal and Provincial EPAs and the Planning and Development Division to integrate CC concerns into IEE & EIA processes. • To ensure that IEE/EIA mechanisms are strictly observed in all development projects, particularly infrastructure projects. • Policy highlighted CC and natural disasters linkage highligbted policy measures to integrate CC adaptation in DRR and to enhance disaster mitigation and preparedness capacities in the country. • It neither highlight the international DRR agenda for example HFA, and policy measures to integrate DDR concerns into IEE & EIA process, neitber it recognizes to conduct EA for DM.
National CC Policy 2021(GoP, 2021c)	In addition to policy measures highlighted in NCCP 2012, it focused equally on CC adaptation and mitigation measures, recognizes international agenda i.e., Paris Agreement on CC, SDGs, and Sendai Framework for DRR (2015-30). It lacks to highlight policy measures /directions to integrate DDR concerns into IEE & EIA process, neither it recognizes to conduct EA for DM.
DM Acts (GoP, 2010a) Azad Jammu & Kashmir DM Act, 2008.(GoAJK, 2008b). National DM act, KP and AJK DM act lack to consider environment and EA.	

Table 5.2: Country Legal Policy Instruments for EA and DM

Policy instruments	Evaluation Themes	
	EA Integration	**Disaster Consideration**
Pakistan EP Act 1997 (GoP, 1997a)	• Sub-section (1) of section 12 called to conduct IEE and EIA of projects. • Lack to consider SEA of state PPPs.	• Clause (r) of sub-section (1) of section 6 is about disasters, and to prepare, coordinate and implement disasters plans. • Clause (b) of sub-section (2) of section 33 address environmental hazards, natural disasters, and calamities
Punjab EP (Amendment) Act,2012 (GOPB, 2012)	The Punjab EP Act (Amendment), 2012 and PEPA (1997) is almost same, just replace word "National" with "Punjab".	
KP EP Act, 2014 (GOKP, 2014b)	In addition to IEE and EIA (section 13) for projects, the act recognizes to carry out SEA of plans (Section 12).	In addition to IEE and EIA (section 13) for projects, the act recognizes to carry out SEA of plans (Section 12).
Sindh EP Act, 2014 (GOSD, 2014a)	Sub section (1) of section 17 is about IEE and EIA. While sub section (1) of section 18 is to conduct SEA of policies, legislation, plans and programmes.	• Clause (m) of sub-section (1) of section 6 highlight to manage natural and environmental disasters. • Clause (t) of sub-section (1) of section 6 is to deal disasters which may cause pollution.
Baluchistan EP Act, (GoBA, 2012)	• To filled IEE and EIA for projects under sub section (1) of Section 15. • The Section 13 is to conduct SEA of certain plans and programmes.	• Clause (q) of sub-section (1) of section 6 and. • Clause (b) of sub-section (2) of section 41 is recognize disaster
Gilgit – Baltistan EP Act, 2014 (GoGB, 2014)	• Sub-section (1) of section 16 is to fill IEE and EIA. • Sub-section (1) of section 17 is to conduct SEA of PPPs	• The clause (m) of sub-section (1) of section-6 is about management of natural and environmental disasters. • Clause (u) of sub section (1) of section 6 is to deal disaster events

Azad Jammu and Kashmir (AJ&K) EP Act, 2000 (GOAJK, 2000)	• Sub section-1 of section 11 is to fill IEE and EIA for projects caused environmental effects. • Lack to consider conduct SEA of state PPPs	• Clause s) of sub section-1 of section 6 is to address disasters causing pollution, preparation of contingency plans for disasters, and to co-ordinate implementation of such plans. • Clause b) of sub section 2 of section 32 is to prepare emergency contingency plans to environmental hazards and natural disasters.
Pakistan CC Act 2017 (GoP, 2017c)	• Recognize environment, environmental tribunal, and environmental magistrates. • Lack to consider EA.	Recognize to prepare emergency contingency plans to cope natural disasters
Policy and Procedure for the EIAs (GoP, 1997b)	• Recognize environmental report contain risk assessment report and disaster plan prepared. • EIA guidelines review of IEE and EIA regulations, 2000 (Pak-EPA, 2000) lack to consider disasters.	
National SD Strategy 2017 (GoP, 2017b)	MoCC need to devise strategy to: • Enforce environmental regulations. • Environmental integration in socio-economic development planning • Carry Out EIA for development projects.	MoCC need devise strategy to: • Promote DRR in the infrastructure development. • Coordinated DRR management. • Adopt and implement integrated policies and plans for DM.

Pakistan has policy instruments for DM and EA at Federal and Provincial levels. The CPEC plan (2017-2030) considers flood and drought prevention and disaster relief, as well as environmentally friendly processes for industrial sectors. However, it fails to recognize NEP 2005, national DRR policy 2013, NCCP 2012, the role of EIA and SEA, and the national EP and DM acts.

This analysis indicates that Pakistan's National and Provincial DM plans recognize the environment and EA for DM. Similarly, Pakistan's EP act 1997 and AJ&K's EP act 2000 also recognize DM and EIA but fail to consider SEA. Likewise, all provincial EP acts recognize disasters, IEE, EIA and SEA, except for Punjab province which fails to consider SEA. There is a need to incorporate SEA in Federal and Punjab EP acts, to promote sustainability and to address DR for CPEC development. The analysis also indicates that national guidelines on community-based DM, northern areas (Gilgit-Baltistan) DRR Plan 2008 and State DM plan 2017 fail to consider EA. GB is a gateway to CPEC, a disaster-prone region (Shah, 2020). A potential threat to glaciers, ecosystems and biodiversity (Nabi et al., 2018) of the GB region. Similarly, national CC (2017) and DM (2010) acts fail to consider EA for DM. After the 18th constitutional amendment, environment and DM are provincial subjects, but only KP and AJ&K have formulated DM acts. These failed to integrate the environment and EA for DM.

C. Expert and Stakeholder's views on EPI, DM and CPEC Sustainability

In this section experts opinion related to Paksitan environmental and disaster management and sustainability of CPEC were evaluated, see Table 5.3-5.5.

Table 5.3: Experts/stakeholders' views analysis about EPI , DM, and CPEC sustainability

Theme	Question	Analysis Scale	Stakeholders /experts categories /analysis						
			AC	AU	CO	EN	IO	MI	OT
Aware about the development-environmental degradation-disaster linkage	Q-1	0= No	3.6%	0%	9.1%,	7.7%	0%	14.3%	4.2%
		1=Yes	95.4%.	100%	91.9%	92.3%	100%	58.7%	95.8%
Disasters are potential threat to CPEC development	Q-5	0= No	12%	12.5%	12.1%	23.1%	0%	28.6%	8.3%
		1=Yes	88%	87.5%	87.9%	76.9%	100%	71.4%	91.7
Knowledge about development-environmental degradation-disaster linkage	Q-2	1=no knowledge	0	0	3%	0	0	0	0
		2= rudimentary knowledge	8.40%	0	9.10%	0	0	0	12.50%
		3 = satisfactory knowledge	48.20%	62.50%	33.30%	61.50%	42.90%	57.10%	29.20%
		4 = comprehensive	31.30%	12.50%	36.40%	30.80%	42.90%	28.60%	50%
		5 = complete knowledge	12%	25%	18.20%	7.70%	14.30%	14.30%	8.30%
Importance of EPI in DM	Q-3	1 = not importance	0%	0	0	0	0	0	0
		2 = little	2.40%	0	0	0	0	0	0
		3 = medium	4.80%	0	6.10%	7.70%	0	0	8.30%
		4 = high	42.20	75%	54.50	46.20	42.90	71.40	37.50
		5 = very high	50.60	25%	39.40	46.20	57.10	28.60	54.20
Importance of EPI in DM for SD	Q-4	1=no importance	0%	0	0	0	0	0	0
		2=a little bit of	1.20%	0	0	0	0	0	0
		3=moderately important	4.80%	0	6.10%	7.70%	0	14.30	4.20%
		4=important	27.70	50%	27.30	46.20	14.30	0	29.20
		5=very important	66.30	50%	66.70	46.20	85.70	85.70	66.70
EIA reports sufficiently address DR	Q-6	1 = no knowledge	6%	0	6.10%	0	0	14.30	4.20%
		2 = poorly	22.90	25%	21.20	23.10	42.90	0	20.80
		3 = moderately;	37.30	50%	30.30	23.10	42.90	28.60	50%
		4 = strongly	30.10	25%	39.40	53.80	14.30	28.60	25%
		5 = very strongly	3.60%	0	3%	0	0	28.60	0
	Q-7	1 = no knowledge	3.60%	0	3%	0		14.30	0

CPEC Sustainability within the existing DM and EA setup		2 = no sustainability;	13.30	0	6.10%	0	28.60	0	0
		3 = poor	39.80	12.50	30.30	7.70%	57.10	57.10	62.50
		4 = medium	36.10	87.50	48.50	84.60	14.30	28.60	33.30
		5= high;	7.20%	0	12.10	7.70%	0	0	4.20%
Sustainability's component at risk due to CPEC	Q-8	1=Economic	7.20%	0	24.20	15.40	14.30	0	12.50
		2= Social	13.30	12.50	21.20	0	0	28.60	8.30%
		3 = Environmental	79.50	87.50	54.50	84.60	85.70	71.40	79.20
Economic Sustainability of CPEC development within the existing country DM and EA setup?	Q-9	1 = no knowledge	3.60%	12.50	3%	0	0	0	0
		2 = no sustainability;	9.60%	0	9.10%	0	0	0	0
		3 = poor	34.90	0	30.30	30.80	42.90	28.60	50%
		4 = medium	42.20	87.50	42.40	53.80	57.10	57.10	45.80
		5= high	9.60%	0	15.20	15.40	0	14.30	4.20%
Social sustainability of CPEC development within the existing country DM and EA setup?	Q-10	1 = no knowledge	3.60%	12.50	0	7.70%	0	0	4.20%
		2 = no sustainability;	8.40%	0	9.10%	0	14.30	0	29.20
		3 = poor	43.40	12.50	30.30	30.80	28.60	42.90	25%
		4 = medium	38.60	75%	48.50	61.50	57.10	57.10	41.70
		5= high	6%	0	12.10	0	0	0	0
Environmental sustainability of CPEC development within the existing country DM and EA setup?	Q-11	1 = no knowledge	2.40%	12.50	0	0	0	0	0
		2 = no sustainability;	18.10	0	6.10%	0	42.90	0	4.20%
		3 = poor	56.60	62.50	39.40	23.10	42.90	42.90	62.50
		4 = medium	15.70	25%	42.40	61.50	14.30	57.10	29.20
		5= high	7.20%	0	12.10	15.40	0	0	4.20%
Importance of EPI in DM for sustainability of CPEC development	Q-12	1 = no importance	1.20%	0	0	0		0	0
		2 = a little bit of	1.20%	0	3%	0	0	0	8.30%
		3 = moderately important	7.20%	0	9.10%	7.70%	0	0	4.20%
		4 = Important	43.40	37.50	36.40	46.20	28.60	42.90	45.80

		5 = Very important	47%	62.50	51.50	46.20	71.40	57.10	41.70
Suggestion for EPI in DM of Pakistan	Q-13	1 = not in favour	0	0	0	0	0	0	0
		2 = a little	3.60%	0	3%	0	0	0	4.20%
		3 = moderately;	13.30	0	6.10%	7.70%	0	0	4.20%
		4 = considerably	21.70	25%	36.40	38.50	14.30	28.60	29.20
		5 = strongly;	61.40	75%	54.50	53.80	85.70	71.40	62.50
Keys= Academia (AC); Authorities (AU), Consultants (CO); Environment Departments (EN); International Organizations (IO), Ministries (MI); Others (OT)									

Questionnaire results suggest that stakeholder representatives were well aware and understand development-environmental degradation-disaster linkages. They thought that the country vulnerability to disasters is a potential threat to CPEC development. Furthermore, all stakeholders understand the importance of EPI in DM. They think that current EIA reports are not sufficiently addressing disaster risk (DR). Analysis indicates that EPI in DM is an important component for SD as well as for the sustainability of the CPEC plan. About the sustainability of CPEC, development experts think that the environmental component of sustainability is at risk followed by social and economic sustainability. Hence, the majority of experts suggested that EPI needs to be integrated with DM.

Table 5.4: An overview of experts /stakeholder's views analysis about environmental policy integration, DM & CPEC sustainability

Theme	Question	Analysis Scale	Stakeholders /experts categories /analysis						
			AC	AU	CO	EN	IO	MI	OT
Aware about development-environmental degradation-disaster linkage	Q1	0= No	x	x	x	x	x	x	x
		1=Yes	□	■	□	□	■	●	□
Disasters are potential threat to CPEC development	Q-5	0= No	x	x	x	x	x	◉	x
		1=Yes	□	□	□	□	■	●	□
Knowledge about development-environmental degradation-disaster linkage	Q-2	1=no knowledge	x	x	x	x	x	x	x
		2= rudimentary knowledge	x	x	x	x	x	x	x
		3 = satisfactory knowledge	◉	●	◉	●	◉	●	◉
		4 = comprehensive knowledge	◉	x	◉	◉	◉	◉	●
		5 = complete knowledge	x	◉	x	x	x	x	x
Importance of EPI in DM	Q-3	1 = not importance	x	x	x	x	x	x	x
		2 = little	x	x	x	x	x	x	x
		3 = medium	x	x	x	x	x	x	x
		4 = high	◉	□	●	◉	◉	●	◉
		5 = very high	●	◉	◉	◉	●	◉	●
	Q-4	1=no importance	x	x	x	x	x	x	x

Importance of EPI in DM for SD		2=a little bit of importance	x	x	x	x	x	x	x
		3=moderately important	x	x	x	x	x	x	x
		4=important	●	●	●	●	x	x	●
		5=very important	●	●	●	●	□	□	●
EIA reports sufficiently address DR	Q-6	1 = no knowledge	x	x	x	x	x	x	x
		2 = poorly	x	●	x	x	●	x	x
		3 = moderately;	●	●	●	x	●	●	●
		4 = strongly	●	●	●	●	x	●	●
		5 = very strongly	x	x	x	x	x	●	x
CPEC Sustainability within the existing DM and EA setup	Q-7	1 = no knowledge	x	x	x	x	x	x	x
		2 = no sustainability;	x	x	x	x	●	x	x
		3 = poor	●	x	●	x	●	●	●
		4 = medium	●	□	●	□	x	●	●
		5= high;	x	x	x	x	x	x	x
Sustainability's component at risk due to CPEC	Q-8	1=Economic	x	x	x	x	x	x	x
		2= Social	x	x	x	x	x	●	x
		3 = Environmental	□	□	●	□	□	●	□
Economic Sustainability of CPEC development within the existing country DM and EA setup?	Q-9	1 = no knowledge	x	x	x	x	x	x	x
		2 = no sustainability;	x	x	x	x	x	x	x
		3 = poor	●	x	●	●	●	●	●
		4 = medium	●	□	●	●	●	●	●
		5= high	x	x	x	x	x	x	x
Social sustainability	Q-10	1 = no knowledge	x	x	x	x	x	x	x

of CPEC development within the existing country DM and EA setup?		2 = no sustainability;	x	x	x	x	x	x	◉
		3 = poor	◉	x	◉	◉	◉	◉	◉
		4 = medium	◉	□	◉	●	●	●	◉
		5= high	x	x	x	x	x	x	x
Environmental sustainability of CPEC development within the existing country DM and EA setup?	Q-11	1 = no knowledge	x	x	x	x	x	x	x
		2 = no sustainability;	x	x	x	x	◉	x	x
		3 = poor	●	x	◉	x	◉	◉	●
		4 = medium	x	◉	◉	●	x	●	◉
		5= high	x	x	x	x	x	x	x
Importance of EPI in DM for sustainability of CPEC development	Q-12	1 = no importance	x	x	x	x	x	x	x
		2 = a little bit of importance	x	x	x	x	x	x	x
		3 = moderately important	x	x	x	x	x	x	x
		4 = Important	◉	◉	◉	◉	◉	◉	◉
		5 = Very important	◉	●	●	◉	●	●	◉
Suggestion for EPI in DM of Pakistan	Q-13	1 = not in favour	x	x	x	x	x	x	x
		2 = a little	x	x	x	x	x	x	x
		3 = moderately;	x	x	x	x	x	x	x
		4 = considerably	x	◉	◉	◉	x	◉	◉
		5 = strongly;	●	□	●	●	□	●	●

Keys= Academia (AC); Authorities (AU), Consultants (CO); Environment Departments (EN); International Organizations (IO), Minisnes (MI); Others (OT)

■ = 100%; □ = 75–99%; ● = 50–74%; ◉ = 25–49%; x = <25%

With respect to an awareness of development-environmental degradation-disaster linkages (Q-1), and disasters and CPEC developments (Q-5), the majority of respondents (75-99 %) responded that they were aware of this linkage, and disasters are a potential threat to CEPC development. Similarly, less than 25 % respondents thought that the EIA report sufficiently addressed disaster risks (Q-6), while over 75% thought that the environmental component of sustainability is at risk due to CPEC development

(Q-7). About the importance of EA integration in DM, over 75% of authority respondents thought this was "high" option (Q-3). Similarly, over 75% of the representatives of international organizations and authorities suggested that there was a strong need to integrate EPI in the DM of Pakistan (Q-13), indicating that EPI in the DM was needed for CPEC sustainability.

Table 5.5: Experts / Stakeholders views on critical factors reducing EPI in the country's DM system and CPEC sustainability

Main critical factors	**Analysis scale**	**Stakeholders /Experts categories /analysis (percentage response value)**						
		AC	**AU**	**CO**	**EN**	**IO**	**MI**	**OT**
Political Commitment and leadership	1 = not at all	10.8	12.5	15.2	0.0	0.0	0.0	8.3
	2 = a little bit	3.6	0.0	3.0	7.7	14.3	14.3	0.0
	3 = to a moderate extent	24.1	12.5	12.1	15.4	14.3	42.9	20.8
	4 = to a considerable extent	27.7	50.0	33.3	30.8	14.3	42.9	50.0
	5 = to a large extent	33.7	25.0	36.4	46.2	57.1	0.0	20.8
Technological	1 = not at all	7.2	0.0	12.1	0.0	0.0	0.0	4.2
	2 = a little bit	7.2	25.0	18.2	23.1	14.3	28.6	16.7
	3 = to a moderate extent	25.3	12.5	9.1	23.1	14.3	42.9	25.0
	4 = to a considerable extent	37.3	25.0	48.5	30.8	42.9	14.3	33.3
	5 = to a large extent	22.9	37.5	12.1	23.1	28.6	14.3	20.8
Structural	1 = not at all	4.8	0.0	9.1	0.0	0.0	0.0	0.0
	2 = a little bit	6.0	0.0	12.1	15.4	14.3	14.3	16.7
	3 = to a moderate extent	31.3	25.0	33.3	38.5	14.3	28.6	25.0
	4 = to a considerable extent	28.9	75.0	27.3	15.4	42.9	57.1	29.2
	5 = to a large extent	28.9	0.0	18.2	30.8	28.6	0.0	29.2
Procedural	1 = not at all	6.0	12.5	12.1	7.7	0.0	0.0	0.0
	2 = a little bit	10.8	0.0	3.0	7.7	0.0	14.3	20.8
	3 = to a moderate extent	27.7	50.0	45.5	46.2	42.9	14.3	33.3
	4 = to a considerable extent	38.6	37.5	33.3	30.8	28.6	42.9	37.5
	5 = to a large extent	16.9	0.0	6.1	7.7	28.6	28.6	8.3
International obligation	1 = not at all	4.8	0.0	15.2	7.7	14.3	0.0	12.5
	2 = a little bit	14.5	50.0	21.2	15.4	0.0	14.3	12.5
	3 = to a moderate extent	21.7	0.0	15.2	30.8	14.3	14.3	20.8
	4 = to a considerable extent	36.1	50.0	39.4	23.1	57.1	57.1	41.7
	5 = to a large extent	22.9	0.0	9.1	23.1	14.3	14.3	12.5
Policy coordination	1 = not at all	4.8	12.5	3.0	0.0	0.0	0.0	0.0
	2 = a little bit	3.6	0.0	6.1	7.7	0.0	0.0	8.3
	3 = to a moderate extent	27.7	37.5	42.4	46.2	14.3	28.6	25.0
	4 = to a considerable extent	47.0	37.5	33.3	30.8	57.1	42.9	33.3
	5 = to a large extent	16.9	12.5	15.2	15.4	28.6	28.6	33.3
Integrated approaches	1 = not at all	4.8	12.5	9.1	7.7	0.0	0.0	12.5
	2 = a little bit	8.4	0.0	18.2	23.1	14.3	14.3	29.2
	3 = to a moderate extent	25.3	37.5	27.3	46.2	28.6	42.9	12.5
	4 = to a considerable extent	41.0	25.0	30.3	7.7	42.9	28.6	25.0
	5 = to a large extent	20.5	25.0	15.2	15.4	14.3	14.3	20.8

Policy Effect	1 = not at all	3.6	0.0	9.1	0.0	0.0	0.0	0.0
	2 = a little bit	7.2	0.0	6.1	23.1	14.3	14.3	29.2
	3 = to a moderate extent	32.5	50.0	42.4	23.1	0.0	57.1	20.8
	4 = to a considerable extent	39.8	25.0	27.3	38.5	42.9	14.3	25.0
	5 = to a large extent	16.9	25.0	15.2	15.4	42.9	14.3	25.0
Public Participation	1 = not at all	7.2	12.5	6.1	7.7	0.0	0.0	12.5
	2 = a little bit	8.4	25.0	21.2	15.4	0.0	28.6	8.3
	3 = to a moderate extent	21.7	12.5	21.2	38.5	14.3	14.3	25.0
	4 = to a considerable extent	31.3	25.0	39.4	23.1	42.9	42.9	37.5
	5 = to a large extent	31.3	25.0	12.1	15.4	42.9	14.3	16.7
Peace and Conflicts	1 = not at all	8.4	12.5	12.1	15.4	0.0	0.0	8.3
	2 = a little bit	6.0	0.0	6.1	7.7	14.3	14.3	0.0
	3 = to a moderate extent	21.7	12.5	39.4	30.8	28.6	42.9	41.7
	4 = to a considerable extent	36.1	62.5	30.3	38.5	14.3	42.9	37.5
	5 = to a large extent	27.7	12.5	12.1	7.7	42.9	0.0	12.5
Monitoring & Evaluation	1 = not at all	6.0	0.0	9.1	0.0	0.0	0.0	4.2
	2 = a little bit	6.0	25.0	12.1	15.4	0.0	0.0	8.3
	3 = to a moderate extent	21.7	0.0	18.2	38.5	14.3	28.6	20.8
	4 = to a considerable extent	34.9	37.5	33.3	30.8	42.9	42.9	29.2
	5 = to a large extent	31.3	37.5	27.3	15.4	42.9	28.6	37.5
Keys :- Academia (AC); Authorities (AU), Consultants (CO); Environment Departments (EN); International Organizations (IO),Ministries (MI); Others (OT).								

Experts thought that political commitment and leadership, technological factors, policy coordination, public participation, peace and conflict, and monitoring & evaluation were the main factors reducing EPI in DM and CPEC sustainability. Similarly, experts also recognized other factors that reduced EPI in DM and CPEC sustainability. including:

- prolonged process of policymaking.
- conflicts of interest between federal and provincial governments.
- inconsistencies between priorities and policies.
- policy coherence between country EP agencies and DM Authorities; and
- lack of equal consideration of socio-economic, environmental and disaster concerns in the development process, and ignorance of long-term environmental and CC concerns.

With regards to open-ended questions, most of the respondents stated that all aspects were comprehensively covered in the questionnaire. To ensure the anonymity of the respondents and confidentiality of the response's statements are subsequently shown in inverted commas without names.

5.3. Discussion

BRI investments are playing an important role in driving global economic growth. However, speedy development can negatively affect natural resources, environmental assets and the global climate (Hussain et al., 2020b). BRI developments can also be a reason for natural disasters (Ng et al., 2020). Environmental degradation is both, a

driver and a consequence of climate-induced disasters (Bolle et al., 2021). EPI is a key feature of SD (De Roeck et al., 2018). It can help to address environmental degradation by integrating EA in DM to reduce development impacts on the environment. In this context, EPI helps to implement policies around the SDGs (Nilsson and Persson, 2017) in an integrated approach. There are many challenges to EPI, BRI and CPEC sustainability, including political will and commitment (Basil and Sabine, 2021), political instability, lack of understanding and knowledge, and insufficient cross-sector coordination (Yin et al., 2016). On CPEC sustainability, an expert **(AC-01)** suggested that there is

"*Political pressure (policy decisions) to relax environmental conditions for approval of specific CPEC projects. As damage to environmental resources affects environmental sustainability and poses challenges in achieving the SDGs, there is a strong need to make a synergy between environment and disaster issues. EPAs need to strengthen EA procedures with the inclusion of environmental and climate vulnerability of any development project along with the solution. Furthermore, post-EIA monitoring must be carried out in order to ensure the adoption of environmental considerations. On other hand, DM Authorities must ensure engaging EPAs and environmental experts in policy-making process. Implementation of adaptation plans must incorporate environmental concerns as well. It requires regular coordination and consultation among EPAs and DM Authorities*".

Furthermore, an interviewee (R-01) stated that *"Political reasons, Bureaucratic working style, lack of capacity, problems in being part of accord, any self-interest, lack of coordination, and unfair means (bribery)"* are key reasons for institutional capacity weakness and hurdle in enforcing rules and regulations for sustainable CPEC.

Similarly, (Coenen et al., 2021) highlighted that BRI's countries' political willingness and stringent environmental laws enforcement are essential for effective EG. CPEC and BRI investments can cause environmental degradation, lead to an increase in CC active GHGs gases, and enhance natural disaster risks. For example, CPEC coal-based energy projects and highways contribute significantly to CO_2 emissions (Rehman and Walker, 2020), impact negatively on CC and lead to environmental degradation. This is not coherent with Pakistan's own green policies. Pakistan's alternative energy policy 2019 commits to 30% of the energy mix being from renewable sources by 2030 (GoP, 2019a). Recently, Waheed et al. (2021) highlighted that CC policies need to coherently address energy policies. Similarly, 65 % of BRI's total energy sector funds are invested in coal-based power plants (Ahmed et al., 2018), a potential threat to environmental sustainability. In the context of CPEC development Environmental and CC Impacts, an interviewee (**Min-02**) stated that

"Yes, there could minor environmental, climate changes and social issues associated with the CPEC project's construction and operational phase, that are genuinely taken on board by key stakeholders, and could be managed and addressed by relevant stakeholders. The CPEC projects are of international repute, and the whole world is currently watching the One Belt One Road Initiative projects, and if there are non-

compliance or issues which could be exploited at the international level, so the government is very mindful of this International pressure and they are very keenly trying to address the issue of any project coming under CPEC "

The UNDP and Pakistan's Council of Research in Water Resources have projected that the country will become water-scarce by 2025 (Gulzar, 2018), requiring efficient water management mechanisms and drastic changes in policy making regarding water usage in CPEC development. Similarly, China's BRI has significant implications for water security, sustainability, and the future of energy generation in Asia (Alkon et al., 2019).

An expert **(EPA-01)** suggested that

"Haphazard government policies and lack of due attention to long term environmental and economic factors reduce EPI in DM. In addition to this, corruption and undue political interference are responsible for vague and ineffective policies that reduce EIP in DM for CPEC sustainability. Environmental factors are essential and indispensable in disaster and development policies. But policies must be based on long-term planning and detailed baselines so that a good balance can be achieved between the three components of SD*".*

Similarly, another expert **(EPA-02)** suggested that

"Political influences and leg pullings amongst sitting Govt. and opposition is also a factor that might reduce EPI in DM and CPEC sustainability. A project is sustainable only when equal priority is given to economic development, social uplifting/development and environmental protection". "DM is supposed to be an integral part of the Environment protection/environmental management plan (EMP). Currently, less emphasis is on the implementation of EMP during the execution of projects; developers give the least priority to environmental protection and there is an absence of effective monitoring & reporting mechanism" **(EPA-03)**.

Although Pakistan and China agreed to transform CPEC into a model green BRI (CPEC, 2020), no associated initiatives have started yet. Regardless of CPEC funding, the Federal Ministry of CC had launched the world's largest ten billion tree tsunami program, protected areas initiative, clean green Pakistan, recharge Pakistan and plastic-free Pakistan initiative. The IUCN described the billion tree tsunami initiative as "a true conservation success story" (CPEC, 2020). The GoP is seen to seek a debt for nature swap from the world in return for its environmental services (Faraz, 2021). However, Pakistan's National Accountability Bureau found irregularities and financial corruption of US$3 M under the billion tree tsunami program (Lang, 2020). Experts believe that:

- *isolated preparation of DM and environmental policies and laws;*
- *EIA has been ignored in the formulation of CPEC projects;*
- *public institutions working in silos;*
- *technical capacity issues of public sector departments;*
- *lack of awareness about environmental legislation;*
- *environmental lobbying, policy-making, advocacy and law; lack of policy coordination; (dis-)continuity of policies; and*
- *a poor environmental institutional framework*

are reducing the sustainability of BRI-funded CPEC development and EPI in DM.

The energy and transport infrastructure development is the main objective of the CPEC BRI programme. Natural hazards and environmental concerns are major challenges to the safety, durability and accessibility of such infrastructures. (Ali et al., 2021b) highlighted that BRI's CPEC transport infrastructure development is a major threat to biodiversity, environmental sustainability, forestation, flooding, glacier melting, CC, and global warming.

In this context, an expert **(R-01)** stated that CPEC development lead to

" *Massive tree cutting for the construction of road networks (in CPEC- from Kashghar, China, to Gwadar, Pakistan. (Tree cutting leads to an enormous concentration of* CO_2 *emissions along with the road networks) increased* CO_2 *emission - melt the glaciers and will increase floods possibility; deteriorating the air quality and Air pollution will add to health effects (increase morbidity and hospital admissions)".*

A coordinated and integrated DM and EA framework are essential for the sustainability of BRI and CPEC. An expert **(NGO-1)** highlighted that

"coordination between the Federal and Provincial agencies, ownership and leadership roles among the stakeholders are reducing EPI in DM and CPEC sustainability".

Public and stakeholder consultation is important in policy process (Sturdy et al., 2012) and in the decision-making processes of construction projects (Yu et al., 2021). For the sustainability of CPEC, an expert **(AC-02)** highlighted that

"the most important lacking factor is the integration and coordination of the concerned stakeholders, involvement and participation of local peoples for the sustainability of the implemented policies. It is working in solitude and the decisions are being made at higher levels without consultations and involvement of the relevant local technical professionals".

Similarly, another expert **(AC-03)** suggested that

"This is very important issue. EPI has been poorly managed in Pakistan's policy frameworks. Gawadar is the development hub of CPEC. There needs a DRR and mitigation plan, particularly with regard to Tsunami. EIAs should be conducted not for the sake of approving projects, rather in true spirits to assess the economic, social and environmental impacts of interventions. Implementation and compliance to building codes must be ensured through proper mechanisms because abrupt growth in infrastructure in this earthquake-prone zone of Balochistan province can put lives of millions at risk."

The CPEC long-term plan is committed to public-private partnerships for infrastructure project development. Pakistan's Public-Private Partnership Authority (Amendment) Ordinance, 2020 (GoP, 2020e) mentions EIA safeguards approvals to execute projects but fails to highlight disaster and CC development concerns. The CPEC highways run through regions experiencing serious geological hazards, land degradation, flood disasters and serious water scarcity (Li et al., 2019). Monitoring of eco-environmental development and DRR along BRI and CPEC is of great significance to the green growth and SD in the region. (Yu et al., 2018) recognized that technology, natural environment, construction, administrative, and political risk are the top risk factors of transnational

public-private partnership for BRI projects. In this context, an expert (Min-01) stated that

"Environmental provisions and CC challenges are not adequately integrated in the DRM and that CPECs cross through highly fragile and climate sensitive mountain system".

Furthermore, another expert **(NGO-01)** suggested that:

"coordination between the federal and provincial agencies, ownership and leadership roles among the stakeholders " was essential for CPEC sustainability.

Also, an expert **(AC-04)** stated that:

"With massive industrialization with that of CC, environmental challenges are now considered non-traditional security risks pertaining to national security. States are now therefore prone to human made disasters that through amalgamation of CC will pose disastrous implications. It is, therefore, a high time to correlate Environmental Policy with DM with a view to cater strategic orientation of economic ventures like CPEC."

5.4. Conclusions and recommendations

BRI and CPEC developments are potentially associated with CC related disasters and environmental degradation. However, neither project EIA nor policy, plan and programme SEA is applied to DM activities associated with projects along the BRI route. Given the complexities of the development-disaster-environmental linkage, environmental and disaster risks of BRI and CPEC are serious development challenges. EPI supports the usage of EIA and SEA in DM and aims at addressing the driving forces of environmental degradation (Persson et al., 2018). It also promotes SD (De Roeck et al., 2018) and integrated planning. Pakistan's national SD strategy (2017) recognizes the necessity of environmental integration in development planning and asks for EIA to be undertaken for development projects. Furthermore, it requests the adoption of integrated policies and plans toward CC and DM (GoP, 2017b).

A key message of this chapter is that the CPEC plan (2017-2030) fails to recognize EIA and SEA and DM related policies and laws. These include e.g. the NEP, National CC policy 2012, National DRR Policy 2013, EP acts, the DM act and the National CC Act. Similarly, DM acts fail to incorporate environmental issues as well as EIA and SEA. On the other hand, EP acts consider disasters. For example, Pakistan's EP Act 1997 requests the "preparation of emergency contingency plans for coping with environmental hazards and pollution caused by accidents, natural disasters and calamities"(GoP, 1997a,p.23).

Importantly, with regards to the CPEC plan, this should integrate NEP 2005 provisions (e.g EIA and SEA), NCCP 2012 and national DRR policy 2013. For consistency among EP acts, SEA should be incorporated into Federal and provincial EP Acts. Experts suggest that disasters are potential threats to CPEC development, and DRR is not sufficiently addressed in EIA reports. Due to CPEC, the environment is at risk and EPI is needed in DM. Experts also highlight that monitoring and evaluation, political commitment and leadership, policy coordination, technological, and public

participation are essential elements for reducing EPI in DM and enhancing the sustainability of the CPEC plan.

There is a need to revise and update the national DRR policy 2013 and NEP 2005 and the CPEC plan 2017-2030 in terms of the EPI-DM nexus. The Federal government needs to revise and update their NEP 2005 and national DRR policy 2013. Furthermore, provincial governments need to develop their own environmental and DM policies, and DM acts. EIA and SEA need to be integrated into in-country DM policies. DM and CC acts are currently missing at the provincial government level and this research is a first step towards exploring EPI in DM and the sustainability of the BRI funded CPEC development plan. An integrated regulatory framework needs to be established based on themes of the Sendai Framework for DRR 2015- 2030 and United Nations SDGs 2030 for the sustainability of BRI development. Otherwise, the sustainability of BRI CPEC projects will be greatly reduced.

Chapter-6

6. ENVIRONMENTAL GOVERNANCE AND SUSTAINABILITY OF CHINA PAKISTAN ECONOMIC CORRIDOR PLAN

6.1. Introduction

Effective EG is an important aspect of CPEC plan sustainability. The CPEC infrastructure development projects, such as transport infrastructure development of highways, railways, coal-based energy projects and industrial development for example, SEZs, can have significant impacts on the environment and local communities. GoP needed to take various measures to address environmental and CC related issues related to CPEC plan implementation. In this context, EPAs are responsible for ensuring compliance with environmental standards and regulations in the country. The EPA has established an Environmental and Social Impact Assessment (ESIA) framework to identify and mitigate potential negative impacts of development projects like CPEC on the environment and local communities. The ESIA process involves a systematic assessment of potential environmental, and socio-economic impacts of a project, as well as consultation with stakeholders and public participation in decision-making processes. CPEC development and investment are considered as historical huge FDI in Pakistan's history. In this context, Pakistan faces several challenges in its EG system, and CPEC development projects caused numerous environmental challenges for sustainability. This chapter presents, an assessment of Pakistan's EG and sustainability of CPEC plan (2017-2030). For this purpose, the country's EG is evaluated in context of integrated governance criteria factors. An integrated EG framework Morales-Giner et al. (2021) (see Chapter 3, Table 3.6 & 3.7) and a multi-criteria decision-making linear programming analysis approach of the Best and Worst Method (BWM-mV M) Wang et al. (2021) were used to rank governance criteria as Best and Worst factors to establish policy implications for CPEC sustainability.

Four governance theme factors, including eleven main criteria and thirty-eight sub-criteria factors, were established using the literature review studies **(see Annexure B)**. The relevant stakeholders /experts were asked via a questionnaire to scale the importance of given governance themes and criteria factors keeping in view the current EG and CPEC sustainability. In this context, the analysis scale and detailed methods approach framework are presented in Chapter 3, Section 3.2.2 and 3.3.3.

This chapter aimed to present results, discussion and conclusion related to research objective -4. In this context, (6.2) is about results analysis, followed by discussion (6.3) and finally conclusion and policy implications are drawn under (6.4).

6.2. Results

6.2.1. Determination of criteria weighting using BWM

The experts gave an overall rating to criteria factors using the scale depicted in Table 3.9 (see Chapter 3). In this context, a pairwise comparison was made for the thematic dimension, main criteria and sub-criteria factors related to EG and CPEC sustainability to establish policy implications for the sustainability of the CPEC plan.

Table 6.1: Thematic dimension criteria-pairwise comparison

Thematic Dimension	**Effectiveness (T1)**	**Robustness (T2)**	**Equity (T3)**	**Responsiveness (T4)**
Best to others	3	3	3	1
Others to the worst	2	2	1	3

The thematic dimension i.e., responsiveness and equity were rated as the best criteria and the worst criteria respectively. Similarly, the best and worst related to the main criteria and sub-criteria of each thematic dimension were determined.

Table 6.2: Main criteria-pairwise comparison

Main Criteria	**C.1**	**C.2**	**C.3**	**C.4**	**C.5**	**C.6**	**C.7**	**C.8**	**C.9**	**C.10**	**C.11**
Best to others	9	7	9	7	5	8	8	3	6	9	1
Others to the worst	2	4	1	4	6	3	3	9	5	2	9

The analysis represents the ranking of the main criteria i.e., transparency (C.11), as the best criteria, and criteria access to information/knowledge (C.3) as the worst criteria. Similarly, Tables 6.3 to 6.11 represent the pairwise comparison to determine the best and worst criteria factors related to identified sub-criteria of each main criterion factor.

Table 6.3: Main criteria (capacity) linked Sub criteria-pairwise comparison

Sub Criteria	**C.2.1**	**C.2.2**	**C.2.3**	**C.2.4**	**C.2.5**
Best to others	3	3	1	1	2
Others to the worst	2	3	5	5	1

In this context, Table **6.3-** presents sub-criteria, the capable visionary leadership is present to address environmental and CC concerns (C2.3); and effective human, financial, and technical capacity is present in relevant institutions (e.g., EPAs) to deal with environmental concerns of CPEC development (C2.4) are determined as best criteria, while criteria i.e. effective mechanisms are in place to resolve conflicts between stakeholders (i.e. Federal and Provincial Government, EPA) and implementation of

environmental laws in letter and spirit (C2.5), is the worst criteria of main criteria capacity (C2).

Table 6.4: Main criteria (access to information/knowledge) linked sub-criteria-pairwise comparison

Sub Criteria	C.3.1	C.3.2	C.3.3	C.3.4	C.3.5	C. 3.6
Best to others	2	3	1	3	2	2
Others to the worst	2	1	3	2	2	2

Similarly, Table 6.4 indicates sub-criteria, monitoring & evaluation, responses to non-compliance in CPEC projects (C3.3) as the best criteria, and sub-criteria, whether information about an environmental concern related to CPEC development is produced and documented at EPAs and the Ministry of CC (C3.2) is the worst criteria of main criteria of access to information/knowledge (C3).

Table 6.5: Main criteria (coordination) linked sub-criteria-pairwise comparison

Sub Criteria	C.4.1	C.4.2	C.4.3	C 4.4
Best to others	1	2	4	6
Others to the worst	6	6	3	1

Analysis indicated that the sub-criterion, the stakeholder's communication and collaboration in the governance process (C 4.1) was defined as the best criterion; and the sub-criteria i.e., forum for discussion, debate, negotiating, and resolving trade-offs is present to make CPEC a green developmental model (C 4.4) was determined as the worst criterion of main criteria of coordination (C4) (see Table 6.5).

Table 6.6: Main criteria (accountability/legitimacy) linked sub criteria-pairwise comparison

Sub Criteria	C.5.1	C.5.2
Best to others	2	1
Others to the worst	1	2

Similarly, Table 6.6. indicates that the sub-criteria (C 5.2), mechanisms are in place to ensure that means and rationales of decisions making are transparent for eco-friendly development under the CPEC plan are defined as the best criteria; and sub-criteria (C 5.1) decision-makers (e.g., EPA) faced consequences for their decisions about EP and CPEC development; are the worst criteria factors of main criteria of accountability/legitimacy (C5).

Table 6 7: Main criteria (inclusion) linked sub criteria-pairwise comparison

Sub Criteria	C. 6.1	C. 6.2	C. 6.3
Best to others	2	1	2
Others to the worst	1	2	2

Similarly, the sub-criteria, policies and processes acknowledge respect for and incorporation of diverse perspectives, values, cultures, and rights (C6.2) were defined as the best criteria; and sub-criteria, marginalized stakeholders' participation in the decision-making process (C6.1) was defined as worst criteria of the main criteria inclusion (C6) see Table 6.7.

Table 6.8: Main criteria (participation) linked sub criteria-pairwise comparison

Sub Criteria	C.7.1	C.7.2	C.7.3
Best to others	1	2	4
Others to the worst	4	3	1

Table 6.8 presents that sub-criterion stakeholders' input is incorporated in planning and implantation (C7.1) is the best criteria, and sub-criteria, equal public participation in the development of EA reports for CPEC projects (C7.3) was determined as the worst criteria of main criteria of Participation (C7).

Table 6.9: Main criteria (justice/ rights) linked sub criteria-pairwise comparison

Sub Criteria	C.8.1	C.8.2	C.8.3	C.8.4	C.8.5	C.8.6
Best to others	3	3	2	3	2	1
Others to the worst	3	1	3	2	3	3

Similarly, in the sub-criteria, timely dispute resolution mechanism (C8.6) was the best criteria; and in the sub-criteria, mechanisms are in place to ensure socio-economic costs and benefits are just and fairly distributed (C8.2) worst criteria of main criteria justice/rights (C8) see Table 6.9.

Table 6.10: Main criteria (innovation/ adaptation) linked sub criteria-pairwise comparison

Sub Criteria	C.9.1	C.9.2	C.9.3	C.9.4	C.9.5	C.9.6	C.9.7
Best to others	3	2	5	4	1	3	4
Others to the worst	2	4	1	2	5	2	2

Similarly, the sub-criteria, capacity building to deal with environmental and CC concerns of CPEC development (C9.5) and sub-criteria, efforts are taken to understand and document the diverse contexts where policies are applied and to deliberate on necessary adjustments (C10.3) were defined the best criteria of main criteria of innovation/ adaptation (C9) and multi-level (C10) respectively (see Table 6.10 & 6.11.)

Table 6.11: Main criteria (multi-level) sub criteria-pairwise comparison

Sub Criteria	C10.1	C.10.2	C.10.3
Best to others	2	2	1

Others to the worst	2	1	2

In this context, the sub-criteria, known and unknown risks and opportunities are considered, analyzed, and planned for (C9.3) was determined as the worst criteria; and sub-criteria, policies exist that recognize the need to downscale environmental management and conservation models to fit local realities. (C10.2) was defined as the worst criteria of the main criteria (C9) & (C10) respectively.

Table 6.12: Performance of stakeholders and thematic dimensions

Thematic Dimension	AC	EC	EPAs	INGOs	MI	NGOs	OT	RS	Average Performance
T1	6.708	5.941	4.857	8.000	7.333	8.000	5.533	6.800	6.647
T2	6.667	5.353	5.286	8.250	8.333	7.500	5.667	7.200	6.782
T3	6.500	5.529	5.286	6.750	8.000	7.500	5.800	7.400	6.596
T4	6.667	5.471	6.714	7.750	7.667	8.500	6.200	7.600	7.071

In terms of average performance of the thematic dimension, the best performance criterion was responsiveness (T4), followed by robustness (T2), effectiveness (T1), and equity (T3) respectively. The stakeholder's performance and consistency index with criteria is shown in Table 6.13 and Table 6.14.

Table 6.13: Performance of stakeholders and main criteria

Main Criteria	AC	EC	EPAs	INGOs	MI	NGOs	OT	RS	Average Performance
C1	5.583	5.882	3.714	5.500	8.667	5.000	5.933	8.000	6.034
C2	6.750	5.882	4.571	7.250	8.333	5.000	5.267	7.800	6.356
C3	5.792	5.706	4.857	6.500	7.333	4.500	5.467	6.000	5.769
C4	6.708	5.412	5.857	6.500	8.667	4.000	6.000	6.600	6.217
C5	7.167	5.824	4.857	6.750	8.000	3.500	5.800	7.600	6.187
C6	6.167	6.059	5.571	6.000	8.000	8.000	5.733	5.800	6.416
C7	6.417	5.706	6.000	6.250	8.333	5.000	5.267	7.400	6.296
C8	7.000	6.235	6.000	6.500	8.667	2.500	6.467	8.400	6.471
C9	6.917	5.353	5.571	6.000	7.333	4.000	6.067	8.000	6.155
C10	6.083	5.235	4.857	6.250	7.000	5.000	5.533	6.600	5.819
C11	7.250	5.941	5.857	7.250	9.000	7.000	7.000	8.200	7.187

In terms of average performance of the main criteria, the best performance criterion was transparency (C11) with a value of 7.187 followed by Justice/ Rights (C8) 6.471; inclusion (C6) 6.416; capacity (C2) 6.356; participation (C7) 6.296; coordination (C4) 6.217; accountability/legitimacy (C5) 6.187; innovation/ adaptation (C9) 6.155; direction/mandate (C1)6.034; multi-level (C10) 5.819; and access to information/knowledge (C3) 5.769 respectively.

Stakeholders' sub-criteria performance descending order

The sub-criteria factors' main results are summarized in Box 6.1. However, the detailed analysis result is presented in **Annexure- G.**

Box 6.1: Summary of sub criteria best performance main results

- The average best performance value related to sub-criteria of C.2, C 2.4 (6.152) is followed by C 2.3 (6.115); C 2.1 (5.803); C 2.2 (5.617) and C 2.5(5.280). Similarly, C3-related sub-criteria best performance criteria C 3.3 (5.906) is followed by C. 3.4. (5.758); C 3.5 (5.693); C 3.1 (5.663) and C. 3.2, (5.419).
- Main criteria C4 linked sub-criteria C 4.2 best performance criteria is (6.118) followed by C 4.1 (6.059); C 4.3 (5.501); and C 4.4 (5.136). The criteria C.5 related sub-criteria C 5.1 (5.623) and C 5.2 (5.597).
- The criteria C.6 related sub-criteria C 6.2 (6.034) is followed by C 6.3 (6.002) and C 6.1 (5.840). Similarly, the best performance criterion C.7 is C 7.2 (6.264) followed by C 7.1 (6.263) and C 7.3 (6.010).
- Main criteria C.8 related sub-criteria C 8.6 (6.019) is follow by C 8.3 (5.797); C 8.5 (5.598); C 8.4 (5.467); C 8.2 (5.452) and C 8.1 (5.325). The criteria C.9, sub-criteria C 9.5 (6.280) is followed by C 9.7 (5.969); C 9.1 (5.874); C 9.6 (5.868); C 9.2 (5.825); C 9.3 (5.585); C 9.4 (5.580). Similarly, C.10 sub-criteria C.10.1 (6.041) is followed by C10.3 (5.917); C10.2 (5.805). Similarly, main criteria C.11 of sub-criteria C.11.1 is (6.395) and for criteria C1, C1.1 is (5.91) respectively.
- The important result is that the main criteria of transparency-related sub-criteria i.e. the process and mechanism are in place to deal with corruption and implementation of environmental laws in letter and spirit (C11.1) have the highest average performance value of 6.359 and sub-criteria i.e. forum for discussion, debate, negotiating, and resolving trade-offs is present to make CPEC a green developmental model (C 4.4) related to main criteria coordination (C4) is the least performance value of 5.136.

6.2.2. Calculation results of the BWM-mV model

The main results of the BWM-mV model are summarized in Box- 6.2. However, detailed calculation results are shown in **Annexure- G.**

Box 6.2: BWM-mV model main results in descending order of importance/ weight gap

- In the context of the theme, responsiveness (T4) was the most important theme with a weight value of (0.486). The second most important theme was effectiveness (T1) and robustness (T2) with a weight value of 0.189 respectively followed by theme equity (T3) with a weight value of 0.135.
- In context of main criteria, the criteria transparency (C11) with weight value of 0.280; followed by justice/ Rights C8 (0.153); accountability/legitimacy C5 (0.092); innovation/ adaptation (C9) (0.076); C2 (0.066); coordination C4 (0.066); inclusion C6 (0.075); participation C7 (0.057); C1(0.051); C3 (0.051); multi-level (C10) (0.051).
- In context global weight gap value. c sub criteria of C2 C2.4 (0.026) is followed by C2.3 (0.018); C 2.7& C 2.1 (0.009); and C2.5 (0.005). Criteria C3, sub criteria C3.3 (0.018) is followed by C3.1 & C3.5 (0.011); C3.4 (0.007); and C3.2 (0.005). The criteria C4, C4.1 (0.032); is followed by C4.2 (0.019); C4.3 (0.010); and C4.4 (0.004). The criteria C5, C5.2 (0.055); is followed by C1.1 (0.051); C5.1 (0.037). Similarly, the criteria C6 of C6.2 (0.029) is followed by C6.3 (0.017); C6.1 (0.011). The criteria C7, sub criteria C7.1 gap value (0.032) is followed by C7.2 (0.018); C7.3 (0.007). The criteria C8, C8.6 (0.045) is followed by C8.5 (0.029); C8.3 (0.029); C8.4 (0.019); C8.1 (0.019); and C8.2 (0.011). Similarly, main criteria C9 related sub criteria C9.5 (0.025) is followed by C9.2 (0.014); C9.1 (0.009); C9.6 (0.009); C9.7 (0.007); C9.4 (0.007); and C9.3 (0.0043). Finally, the sub criteria of the C10 gap value of sub criteria of C10.3 (0.026); is followed by C10.1 (0.015) and C10.2 (0.0102) respectively.

The following main reasons for weak institutional capacity were highlighted by the experts (see Box 6.3)

Box 6.3: Experts /Stakeholder's overall feedback on institutional capacity CPEC development and sustainability

- Lack of transparency and coordination among relevant institutions; misuse of authority, corruption; lack of professionalism, incompetency, lack of training; political clashes; policy inconsistency, lack of experts and data; political appointments.
- Lack of capacity to understand the ground realities; bad governance; lack of technical know-how; lack of public unawareness, weaker policies; lack of proper training and equipment; lack of government support to enforce environmental laws; political influence.
- Political pressure on EIA report approval; lack of funds to implement Environmental Management Plan, legislative loopholes; lack of appropriate policies, strategies, and tools; lack of resources for research and development; political will; lack of awareness on CC and mitigation; weak accountability; poor transparency; political instability and extremism.

Table 6.14: Consistency index (CI)

Theme	Main Criteria	Sub-Criteria								
(T1-T4)	(C1-C11)	(C2.1 -2.5)	(3.1-3.5)	(C4.1-4.4)	(C5.1-C5.2)	(C6.1-C6.3)	(C7.1 -C7.3)	(C8.1-C8.6)	(C9.1-C9.7)	(C10.1-C10.3)
0.081	0.178	0.116	0.058	0.098	0.2	0.1	0.0625	0.084	0.042	0.1

Similarly, results related to stakeholders opinion about Pakistan current environmental governance and sustainability of CPEC plan are depicted in Figure 6.1 and Figure 6.2 respectively

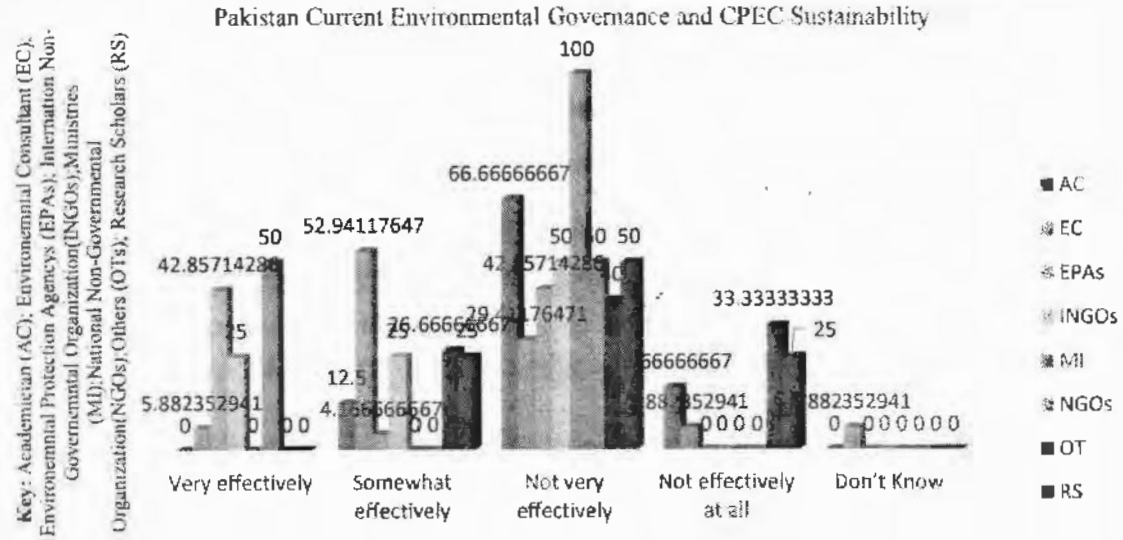


Figure 6.1: Question-1 do you think that effective EG is in place in Pakistan for environmental and social safeguards while implementing the projects under CPEC?

Analysis indicated that a large percentage of stakeholders think that the current EG is not very effective for the sustainable implementation of CPEC development.

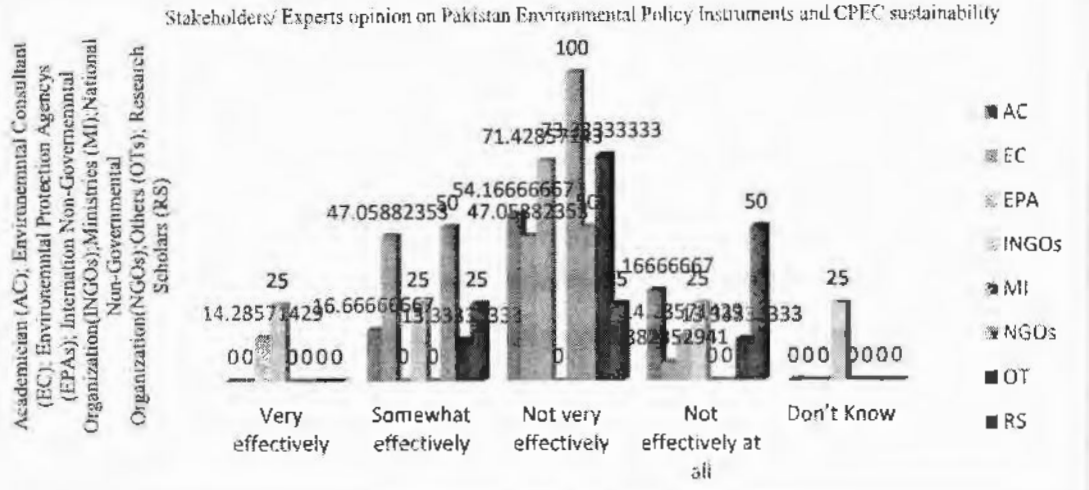


Figure 6.2: Question: 2 Are the relevant institutions capable of effectively implementing relevant policies and plans by enforcing rules and regulations for sustainable and green CPEC development?

Analysis indicates that maximum experts think that relevant institutions are not very effectively capable to implement relevant policy instruments for sustainable and green CPEC development.

6.3. Discussion

The CPEC developmental plan and international UN 2030 Agenda have lots of shared aims and objectives. EG is key to achieving UN 2030 Agenda of SD goals (Seixas et al., 2020). The multi-billion-dollar CPEC have numerous socio-economic and environmental concerns. The Stakeholder's perceptions related to CPEC sustainability are critical issues for governments and policymakers (Hassan et al., 2022).

In context of CPEC development, Pakistan EG, EA and CC an interviewee (Min-02) stated that

"CPEC have multiple projects and proponents of each project are different and they all are abiding by national environmental laws. Environmental approval is a mandatory requirement for all those projects. This is an overall assessment or statement of all the projects which are following under the CPEC. Although the Pakistan CC Act-2017 does exist, however, no operating rules and regulations made there under exist i.e for CC adaptation and mitigation of a project, so whatever the climatic aspects are covered in the assessment of the impact, however, I don't think so the specific CC impact assessment are taking thereof. The proponent does have to cover the generic term of change adaptation and mitigation under the existing environmental laws and is not linked up to the Pakistan CC act 2017"

The result of this study indicates that transparency is the most important main criterion for EG and CPEC sustainability. Similarly, the sub-criteria related to transparency main criteria, the process and mechanism in place to deal with corruption and implementation

of environmental laws in letter and spirit (C11.1) were ranked with the largest gap value. Much emphasis is given to the transparent implementation of the CPEC plan.
In Pakistan, the absence of good governance (Tufail, 2018) and the formulation of the right policies are critical issues (Masood, 2019). Corruption is a key issue that affects Pakistani governance and administrative setup (Chêne, 2008). According to Bokhari (2017) country's poor quality governance lead to the failure of law enforcement. Corruption in Pakistan can be found in public, private, political, judicial, commercial, and even the religious sphere (Chêne, 2008, Javaid, 2010).

From the perspective of environmental sustainability and BRI-funded development, Zubedi et al. (2022) highlighted that numerous BRI countries have not strict adherence to ecological and global protection reforms including transparency in BRI related projects is lacking. In the context of CPEC development, an expert **(AC-06)** stated that the *"absence of rules and regulations; corruption; nepotism; incompetent bureaucracy; no accountability; improper training for capacity building; and lack of resources.*" are the main challenge of current EG, CPEC sustainability and weak institutional capacity. Furthermore, it is suggested that*" there is a need for comprehensive strategy and planning*" for the sustainability of the CPEC plan.
Corruption severely affects both national and overseas investment, reduces fiscal performance, hinders trade, triggers distortions in the composition and magnitude of government expenditure, and declines the funding and economic systems (Faisal and Jafri, 2017 P.60). Similarly, the political instability established an environment in which corruption can thrive and weaken governance. For example, the persistent institutional clashes (for instance between the judiciary and executive), constitutional crisis, lack of accountability, and poor law and order conditions, reflect the poor quality of governance (Tufail, 2018). In this context, Hussain (2022) highlighted that " *CPEC is a good programme, but Pakistan has a lot of work to do on security, corruption, and governance*".
Great transparency is needed in CPEC investment (Dawn, 2021b). For example, a report by AidData, a US based international development research lab calls for great transparency in CPEC development. Chinese financing under CPEC consists of loans that are at or near commercial rates as opposed to grants (Dawn, 2021b, Malik et al., 2021). The GoP claims all CPEC projects are transparent and involve zero hidden loans (Dawn, 2021a). However, the Chinese representatives believe that about 80 percent of the CPEC investment is lost to corruption due to bad governance and conflicting roles played by the civilian government and the army establishment (Wani, 2020). In connection with corruption allegations, the chairman of CPEC authority has come under pressure to resign (Aamir, 2020) to make sure accountability, transparency, and checks and balances on CPEC development.
Transparency and accountability are important aspects of any development project, including CPEC. There have been concerns about the lack of transparency and accountability and corruption in the CPEC project. In this context, the terms of the agreement between Pakistan and China have not been made public, and there are no clear mechanisms for public oversight and accountability. This has led to fears that

CPEC projects could lead to a debt trap for Pakistan and that it could be used by China to gain strategic influence in the region. However, in March 2021 to respond to transparency, accountability and good governance concerns of CPEC development both China and Pakistan signed an MoU intending to ensure that CEPC projects are implemented in a transparent and accountable manner. Overall, while there have been concerns about the lack of transparency in the CPEC project, however, both China and Pakistan have made efforts to address these concerns. The signing of the MoU on transparency and good governance is a positive step towards ensuring that the CPEC projects are implemented in a transparent and accountable manner.

In the context of the thematic dimension, the average performance of responsiveness (T4) was the best performance theme. Responsiveness governance supports adaptation to diverse contexts and changing conditions. The country (Pakistan) has environmental and CC policy instruments and institutions at the central and provincial government levels. However, under the CPEC development agreement, no explicit environmental and safeguard guidelines and CC frameworks are present to ensure the sustainability of the CPEC plan (Aslam, 2021).

Most of the expert stakeholders think that Pakistan's current environmental system is not very effective for the sustainable and green execution of the CPEC plan. In this regard, the experts /stakeholders stated numerous factors that lead to the weak institutional capacity of EG related institutions. For Example, *lack of transparency and coordination among relevant institutions (***Interviewee AC-07)**; *corruption; lack of professionalism, incompetency, lack of training (***Interviewee AC-08)**; *political clashes; policy inconsistency; corruption and illegal appointments* **(Interviewee EPA-05)**; *lack of capacity to understand the ground realities; political appointments, bad governance; lack of technical know-how* **(Interviewee R-05);** *weaker policies; lack of proper training and equipment; lack of government support to enforce environmental laws* **(Interviewee EC-04)**; *political influence; political pressure on EIA report approval* **(Interviewee EC-03)**; *lack of fund to implement EMP, legislative loopholes; lack of resources for research and development; political will, environmental compliance is at least priority for proponent, public entities and the general public* **(Interviewee Min-02);** *weak accountability; poor transparency; and* political instability **(Interviewee R -04)**.

All these issues are relevant to Pakistan's situation and sustainability of CPEC development. The CPEC has the potential to bring significant economic benefits to Pakistan, but it has also raised concerns about the country's dependence on China and the environmental and social impacts of CEPC projects. Political instability in Pakistan has been a long-standing issue, with frequent changes in government and ongoing conflicts with India and other neighboring countries. Legislative loopholes in Pakistan's legal system related to EG have been a challenge, with issues such as corruption, inadequate law enforcement, and security being major concerns.

Similarly, the interviewee **(CA-02)** stated that

"I think overall public sector in terms of the framework, policy, and mechanism, is quite a good laid-out procedure. However, their implementation sometimes depends on the team whose implementing in, but overall as far as the paperwork is concerned, and

overall articulation of the policies is concerned I think for some cases we have extra policies but in some cases, the issue is not of the policies but the issue is the capacity of individuals whose implementing those policies. Overall capacity is to some extent one of the issue to implement the CPEC Plan in a sustainability context"

The Provincial government need to enhance the institutional capacity of the relevant department (Iqbal et al., 2022) to promote environmental sustainability and climate-compatible development in Pakistan. In the context of CPEC stability and ecological sustainability, Pakistan is suffering numerous challenges, for example, lack of resources, increased taxes, foreign debts, political leader corruption, and financial crisis (Li et al., 2021a). All these factors directly and indirectly negatively affect the sustainability of the CPEC plan.

In context of the current EG system of Pakistan and the sustainability of CPEC, an interviewee **(CA-01)** stated that

"Institutions, for example, Environmental Protection Agencies are playing important roles to ensure the environmental sustainability of the CPEC Plan. In Pakistan, environmental protection agencies are responsible for the issuance of environmental approval for CPEC projects that likely cause adverse environmental effects. We didn't report any issues to EPAs rather EPAs are approached by the industries that are intended to set business and we have seen that EPA took complete due diligence while granted NOCs to these businesses. No double institutional capacity building is one of the hurdles in the sustainable implementation of the CPEC plan. However, CPEC investment provides an opportunity for relevant institutions to learn from Chinese counterpart to enhance institutional capacity and effective implantation of policies, enforcing rules and regulations to make CPEC a green and climate-resilient development"

In this context, (Qureshi, 2015, Hussain, 2019b) emphasized that some political parties in Pakistan were not adequately consulted, and anxieties were raised on security, safety, corruption, bad governance, project implementation, and legitimacies. In addition to tbis, Pakistan is facing problems, such as political-military anarchy, bad governance, interprovincial conflicts, and terrorism (Surahio et al., 2022) .

Similarly, key factors impacting the CPEC project's performance and sustainability are poor implementation capacity, institutional voids, poor transparency, project connectedness, and political ambition (Waheed, 2020). Both federal and provincial governments need to establish a political consensus to get equal benefits from CPEC investment.

In the context of institutional capacity and CPEC sustainahility, an expert **(EPA-06)** stated that

"*Environmental Governance system of Pakistan is outdated and has no capacity to fully understand the Environmental impact of CPEC projects. Federal and Provincial Governments have promulgated a few laws, but implementation and monitoring are almost non-existing. In the context of CPEC projects and Environmental Sustainability, Environmental NOCs were given on substandard EIAs under Immense pressure from Federal and State Governments to make sure FDIs*".

Furthermore, an interviewee **(Min-02)** stated

"All the regulatory agencies in Pakistan don't have the capacity to adequately cover the project when it comes under EIA or environmental approval and pre & post monitoring. There are challenges also from the proponent side. The Authorities or Environmental agencies are not up to the mark as far as means and capacities. As a result, environmental compliance is compromised."

Similarly, an interview **(PC-02)** stated that

"I don't think that relevant institutions for example EPAs are capable of effectively implementing to make CPEC a green and SD *because of*

- *Inadequate trained human resources*
- *Lack of latest equipment and laboratories for testing, monitoring, and follow-up of the EIA process*
- *Inadequate physical and financial resources, and financial commitment*
- *limited human and technical capacities at EPAs including Environmental Tribunals, Provincial Environment Departments, and outdated regulations"*

In the context of CPEC development and SEA, an interviewee **(Min-02)** stated that

"*SEA has to be conducted in the early stage. I think it's late when we talk about SEA of CPEC projects because most of the projects have already been in the planned and designed stage. We need to consider social and environmental impact assessments of the CPEC plan, and there is a need for post-clearance, post-approval monitoring and regulatory mechanism for CPEC projects because there are social issues and environmental impacts associated with the project during operational and completion phase. The CPEC authority has to address these issues and has to ensure that the genuine issues, not the political ones should be addressed. For this purpose, there has to be a technically sound environmental management unit under CPEC authority with reporting mechanism from every project under development/construction or operational phase.*"

Policy inconsistency and long waited draft policy documents are also a hurdle in the effective implementation of current EG. In this context, an expert **(AC-09)** stated that

"*Environmental policies need to be revisited. There's no mechanism under which Monitoring and revisiting the mitigation plans and their efficacy can be ensured. Our Environmental policies somewhat address project-based vision, and they don't consider cumulative effects or strategic environmental assessments into account.*"

The criteria, the capable visionary leadership to address environmental and CC concerns (C2.3); and effective human, financial, and technical capacity in relevant institutions (e.g., EPAs) to deal with environmental concerns of CPEC development (C2.4) were determined as the best criteria for the green development of CPEC plan. In this context, government initiatives, for example, the ten Billion Tree Tsunami Program (TBTTP), the Clean Green Pakistan Initiative, the Clean Green Pakistan Index (CGPI), Pakistan Electric Vehicles Policy 2020-2025, and the Protected Areas Initiative are strategies adopted to combat CC (Khan, 2021a) to address environmental pollution and waste management. These initiatives help to promote sustainability in the CPEC development projects, and to address the CC and environmental concerns of CPEC development and transform the CPEC into a green and climate-resilient China Pakistan Green Economic Corridor. However, the monitoring and implementation of these

initiatives are of critical concern. For example, TBTTP is expected to sequester alone 148.76 MtCO2e if fully implemented (GoP, 2021e). In this context, various irregularities, mismanagement and corruption and transparency related issues were reported in media and literature. For example, (Lang, 2020) highlighted that around US$3 M had been lost to corruption in Billion Tree Tsunami Program.

An expert **(Ind-06)** stated, *"While shadowed by economic disadvantages, a green approach may not be the top priority as other matters of the state are valued. Moreover, the mass developmental projects would require a green drive on a larger scale which would result in a possible spat between the locals and government as already seen in parts of Baluchistan as the local fear of a "take over" of their ancestral lands and their property*".

Effective monitoring and evaluation are key elements of SD and EG. To address these concerns, capable visionary leadership is needed. The leadership should prioritize SD to ensure that CPEC is implemented in an environmentally responsible manner. This can include measures such as promoting the use of renewable energy, implementing environmentally friendly construction practices, and addressing the impacts of transportation infrastructure on wildlife and ecosystems.

Furthermore, leadership should engage in meaningful consultations with local communities, public participation and civil society organizations to ensure that their concerns about environmental and CC impacts are heard and addressed. This can include conducting EIAs, and SEA, DRA, conducting public consultations, and creating mechanisms for community participation in decision-making. Moreover, leadership should also prioritize CC adaptation measures to ensure that infrastructure developed under CPEC is resilient to the impacts of CC. This can include measures such as designing infrastructure to withstand extreme weather events, promoting the use of climate-resilient agriculture practices, and investing in water management systems to ensure water security in the face of changing weather patterns.

Some CPEC projects focus on renewable energy development, such as the construction of wind and solar power plants. These projects could help Pakistan transition to a low-carbon economy and reduce its dependence on fossil fuels. However, challenges remain in ensuring that CPEC is implemented in an environmentally responsible manner. For example, some critics have raised concerns about the lack of transparency and accountability in the project's decision-making process, as well as the potential displacement of local communities. Overall, success of CPEC in promoting SD and addressing environmental and CC concerns depends on the actions of capable and visionary leadership, as well as the engagement of civil society and local communities in the decision-making process.

In this context, an expert **(EC-04)** stated that

"*Current EG is reasonable, but it is mostly focused on the preparation of Environmental Reports. There is a need to regularly monitor the performance of environmental mitigation measures during construction and operational phases of the CPEC and annual environmental compliance reports should be made public by EPAs*"

In this context, sub-criteria i.e , access to information/knowledge C3, monitoring & evaluation, and responses to non-compliance in CPEC projects (C3.3) are the most

important; and sub-criteria, whether information about an environmental concern related to CPEC development is produced and documented at EPAs and the Ministry of CC (C3.2), is the worst criteria. In this background, an expert **(EPA-07)** stated that "*Currently the EG system is somewhat working on CPEC but there is a lack of CPEC dedicated governance system to foresee the situation and environmental impacts of the mega project on Pakistan. There should be more studies for profiling environmental parameters to monitor and compare their state due to anthropogenic activities during the development and post-operation phase of CPEC to ensure the protection of natural resources and SD in the region. There should be cooperation based on sharing of knowledge and expertise among the scientific community on a national/ regional scale is needed worthy for scientific knowledge and data sharing.*"

Access to information and knowledge is essential to ensuring transparency and accountability in decision-making process for CPEC projects. This includes providing information about potential environmental and social impacts of CPEC projects, as well as information about the rights and concerns of local communities. With this information, local communities and civil society organizations can participate in decision-making process, provide feedback, and hold decision-makers accountable.

Monitoring and evaluation ensure that CPEC projects are implemented following environmental and social safeguards. This includes monitoring the potential impacts of projects, such as air and water pollution, habitat destruction, and displacement of local communities. Evaluation assists to recognize potential problems early in project cycle, allowing for corrective actions to be taken before damage occurs. Responses to non-compliance are essential to ensure that CPEC projects adhere to environmental and social safeguards. These responses can include penalties for non-compliance, suspension or termination of projects, or other corrective measures.

In addition to this, an expert **(INGO-02)** stated about CPEC development and EG that "*No public information is available on CPEC, all proposed or approved projects should have been prioritized by People of GB and relevant departments for their scrutiny, appraisal and impact assessment and analysis (environmental, social and economic)*"

The trade and fiscal developmental activities under CPEC development are at the cost of environmental degradation. In this context, both China and Pakistan are required to make arrangements and encourage initiatives for SD of CPEC projects and to prevent trade threatening activities to the environment.

An interviewee **(EC-01)** stated that

"*Pakistan has well-established SD Goals and targets. EIA is a legal requirement for development projects. However, more effort is required to conduct a SEA planning aspect of CPEC development, to make this project environmentally sustainable. The CPEC has a considerable strategic environmental impact. The implementation of environmental policies and laws is an area that needs more attention.*" The efforts made to ensure EP for CPEC should be publicly available (Masood et al., 2020, McCartney, 2022, Khalid et al., 2022) to build stakeholders' confidence in CPEC sustainability. In the context of current EG and CPEC development, an expert **(EC-05)** stated that

"*When the projects are funded by International Financial Institutions the environmental compliance is much better as compared to solely government-funded projects. CPEC projects involving donor/finances have betterEG*"

The sub-criteria (C 5.2) of the main criteria (C5) i.e., mechanisms are in place to ensure that means and rationales of decisions making are transparent for eco-friendly development under the CPEC plan (C 5.2) are ranked as the best criterion; and sub-criteria, decision-makers (e.g., EPA) faced consequences for their decisions about EP and CPEC development (C 5.1) are the worst criteria. this context, an expert **(NGO-3)** stated that

"*Environment is not taken as a basic requisite for infrastructure projects and usually the EIAs are conducted to tick the boxes. SD is not a concept well understood by the authorities hence they do not evaluate the pros and cons of a project based on environmental concerns. Social behaviour also dictates the seriousness towards environmental aspects*".

A mega developmental investment in developing and under-developing from developed countries brings some challenges, for example, inconsistency in the development policies, cultural mismatches, and lack of institutional capacity for optimal utilization (Arrfat, 2017) and transparency.

To ensure transparency, GoP has established several mechanisms. For example, EPA is responsible for overseeing environmental assessments and monitoring compliance with environmental regulations. The EPA is required to make all EIAs available to the public for review and comment before making any decisions about CPEC projects. Moreover, the JCC oversees the implementation of CPEC projects. The JCC has mandated the establishment of a monitoring and evaluation framework for CPEC projects, however, working group related to environmental and climate resilience development, to ensure CPEC projects are being implemented in an environmentally sustainable and climate resilient development is missing in the current institutional framework of CPEC plan implementation.

In this context, an interviewee (PC-01) stated that

"*No working group related to the environmental sustainability of CPEC projects has been established yet. The planning commission environmental section and Planning Commission manual for the development projects (revised 2019) consideration of EA , CC and DM has nothing to do with the CPEC projects*".

Additionally, the Interviewee (PC-02) stated that

"*Planning commission development projects manual (revised 2019) project formulation forms although mentioned EIA, CC , and disaster risk management. However, it is just a formality and is not more than a tick-mark exercise as the planning commission has no mechanism to enforce commitments related to EA , climate-compatible development and DRR intervention. CPEC projects are under both Federal and Provincial Governments. There is a need to create cohesion in environmental laws, sectorial guidelines,. and regulations for the sustainability of transboundary CPEC Plan 2017-2030 and related projects. Additionally, national-level consultations need to be carried out to include SEAs for large-scale and transboundary CPEC development plan 2017-2030 and projects. Similarly, the cost of environmental*

management is not included in Planning Commission Performa No. 1 (PC-I), a great challenge for the sustainability of CPEC plan 2017-2030."

In the context of working group integration to deal with environmental and CC concerns of CPEC development. An Interviewee (CA-01) stated that;

"*A working group under the Joint Cooperation Committee to promote environmental sustainability, climate resilience development, CC DRR and overall sustainability of the CPEC Plan is currently lacking in the existing Institutional Framework of the CPEC. However keeping in view, the current CC disaster flood situation in the country and the highly fragile ecosystem along the CPEC route, the authorities recommend in a recent consultative review meeting for the preparation of the upcoming 11th JCC meeting on CPEC to integrate working group in existing Institutional Framework of CPEC Authority on 'environment, CC, and DM for the sustainability of CPEC Plan."*

Similarly, an interviewee (CA-02) stated that

"*We don't have a working group on CC, the environment, and sustainability. I think instead of having a complete joint working group on CC and sustainability that's not required, but we can have a sub-group under the long-term planning group, that is a long-term planning joint working group because CC is a long-term process, so perhaps in that, we can have a subgroup"*

To ensure the sustainability of CPEC development projects and minimize their environmental and CC impact, both Pakistan and China need to incorporate environmental and CC considerations into CPEC planning and implementation. This includes developing an ESIA for CPEC projects, establishing an Environmental and Social Management Framework, and creating a Joint Working Group to address environmental sustainability and CC concerns.

Regarding consequences for decision-makers, the GoP has enacted several laws and regulations to ensure compliance with environmental regulations. For example, the Pakistan EP Act of 1997 provides penalties and fines for non-compliance with environmental regulations. The act empowers the EPA to impose fines, issue warnings, and take legal action against violators of environmental laws.

An expert **(AC-06)** stated that

"*CPEC is a flagship and largest development project since the creation of Pakistan. If we look into the EG System of Pakistan, I have observed that the system is very weak. Although several legislations (Environmental Protection Acts, CC Act, NDM Act and local government acts) support the EG System but at the operational level so many loopholes exist providing easy access to the corporate sector to manipulate the system or bribe it, undermining the significance of implementation of environmental quality standards. A transparent mechanism doesn't exist to give access to citizens to record their environmental concerns about major projects and influence final decision making. Decision making is not guided by science and is negatively influenced by political interference. In regard to CPEC sustainability, we need to keep in mind that Gawadar is located in a seismic zone, and no one knows how much CPEC infrastructure is resilient to resonance, cyclones or tsunamis. CPEC could enhance CC vulnerabilities due to possible environmental repercussions i.e., the extension of road network with increased flow of vehicular traffic increasing environmental pollution; traditional coal-*

fired power plants enhancing CO_2 emissions and harvesting of trees for the construction of CPEC route, increasing soil erosion. Appropriate measures are required to be taken before these projects are getting mature otherwise, Pakistan's vulnerability to climatic extremes can be further enhanced."

The EG, public participation and SD are interrelated and integral elements to achieving SDGs (Pavlova, 2017). However, in the case of Pakistan, public participation influence in the EIA decision-making is weak (Nadeem and Fischer, 2011). The criteria for equal public participation in the development of EA reports for CPEC projects (C7.3) was ranked as the worst criterion.

An expert **(AC-05)** stated about current EG System of Pakistan and CPEC sustainability;

"*CPEC project seems to be a good initiative in terms of development but due to neglected concerns on environment and the political nepotism has highlighted the worst negative impacts on Pakistan. Similarly, the employment of more Chinese than Pakistani workers has made unemployment rates even higher than before. We have perfect environmental policies and acts the negligence is on the implementation part that has made us to suffer from severe water and energy crisis.*

Equal public participation in EA reports development for CPEC projects is essential for ensuring transparency, accountability, sustainability, environmentally responsible and socially acceptable. It allows affected communities, civil society organizations, and other relevant stakeholders to provide their input and feedback on the potential environmental and CC impacts of the proposed CPEC development projects.

In context of CPEC development and EIA, an interviewee **(EC-01)** stated that

"Lot of EIA reports have been conducted but they are inefficient and ineffective as they don't consider and analyze in-depth CC disasters and strategic environmental impacts. The current EIA report failed to consider and incorporate CC disaster risk and environmental risk in a satisfactory manner. In this context, it suggested that EIA studies need to go detailed about CC and disaster risk management for the sustainability of CPEC development."

6.4. Conclusion and policy implications

BRI-related CPEC investment is an ambitious effort of the Government of China to boost trans-continental connectivity and cooperation mainly through infrastructure investments and trade. Although this international developmental programme is supposed to promote economic growth, it can have considerable environmental implications. Despite escalating investments in the renewable energy sector development, the majority of BRI energy schemes are of fossil fuels nature (Jackson et al., 2021). In this context, the BRI-related CPEC development determines new challenges and opportunities for EG, to plan and construct environmentally friendly and climate-resilient large infrastructure projects. The ways through which China's BRI infrastructure development affects the natural environment are land-use changes, impacts on the landscape and GHGs emissions (Teo et al., 2019). The development of

transport arrangements caused habitat loss, the overexploitation of resources and resulting landscape degradation (Ascensão et al., 2018). In this way Infrastructure development potentially influences the achievement of all SDGs (Thacker et al., 2019). CC and environmental sustainability are important elements of the UN 2030 agenda to promote sustainable development. SD is a balance of economic, ecological, and societal aspects.

The weak EG system, ineffective institutional capacity, lack of transparency in the decision-making process, an increase in insecurity, and mistrust between central and provincial government is likely negatively impacting the CPEC development, with strategic implications for the BRI that consider CPEC as the flagship programme. In this context, Surahio et al. (2022) determine that the security risk is critical for Chinese manpower. To address conflicting scenarios among the central and provincial governments, enhance the country's EG, to ensure transparency in CPEC-related development and security-related issues, Pakistan needs to devise and reframe a legal and institutional framework that strengthens security-related matters, transparency and CPEC governance issues.

In this context, criteria, timely dispute resolution mechanism (C8.6) were the best criteria; and criteria, mechanisms are in place to ensure socio-economic costs and benefits are just and fairly distributed (C8.2) ranked as the worst criteria for the sustainability of CPEC plan. In the CPEC governance, trade, and fiscal dispute, there is no dispute resolution mechanism in place to provide relief to the parties concerned at the local, regional, provincial and federal levels (Hussain, 2019a). In this context, Coenen et al. (2022) highlighted that BRI projects run the risk of falling short of sustainability due to a lack of ecologically sound and transparent planning and implementation. Similarly, criteria i.e., capacity building to deal with environmental and CC concerns of CPEC development (C9.5) and criteria, efforts are taken to understand and document the diverse contexts where policies are applied and to deliberate on necessary adjustments (C10.3), were ranked as the best criteria for the sustainability of CPEC plan.

An effective timely dispute resolution mechanism is essential for addressing any environmental or governance disputes that may arise during the construction and operation of CPEC. This mechanism should be transparent, impartial, and accessible to all stakeholders, including local communities, civil society organizations, and environmental experts. By ensuring effective dispute resolution mechanisms, CPEC can help to promote SD and environmental sustainability in the region.

Similarly, another important result is that for example, the EG theme responsiveness was the most important theme with a weight value of (0.486) for the sustainability of the CPEC development. In this context, it is concluded that with the rising complication of socio-ecological issues, the environmental governance structures needed to embrace increasingly collaborative policies and instinctive procedures that critically develop the responsiveness and participatory approach in EG systems. The second most important theme was effectiveness (T1) and robustness (T2) with a weight value of 0.189 respectively followed by theme equity (T3) with a weight value of 0.135.

Similarly, criteria were ranked as follows in descending order of importance i.e. transparency (C11) with weight value of 0.28; followed by justice/ rights C8 (0.153); accountability/legitimacy C5 (0.092); innovation/ adaptation (C9) (0.076); Capacity C2 (0.066); coordination C4 (0.066); inclusion C6 (0.075); participation C7 (0.057); Direction/mandate C1(0.051); C3 (0.051); multi-level (C10) (0.051).

The SDGs emphasise enhancing transparency in-country development process. The BRI development increases emissions among host countries. In this context, (Zubedi et al., 2022) emphasises that China and corridor economies require to adopt strict policy reforms to increase transparency, expand trade, improve debt sustainability, and mitigate environmental, social, and corruption risks and CPEC development is no exception. By stakeholder expert opinions this novel approach emphasizes transparency, accountability, innovation/ adaptation, capacity building and coordination in the planning process and good governance for CPEC sustainability.

Even though numerous studies related to BRI development highlighted the importance of governance instruments i.e SEA and EIA to predict, prevent and mitigate potential negative environmental effects of development plans and projects (Anthony, 2020, Turschwell et al., 2020, Wang et al., 2020, Ng et al., 2020, Harlan, 2021) However, in the case of CPEC development, EIAs or SEAs are not effectively conducted for EP.

The expert believes that EIA has been ignored in the formulation of CPEC projects. Additionally, the current EIA reports failed to consider and analyse CC disasters and environmental risks in a satisfactory manner. Similarly, limited institutional capacities inhibit effective monitoring and enforcement of the provisions outlined in the EIA. In the context of SEA, limited understanding, as well as the ability for strategic decision-making (Zhang et al., 2021), is a great concern for CPEC development and sustainability.

Pakistan's current EG system faces several challenges, including lack of implementation and enforcement of environmental laws and regulations, weak institutional frameworks, lack of political will, transparency and accountability, inadequate public participation in the decision making process, inadequate financial and human resources for environmental management, insufficient monitoring and assessment. However, the government has taken some steps to address these challenges, such as establishing a dedicated Ministry of CC, EPAs, environment, CC and DRR related policy instruments, and launching initiatives to increase renewable energy generation, and implementing programs to conserve natural resources and promote SD in the country.

However, CPEC development poses challenges for EG in Pakistan due to its scale and scope. Overall, Pakistan's current EG system and the sustainability of the CPEC development project are intertwined. To ensure long-term environmental sustainability and economic growth, Pakistan needs to strengthen its EG system and ensure that environmental, CC and DRR considerations are incorporated into all aspects of the CPEC development projects. In this context, effective EG is essential for ensuring that the benefits of CPEC are sustainable and do not come at the cost of the environment and people's well-being. Here are some critical policy implications in context of Pakistan's current EG system and sustainability of CPEC development:

Strengthen institutional frameworks: GoP needs to strengthen institutional frameworks for EG to ensure effective regulation, enforcement, and compliance with environmental laws and standards. This includes strengthening capacity of regulatory bodies, such as EPAs, and ensuring their independence and accountability.

EIA guidelines development: GoP needs to develop robust EIA guidelines that consider potential environmental, CC, disasters and social impacts of CPEC projects. These guidelines should ensure meaningfull participation of stakeholders in EIA process and ensure that the projects adhere to environmental and social safeguards.

Capacity Building: GoP needs to build capacity of relevant EG institutions such as EPAs including local communities, civil society organizations, and environmental professionals to participate in EG and hold project proponents accountable for their ecological and social impacts.

Promote green development: There is needs to promote green development by incentivizing renewable energy, promoting energy efficiency, and incorporating environmental and CC considerations into planning and design of CPEC projects. This includes adopting Chinese Government Guidelines for green BRI development (Belt and Portal, 2017) and recently established green financing guidelines and framework for CPEC development (Nedopil et al., 2023). Green infrastructure need to be promoted in CPEC development to reduce negative impact on environment.

Promote public participation: Public participation need promotion in decision-making process related to CPEC development. This can be achieved by providing access to information, conducting public consultations, and encouraging public to participate in decision-making process.

Ensure transparency and accountability: Transparency and accountability should be ensured in CPEC development by establishing mechanisms to monitor and enforce environmental policies, laws and regulations. This can be done by establishing an independent environmental tribunal to handle environmental disputes related to CPEC. To address CC and environmental concerns, both Chinese and Pakistani governments have established several governance mechanisms, including the JCC, which oversees overall direction of CPEC implementation through a long-term Plan for CPEC development 2017-2030, which outlines the strategic vision for CEPC programme. However, there is still a need for greater transparency and public participation in decision-making processes for CPEC planning implementation, as well as a mechanism for resolving any governance disputes that may arise.

Chapter- 7

7. SUSTAINABILITY ASSESSMENT OF CPEC PLAN

7.1. Introduction

The CPEC development has the potential to provide significant economic benefits to Pakistan and regional countries, However, it also raises concerns related to environmental impacts, social issues, economic sustainability, and political stability. In this context, a comprehensive sustainability assessment of CPEC plan is essential to ensure that CPEC development contributes to long-term SD of Pakistan and the region. The assessments take into account the socio-economic, environmental, and political aspects of CPEC projects and identify measures to address potential negative impacts. By doing so, the CPEC projects can become a model for sustainable infrastructure development in Pakistan and the region. In this context, this chapter presents SWOT analysis to explore sustainability of the CPEC plan (2017-2030) research objective -5 and highlights opportunities for SEA integration into CEPC plan (2017-2030). In this context, a combination of multicriteria integrated decision-making approach SWOT analysis-Best Worst Method has been applied to analyze, weight and rank SWOT criteria factors in terms of best and worst criteria to establish policy implications for the sustainability of CPEC plan (2017-2030) (see the detailed method at Chapter 3, Section 3.1.5.1.). A questionnaire-based survey was circulated among experts /stakeholders to scale the criteria factors related to the SWOT factors of CPEC development plan 2017-2030 (see Annexure C). The assessment results are presented in 7.2. Similarly, section 7.3 presents the discussion part of this chapter. In light of the research findings conclusions and policy implications are drawn in sections 7.4 and 7.5 respectively.

7.2. Results

The detailed results of this chapter are placed in **Annexure-H.** However, a summary of the main results is provided in Box 7.1.

Box 7.1: Criteria weighting, performance gap and consistency index determination

- In the context of the main criteria factors, the internal strength criteria (ISC) geostrategic position (ISC 1.10) was determined as the best ISC, and criteria increase dependency on China (IWC 2.9), as the worst internal weakness criteria (IWC) of the main criterion dimensions. Similarly, for ISC-related sub-criteria factors criteria of geostrategic position (ISC 1.10) was identified as the best criterion, and the criteria of cultural friendliness (ISC 1.6) was determined as the worst criterion.
- In the Internal Weakness Criteria (IWC), the criteria technological inefficiencies (IWC 2.17) were identified as the best, and the criteria increase

dependency on China (IWC 2.9) as the worst for the sub-criteria of the main criteria internal weakness (IW).

- For external opportunities (EO) criteria theme ranking, the criterion increases job opportunities (EOC 3.18), and criteria regional connectivity (EOC 3.19) were categorized as the best criteria and the criterion mutual trade gain I (EOC 3.4) as the worst criteria of sub-criteria related to main criteria theme external opportunities (EO).
- In terms of average performance value, the best performance criterion related to ISC is increased employment (ISC 1.4), followed by energy demand fluffiness (ISC 1.7). Similarly, for internal weakness (IW), the criteria of technological inefficiencies (IWC 2.17) are followed by a lack of good governance in general (IWC 2.6).
- From the perspective of EOC, the criteria increased job opportunities (EOC 3.18), is followed by regional connectivity (EOC 3.19). Similarly, best performance criteria related to external threats (ET), and criteria factor exploitation of the natural resources (ETC 4.11), are followed by CC disaster concerns (e.g., potential threat to the ecosystem, biodiversity and Northern area glaciers melting).
- In the context of importance (weight value) the criteria related to internal strength (IS) are Dedicated leadership (e.g., Ten Billion Tree Tsunami Program) (1.13); Mutual Defense and Strategic cooperation. (1.12); Centralized planning and decentralized implementation practice. (1.11) and Geostrategic position. (1.10) have the highest importance value
- Similarly, in IWC, the criteria of technological inefficiencies (IWC 2.17) were the most important followed by the Lack of mechanism to transform SEZs into Eco-Industrial Parks (C2.18), and criteria increase environmental and health issues. (2.11) were the most important criteria
- Regarding external opportunities (EO) related criteria, the criteria development of Gwadar (Maritime economic development) (C3.21) is the most important criteria followed by criteria capacity-building initiatives (C3.22); promote cooperation on infrastructure, transportation, industrial collaboration, Gwadar, and energy security through CPEC. (C3.24); Regional connectivity (C3.19)
- Similarly, external threat (ET) criteria, criteria local Business losses. (C4.1); and natural resources exploitation. (C4.11); are determined as most important followed by criteria environmental impacts (C4.10); mistrusted inter-Provincial and Federal harmony in CPEC plan implementation (C4.21); and criteria law and order situation in Baluchistan Province (C4.22).
- In the context of gap value, the ISC i.e., criteria cultural friendliness (ISC 1.6) is followed by criteria centralized planning and decentralized implementation practice (ISC 1.11); infrastructure development (ISC 1.1). Similarly, for IWC, the criteria increase dependency on China (IWC 2.9) is followed by criteria lack of technical skill labour (C2.8). Regarding EOC, analysis

indicates that the criteria mutual trade gain (EOC 3.4) is the most important followed by the criteria economic stabilization (EOC 3.2) and economic empowerment (EOC 3.1). Similarly, about ETC, the criteria for geo-political threats to regional countries like India (ETC4.4) is followed by the criteria Kashmir issue, especially Indian stance on Gilgit- Baltistan, a gateway of CPEC (E4.3)

- In the context of the consistency index (CI) value, the CPEC development opportunity-related criteria CI value is very close to zero, which is followed by weakness, threat, and strength-related criterion factors respectively. It means that more opportunities are associated with CPEC development followed by weaknesses, threats, and strengths.

7.3. Discussion

The BRI investment sustainability, to achieve sustainable outcomes, key SWOT and their implications are of great concern to CPEC development. BRI-linked CPEC is a multi-dimensional development program with significant potential to contribute to achieving SD goals by 2030 (Gu et al., 2019). The basic principle of SD for a nation or region is to progress economically and environmentally efficiently. However, a long-term approach is needed to deal with factors, such as corruption, political instability, poor fiscal management, SD practices, and prosperity in BRI countries or regions Ullah et al. (2022) and Pakistan is no exception. In this context, Ullah et al. (2021a) concluded that BRI investment can pay successful SD. The weak government systems, globalization, and government resources need to be utilized amicably in BRI countries. In the context of the CPEC plan, the following improved strategies and policy implications were recognized based on the criteria theme of strengths, weaknesses, opportunities, and weaknesses.

7.3.1. CPEC related strength criteria, improved strategies policy implications

In terms of CPEC internal strength's theme criteria factors. The Geostrategic position (ISC 1.10) is ranked as an important criterion for CPEC development and sustainability, while cultural friendliness (ISC 1.6) is the worst criterion. Apart from fiscal benefits, Pakistan has important geostrategic significance for China. In this context, Shaikh and Chen (2021) recognize that for China, the geostrategic significance of Pakistan is greater than simply trade relations. The CPEC development provides a new geostrategic reality and geo-economic advantages for China, strengthens trade and economic cooperation, potentially impacts the regional state's trade and energy security and creates economic and energy security for Pakistan (Javed and Ismail, 2021).

In this context, China–Pakistan relationship is not entirely financial aspect, but more significantly, Pakistan's geo-strategic position. The geostrategic benefits practised by both countries are mainly designed within a framework of geo-economics and geopolitics. Similarly, through global connectivity, the CPEC development could better

the living standards of local communities Ali et al. (2017a) and boost local community revenue business, and employment opportunities (Kanwal et al., 2019a). However direct contact between the Chinese and Pakistani public has been confined largely due to linguistic obstacles (Shanglin, 2001). Both nations are distinct in civilization, beliefs and governance structures, but regardless of these differences, their relationships have survived. To reinforce the ties relationship, both countries are now assisting cultural exchange programmes, for instance, by launching Chinese linguistic programmes in Pakistan.

In this context interviewee, **(EC-01)** stated that

"*Although there are some challenges to CPEC development with respect to CC disasters and environmental concerns and their mitigation arrangement, however one thing is very clear the geostrategic and geopolitical significance of this project is a huge and great strength of CEPC development. It is not just a road construction project, people mistake it as a road project, it is a comprehensive developmental program comprising energy sector development, road infrastructure development, tourism, trade, industrial development, and cooperation. To make it the successful government of Pakistan and China including the public sector and local people showed strong commitment and determination. All different political Parties in Pakistan are agreed on the successful implementation of CPEC development- A strength of CPEC*".

Similarly, an interviewee **(CA-01)** stated that

"There are huge opportunities linked with CPEC development. Key opportunities include industrial (SEZs) and economic development, job opportunities, and energy sector development to overcome energy crises to enhance economic growth in the country. The geostrategic position of Pakistan is the main strength of the CPEC plan. Similarly, some threats and weaknesses are linked to the sustainable implementation of CPEC. Development under CEPC is very new for Pakistan, therefore the concerned authorities in collaboration with China are trying to convert those threats and weaknesses into opportunities".

The CPEC Plan emphasizes people-to-people contact, cooperation, and exchange among both nations for smooth CPEC development. (Mustafa et al., 2017) concluded that there are long-term impacts of CPEC development on Pakistani culture. In this context, (Zhang et al., 2017) recognize the culturally related risk to CPEC development such as demolition of historic and artistic heritage; local language, customs and barriers, religious belief conflict, psychological and cultural integration of land acquisition, and resettlement. Similarly, Niazi et al. (2020) highlighted programmes between both countries for cultural exchanges in the form of art, literature, education, language, and food. The People-to-People contacts and cultural exchanges would likely promote inter-civilization communication and coordination to build a balanced neighbourhood to enhance cooperation among countries of distinct cultures (Mikheev et al., 2021).In the context of CPEC related potential weakness, an interviewee **(EC-01)** stated that

"*With Chinese workers there exist some problems with cultural harmony, however as this is a joint venture program, both countries are also working to reduce cultural differences through cultural exchange programs*".

In the context of the most important criteria, the result indicates that the internal strength criteria (ISC), the weight value of criterion that includes geostrategic position (SC1.10); centralized planning and decentralized implementation practice (SC1.11); mutual defence and strategic cooperation (1.12); dedicated leadership (e.g. Ten Billion Tree Tsunami Programme) (1.13); is with a weight of 0.1109 is higher than other criteria factors of ISCs i.e. trade cooperation (1.5); technology diffusion (1.8); enhance foreign investment (1.9); energy demand fluffiness (1.7) of 0.0887 weight value. Similarly, the criteria cultural friendliness (1.6) has the least weight value of 0.0221. The criteria factors having a great weight value of 0.1109 are more important than others.

In this context, Pakistan's geographical position, centralized planning and decentralized implementation practice, mutual defence and strategic cooperation, and dedicated leadership are important factors for the sustainable implementation of the CPEC plan. Based on the analysis, CPEC will lead to more coordination and strengthen the strategic and defence relationship between Pakistan and China. Both China and Pakistan have developed a mechanism of defence cooperation between both nations (Gul et al., 2021). China encounters the Indian stance on Kashmir and GB -a gateway of CPEC. The game changer CPEC is changing the political terrain of the world and is pushing the power politics towards a new polarization Ullah and Anwar (2020) which is being led by China. CPEC is facilitating the transformation of geopolitics into geo-economics (Iqbal et al., 2021). CPEC has been considered a federal government-negotiated development programme. The devolution is endorsed, and the role of the federal government is significantly contained. For instance, in the case of SEZs' development of CPEC portfolio, the power of decentralization was practised to create a legal environment to produce an efficient and conducive business environment by an efficient and regulatory administration (Takrim and Baloch, 2017).

Although CPEC brings many economic benefits, however, its environmental sustainability and CC are of significant concern. The government's 'Billion Tree Tsunami' programme implies not just mitigating deforestation and CC concerns of CPEC development, but also achieving greater environmental sustainability (Asghar et al., 2021) and contributing to green CPEC growth.

In this context, an interviewee **(CA-02)** stated that

"I think huge opportunities in terms of lot of investment, green and sustainable investment because most countries including China is looking and investing in environmentally friendly projects. China has a similar level of discussion on environmentally SD. I believe there is a huge opportunity in Pakistan if we can somehow look at this possibility, but again when there is an opportunity, we need to build the capacity to attract that opportunity. I think Pakistan should now look at some set of green projects in the energy sector, in highways projects not too much as the overall carbon emission of Pakistan is not high as the global standard, so we are happy in this state but overall Pakistan is getting CC impact globally. CPEC-related Opportunities are large, and how to capitalize on them depends on decision-makers. Similarly, SEZ development is a part of the CPEC agenda to bring new technology, and we are giving incentives for using the latest efficient technologies in SEZ development that will definitely reduce emissions".

From the perspective of foreign investment, the CPEC plan attracts foreign FDI for tourism industry development Ullah et al. (2020) and other revenue-generating areas, for example, industrial development Sharif and Hyder (2017) and the transportation sector development Zubedi et al. (2018). The value of the CPEC would be more than the FDI inflow in Pakistan since 1970 (Hali et al., 2014). In this context, CPEC related FDI for Pakistan improves sustainable economic development and trade, enhances regional integration, overcomes energy catastrophes, infrastructure development establishes people-to-people contact, and tourism sector development (Kousar et al., 2018). While, devaluation in FDI influx resulted in adverse effects on exports, and deterioration in physical infrastructures (Mehar, 2017).

Similarly, the weight value related to criteria, increases employment (1.4), technology diffusion (1.8), and enhances foreign investment. (1.9), energy demand fluffiness. (1.7) is 0.0887. While weights of economic feasibility criteria (1.2), increase exports (1.3), infrastructure development (1.1), and cultural friendliness (1.6), are 0.0354, 0.0295, 0.0253 and 0.0221 respectively. To some extent, these findings reveal that criteria, for example, cultural friendliness criteria are more critical. The CPEC development had a considerable effect on the Pakistani culture. The international project, for example, CPEC caused diggings and exploration of new historic sites, the impact on the culture of resident inhabitants, and provide opportunities for cultural exchange, new cultural values may occur, which might a challenge for local culture in terms of traditional and religious perspective, as some residents think that the CPEC is a threat to local culture, a means of Chinese cultural domination (Khalil et al., 2021). In this context, Zhang et al. (2017) emphasize that more than 90 % of the Pakistan population believes in Islam and Chinese entrepreneurs' CPEC may influence local religious culture or religious facilities. Similarly, Chinese workers may violate local traditions and faith, triggering local conflict and criticism. Because of these threats, both Pakistan and China need to establish friendly and peaceful strategies to deal with social and cultural-related concerns related to CPEC development. Similarly, Rathore et al. (2020) recognize that CPEC would support the financial development of the whole region, impacting the public of more than 4 B among greater than 60 countries, and is likely to result in a great number of employment chances ranging from 600,000 to 1,000,000 between 2015 to 2030.

In context of SWOT, current EG and CPEC sustainability, an expert **(INGO-01)** highlighted that

"*Lack of national unity and distrust among key stakeholders*" is a critical factor. All stakeholders must realize that if no determined and diligent steps are taken, CPEC construction might be doomed to failure from the start to implementation.

7.3.2. CPEC-related weakness criteria, improved strategies policy implications

Twenty criterion factors were identified as the internal weakness criteria theme. In this context, criteria, for example, technological inefficiencies (IWC 2.17) with a 0.1021 weight value is the most important weakness criteria, followed by criteria with a weight value (0.0751), lack of a mechanism to transform SEZs into Eco-Industrial Park (IWC

2.18), increase in environmental and health issues (IWC 2.11), and long-awaited policy document revision/update (e.g NEP 2005 & National Maritime Policy 2002) (IWC 2.20). For the smooth execution of CPEC Projects, for example, to boost industrialization, Pakistan is facing challenges of weak institutions, low-quality human resources and a lack of modern technology (Mahmood, 2018). Similarly, industrial development has been facing several challenges including technological inefficiencies and higher environmental pollution (Shah and Park, 2019). China is investing enormously in the transfer of technology in building mega projects (Ahmad et al., 2020). In this context, CPEC provides an opportunity to address technological issues in Pakistan with close coordination with Chinese Partners. The vague management policies relate to the CPEC development, for example in coastal and marine areas of Pakistan have created an inflaming long-standing tension between federal, provincial and local communities (Ullah et al., 2021b).

An expert **(EPA-04)** stated that

"*lack of human resources; legislative loopholes and limited technical capabilities*" are potential weaknesses factors of CPEC development.

Similarly, other criteria, for example, lack of good EG (IWC 2.7); lack of good governance in general (IWC 2.6); corruption (IWC2.4); financial constraints (IWC 2.3); political willingness (IWC 2.2); dumping (IWC 2.15); security issues (IWC 2.12); lack of transparency and non-availability of clear information about China Pakistan cooperation and initiatives to make CPEC a green development (IWC 2.19); political instability (IWC 2.1) have a weight value of (0.050) and are critical criteria for CPEC development. In this context, for example, Surahio et al. (2022) highlighted that security threats and costs, corruption, electricity costs, political violence, and forestry are of great concern to CPEC development. Similarly, political uncertainty, weak governance, ethnopolitical issues, governmental and institutional concerns are hurdles in CPEC development and implementation (Zhang and Shi, 2016, Hussain, 2017, Javed, 2018, Pan et al., 2020). In the context of CPEC environmental and CC concerns, an expert **(AC-05)** stated that

"One of the weaknesses of CPEC is that we (Pakistan) are importing coal for energy production from China while we have a huge reservoir of coal that is rejected due to its sulfur and moisture content. Developing strategy to Desulfurize that coal and use it could be beneficial to Pakistan".

Similarly, in the context of CPEC development weakness, an Interviewee (R-01) highlighted that

"Climatic effects- Pakistan not following –climatic accords- CO_2 *emissions increase; Global climatic risk index may rank Pakistan down; China will get a big market in Pakistan and can access to other countries through this route overcoming Pakistan's chance.; Our local industry will be affected; China will control sea routes; Economic ties with other countries may be affected.; FDI- Chinese workers are paid more."*

Similarly, political stability and consensus-building about provincial governments' shares in CPEC investment (Ali, 2016) are crucial factors for the sustainability of CPEC development. Similarly, extremism, poverty and deprivation, lack of political consensus, and political instability are other factors related to internal constraints of

CPEC development (Farooq and Khawaja, 2020). Likewise, Ul Hassan (2020) concluded that political instability, the bureaucratization of the CPEC through the CPEC Authority (Rana, 2020b) development, and the federal-provincial tussle and mistrust hamper the CPEC corridor.

A lack of internal consent hinders growth in any part of the globe, and CPEC is no exception. Initially, when it was announced, the majority of polite consensus-building supported it. However, the eagerness changed to deep worry when mainstream political parties especially for economically weak provinces, for example, KP and Baluchistan announced that their reservations regarding CPEC development and share were not being considered (Fazil, 2016) by the federal government. In this context, for example, the Chief Minister of KP province stated that "It is not a western route but merely a road, because it has no such infrastructure that would improve the condition of neglected provinces such as KP, Baluchistan and GB."(Raza, 2016).

In addition to this, Pakistan is facing governance and widespread corruption-related problem, that affect the CPEC development. A strong transparency and accountability system is required in the country to make the CPEC projects a representation of transparency and good governance. China had adopted a policy of zero-tolerance against corruption (Dawn, 2015), and a strong National Bureau of Corruption Prevention was set up. In this context, both China and Pakistan are set to sign an anti-corruption accord that will have zero tolerance for corruption (Malik, 2015). According to Liu Jianchao, Chinese Assistant Minister of the National Bureau of Corruption Prevention, both countries need to work together and sign an agreement to ensure transparency in CPEC plan implementation, to make it a symbol of good governance and transparency (Dawn, 2015).

In this context, an expert **(NGO-02)** stated that

"*equal interest and energy of the partners, especially of the Pak-China, are very important, in terms of its consistency, trust and cooperation to maintain the environmental viability in all development projects. So that environmental safeguard and good governance are ensured.*"

Pakistan's internal security issues including regional security challenges could be the biggest risks to CPEC sustainability, specifical instability in Afghanistan and Baluchistan Province. The current insurgency in Baluchistan puts the main security disputes in the execution of the CPEC (Wolf, 2020). The Gwadar port, the CPEC's focal point, is located in this Balochistan. Its vast natural resources and geostrategic location make Baluchistan a vital part of the CPEC's success. However, the people of Balochistan have concerns regarding CPEC development and benefits. For example, most recently protests at Gwadar against CPEC about fish resource exploitation by Chinese trawlers (Azam, 2022). In this context, Ahmad et al. (2020), highlighted that Pakistan is facing various challenges and obstacles to achieving the maximum benefits of CEPC, which include economic uncertainty, issues in Baluchistan; security threats; terrorism and the religious impact of CPEC; foreign involvement; external challenges; and geographical situations. The federal government need to integrate sincere concerns

of all political parties and local communities of Balochistan into CPEC development strategies to make CPEC-related projects more comprehensive and less unfair.
In this context, an expert **(EC02)** stated that
"*There is a need to clarify the federation's role in the distribution of CPEC wealth and earnings among the provinces. CPEC is the best opportunity in the region. It must be protected from international threats, particularly from India. To recover from weaknesses, train the manpower to be at par with China's manpower. Chinese Environmental laws must be translated, understood and replicated in Pakistan*".
The other criteria, for example, affected local industries (IWC 2.5); weak institutional setup for EP and CC (IWC 2.14); long-term queued development (IWC 2.10); cultural issues (IWC 2.13); lack of technical skill labour (IWC 2.8); increase dependency on China (IWC 2.9) have the least weight value of 0.037, 0.037, 0.025, 0.021, 0.018 and 0.006 respectively. From the perspective of the CPEC's impact on local industries, Khalil et al. (2021) emphasized that CPEC can boost local industries and financial activities, but it also has negative impacts on the community and local industry. Similarly, Abbas et al. (2019) recognize that due to CPEC development, Pakistan's imports from China may rise, which can have an effect on Pakistan's local industry as Chinese trades will replace their industries. In this context professional, well-experienced businessmen, engineers and other professionals are needed (Farooq, 2020) for strategic oriented CPEC market.
In this context, the interviewee **(EC-01)** stated that
"*China believes in transparency in developmental projects. Corruption and transparency are a great concern in both the public and private sectors, that needed considerable attention for CPEC development sustainability*".
In the context of ease of doing business, World Bank ranked Pakistan in 108 among 190 economies (Bank, 2019b). Institutional coordination is also a potential challenge in the implementation of the CPEC plan. Jahangir et al. (2020) highlighted the lack of harmonization among numerous government sectors and organizations delays potential financing in SEZs. For example, chambers of trade and commerce business show a non-cooperative attitude and are reluctant to work with the government agencies concerned. Hence, the central government is facing a challenge in developing the capacity of small provinces. An interviewee **(EC-01)** stated that
"*poor governance and lack of consensus, and understanding and confidence among relevant stakeholders i.e., provinces and federations is another weakness of CPEC development*"

7.3.3. CPEC opportunity-related criteria, improved strategies policy implications

Twenty-four criterion factors related to CPEC opportunity were identified. The criteria factor 'development of Gwadar' (Maritime economic development) (EOC 3.21); capacity-building initiatives. (EOC 3.22); and tourism sector promotion (EOC 3.23); have the highest weight value of 0.075 and are ranked as a highly important criterion followed by criteria of regional connectivity (EOC 3.19) and increase job opportunities (EOC 3.18) with a weighting value of 0.066 respectively. Under the CPEC project,

Gwadar, a part of Baluchistan province would be linked through Indus Highway. The primary purpose is to connect the Xinjiang province of China to the Gwadar port. Gwadar port development has geoeconomics and geopolitical significance for both countries. In this context, Gholizadeh et al. (2020) concluded that Gwadar Port's development might boost the financial security of China and Pakistan. In the context of CPEC-associated opportunities, the interviewee **(EC-01)** stated that

"*CPEC is a game-changer billion-dollar developmental package. Various power sector plans are associated with CPEC development to overcome current and future energy shortfall in the country, and a huge FDI is itself a great opportunity for Pakistan*".

The mega-infrastructural development of the CPEC project offers easy access to incredible tourist destinations and keeps appealing to tourists. It positively influences Pakistan's tourism industry demand and improves tourism requirements Nazneen et al. (2019), improved destination image (Nazneen et al., 2021) and enhanced entrepreneurial opportunities (Kanwal et al., 2019c). CPEC development significantly enhances regional connectivity (Ul-Haq et al., 2020). The infrastructural development increases accessibility and expands the tourism industry (Kurihara and Wu, 2016). There is a well-recognized relationship between infrastructure development, tourism demand, trade, and economic sustainability (Noureldin et al., 2022, Rahman, 2022). However, infrastructural expansion and increased tourism requirements are a threat to ecological and socio-cultural sustainability (Nazneen et al., 2022). For example, destination tourist caused air and water pollution, disrupts local culture, raises the crime rate, transportation overcrowding, waste, and litter, and devastates ecosystems, biodiversity, and wildlife (Matarrita-Cascante et al., 2010, Nazneen et al., 2019).

Similarly, weight value 0.051 of criteria i.e overcoming energy shortfall (EOC 3.12); industrial development (EOC.13); advancement in technology (EOC 3.14); overcome energy crises (EOC 3.20) followed by a weight value of 0.034 for criteria entrepreneurship (EOC 3.16); expanding business opportunities (EOC 3.6); transportation development (EOC 3.8); and an increase in exports (EOC 3.17) respectively.

The CPEC will serve the nation worldwide in terms of industrialization, technology advancement, overcoming energy crises, global market access, and lowering the unemployment rate (Sarmad and Choudhary, 2019). In the context of energy sector development, the CPEC portfolio energy projects completion will boost Pakistan's energy sector and make the country an energy-efficient state. Additionally, the accomplishment of these energy projects will provide cheap and clean energy, enhance power quality, and reduce load shedding in the country. In this context, Khan et al. (2020c) concluded that CPEC performs a significant role in overwhelming the energy crisis in Pakistan. Energy is scarce in Pakistan and traditional resources are unable to fulfil the requirements. CPEC plan energy projects that will fulfil the energy requirements of the country. Likewise other criteria factors, for example, private sector development (EOC 3.5); access to the financial market (EOC 3.11); decrease travel distance (EOC 3.15) and direct access to trade through the sea route (EOC 3.10) are at the same rank with a weight value of 0.025, followed by criteria of less transportation cost (EOC 3.7); economic empowerment (EOC 3.1); time-saving (EOC 3.9) with a

weight of 0.020, and criteria economic stabilization (EOC 3.2) with weight of 0.017; and mutual trade gain (EOC 3.4) weight of 0.014 respectively.

In context of CC and environmental concerns of CPEC, an interviewee **(CA-01)** stated that

"*CPEC Projects especially coal-based energy projects may cause environmental degradation and contribute to CC . However,super-critical advanced technology has been used in the coal-fired power plant which improves coal efficiency, reduces emissions, and ultimately promotes environmentally friendly development. In this context, for example, the Sahiwal Coal-Fired Power Plant in Punjab, the Power Plant at Port Qasim- Sindh, and the Hub Coal Power Project, Balochistan of 1320 MW respectively are using imported coal as primary energy input and supercritical technology to address environmental and CC concerns of CPEC energy projects*"

The Gwadar port development, market and trade openings and mutual trade gains are the opportunities of CPEC projects for Pakistan. Similarly, the CPEC reaches economic balance, trade gain, and low transportation costs (Naz et al., 2019). Additionally, CPEC development reduces cost, time, and routes for Chinese energy and trade supplies. Currently, China is using the Shanghai Port for trade with other states. The distance between the Shanghai seaport and Kashgar dry port is about 5153 km being used to move goods from Kashgar to Shanghai Port and then to other destinations around the globe (Aqeel, 2016). The trade and natural oil supply from this route is more expensive and time-consuming for China. However, the distance between Kashgar and Gwadar is almost half of the present trading route. CPEC would reduce the trading route by some 11,000 km and reduce time to mere 10 days as compared to 45 days to get the Chinese imports and exports (Hussain, 2021).

At present, Pakistan is coping with a crucial financial condition. CPEC offers Pakistan various chances to improve its economic and strategic position. The CPEC development will boost the Pakistani economy through infrastructure development, determining employment opportunities, and overcoming energy crises in the country. The CPEC-related SEZs in all provinces will bring about economic prosperity (Butt and Butt, 2015) and are considered critical for Pakistan, China, neighbouring countries (Irshad and Xin, 2014) and the rest of the globe. Additionally, CPEC investment will open new possibilities for monetary growth and development of the tourism sector and economic cooperation. However, the lack of an effective mechanism in Pakistan to address intra-state conflicts (Stiftung, 2018) is a concern of CPEC development

An interviewee **(EC-01)** stated that

"*CPEC will enhance provincial harmony through interlinked road infrastructure development, which leads to resolved conflicts among provinces and the federation. All provinces have different ways of life and diverse cultures and norms. CPEC development will provide cultural productivity.*"

7.3.4. CPEC threat-related criteria, improved strategies policy implications

In the context of external threats criteria natural resources exploitation. (ETC 4.11) with the highest weight of 0.120, followed by environmental impacts (ETC 4.10) 0.090; and criteria factors of mistrusted inter-provincial and federal harmony in CPEC plan

implementation (ETC 4.21); law and order situation in Baluchistan province (ETC 4.22); political instability in Afghanistan (ETC 4.23); and COVID-19 (ETC 4.24) are in the same level of weight value of 0.075 respectively.

Despite numerous advantages of the CPEC projects, scientists have noted certain detrimental impacts of the CPEC route, for example, traffic congestion, noise, ecological issues and the devastation of agricultural land (Kanwal et al., 2019b, Sun et al., 2020). Generally speaking, CPEC has been designed to link up Pakistan's all provinces through rail, road and other means of transportation (Khan and Khalid, 2018). However, the mistrust among provinces about the CPEC route and its benefits is a potential risk to the sustainable execution of the CPEC plan. In this context, for example, the CPEC starts from Gwadar, Baluchistan province and continues to the rest of the state (Makhdoom et al., 2018). Baluchistan province is very significant as of its port resources and services and is a hub for natural resources. It has a large amount of coal, gold, copper, silver, platinum, aluminium, and uranium (Ahmad et al., 2020). The province, however, lacks the appropriate infrastructure to exploit and transport these resources (Khetran, 2014). CPEC development provides an opportunity to improve infrastructure and boost the provincial economic position. However, the province's development came to a standstill due to the existence of terror-connected events (Ali et al., 2018).

In context of CC and environmental concerns of CPEC development, an interviewee **(CA-02)** stated that

"Let's categorise CPEC projects into different phases and sectors. I don't think that infrastructure, Fiber Optics, and projects related to the maritime sector have significant environmental and CC related impacts. Within the context of the overall energy sector, the percentage is not too much but a little bit of environmental and CC concerns because there are few coal-based projects, but what we have done, we have applied high-standard technology that ultimately reduces overall carbon emission with no significant impact, but only some impact may be observed "

Baluchistan is one of the economically deprived provinces of Pakistan. The province is enriched in natural resources. Considering CPEC development, the local community believes that the CPEC is inequity among the residents of Baluchistan and promotes deprivation for local Balochs. In this respect, separatists Baloch made attacks on government buildings, oil pipelines, and busses and killed Chinese engineers and workers to expand the fear, and harm the CPEC development (Ahmad and Mi, 2017). For example, separatists attack of 26 April 2022, Chinese nationals at Karachi University Pakistan to create a hurdle in CPEC development. In this connection, KP political leadership and the public also argue with CPEC development. The key reason for this dispute was shifting of the predefined route of CPEC to give some benefits to the Punjab province stated an expert.

In the context of the CPEC development linked threat, an interviewee **(Ind-01)** stated that

"*The loan which Pakistan got from China will be given back with interest. Our currency is already devalued. When there will be thousands of Chinese settled and worked there. It may lead to clashes with locals in future (even still some terrorism is observed). China*

needs 50 km zones on both sides of the road). Debt trap can become wider (may or may not)."

The success of CPEC development depends on political stability in Pakistan and regional countries, especially in Afghanistan. In this context, Verma (2022) concluded that the uncertainty in Afghanistan will surge into the region and elsewhere and take the lead in non-conventional threats/disputes. Countries, for example, China and Pakistan will suffer from a rise in extremist conflicts due to an insecure Afghanistan which will lead to instability in Pakistan and China. The CPEC is a key BRI corridor, and its accomplishment considerably depends on stability in South Asia. However, political instability in Afghanistan presents a likely security risk for the CPEC, threatening China's interests in South Asia. For CPEC and BRI linked other investments, political and financial stability in South Asia is necessary.

Similarly, the criteria factor i.e., the CC disaster concerns (e.g., potential threat to the ecosystem, biodiversity and Northern area glaciers melting) (ETC 4.12) have a weight value of 0.060, followed by incoherent policies (ETC 4.13), 18th constitutional amendment of Pakistan and EP (e.g marine resource conservation and Marine Pollution) (ETC 4.18) of weight value of 0.036.

In this context, an interviewee **(EC-01)** stated that

"*Pakistan is a highly vulnerable country to CC , especially the Northern Areas where there are glaciers and CC can substantially affect the ecosystem and glaciers' resources. The CPEC runs through these major areas which are susceptible to CC . I don't think we should be too much happy about the Chinese huge FDI for economic development which leads to environmental and CC consequences. Therefore, we must consider CC and environmental consideration in the planning process of CPEC and related development policies to address CPEC-related negative effects on the country's ecosystem. A careful study is needed to understand the CPEC development and resulting environmental and CC concerns. The strategic effects of what's going to happen with the temperature and resulting climate disaster in the form of floods need to be considered in the planning process of CPEC development*".

In this context another interviewee **(CA-01)** stated that

"SEA is an important tool to cope with environmental issues and challenges of CC impact associated with CPEC plan. It will provide opportunities to mitigate ecological hindrances, and support low-carbon and climate-resilient development under CPEC"

CPEC development offers potential threats to Pakistan's biodiversity and environmental sustainability (Ali et al., 2021b). Similarly, other threats related to CPEC development include global warming, deforestation, emission of CO_2, flooding, agriculture runoff and deterioration of local fauna and flora leading to disturbance of the local biodiversity (Nabi et al., 2018).

In this connection, an expert **(R-02)** stated that

"Mainstreaming local communities to harvest the fruits of CPEC, building their capacities and taking measures to mitigate climate and environmental adverse effects".

An interviewee **(CA-01)** stated that

"*Pakistan has an environmental and CC governance framework. Yes as far as the CPEC development, it is part of the long-term plan of CPEC to improve the*

environmental ecology while implementing the project. FDI related to CPEC is a unique developmental initiative in the history of Pakistan. As a developing county, much focus is on the economic and social aspects. However, the CPEC planner and implementors are also very careful about the international agenda of SD, especially CC , environmental sustainability, and DRR linked with CPEC development"

The 18th Constitutional Amendment in Pakistan leads to greater provincial independence (Adeney, 2012, Musarrat et al., 2012, Rana, 2020a). The key part of the budget is now being allocated to provinces. Therefore, political consensus is essential in the implementation of the CPEC plan. The Provincial Governments, for example, Balochistan and KP have objections over the intended route of the CPEC plan which may be a potential threat to CPEC project Implementation (Gul, 2015). Similarly, the poor law and order situation in both Balochistan and KP provinces is an obstacle to the smooth implementation of the corridor. Additionally, both provinces lack appropriate infrastructure because of their hilly landscape which is a big challenge (Hussain, 2017) for CEPC development. An expert **(Min-02)** stated

"*There are serious doubts and concerns on mitigative measures and sustainability. Restoration and social dimensions of projects under CPEC may have lasting impacts which may disturb the ecosystem, biodiversity and traditional cultural practices.*"

Regarding the CPEC development, each provincial government is willing to obtain a larger share. The effective Punjab Province has been criticized by the other provinces for taking a major stake in the CPEC investment for infrastructure development. They have even called this CPEC project an agreement between China and Punjab, while Balochistan province is a particularly staunch opponent. Similarly, in addition, the politician of Balochistan province's general public of the province have vigorously criticized the CPEC project, (Ahsan, 2021).

The criteria, for example, extremism and terrorism (ETC 4.16); security issues (ETC4.7); inter-provincial disputes on the CPEC route and Environmental concerns (ETC 4.17); economic issues (ETC 4.5); inconsistencies in EG (ETC 4.20) have 0.030 weight value.

In context of CPEC development, CC, and environmental concerns, an expert **(R-03)** stated that

"*Ministry of CC may play its role as a main implementing partner for EG and CPEC sustainability by engaging relevant Departments (EPA, PMD, NDMA*".

In the context of extremism and terrorism, Pakistan has suffered a lot as a society and as a state. Since 9/11, more than 30,000 civilians and security recruits have lost their lives in terror attacks. (SATP, 2016). Similarly, according to Pakistan's Finance Division survey during 2017-18, since 2001, terrorism cost for Pakistan has been $126.79 B. The CPEC is a $62 B investment programme, 1/5 of the country's total GDP making it an appealing financial endeavour for Pakistan where terrorism, corruption, and political instability have impeded sustainable economic development, particularly over the last two decades (Khan, 2021c).

Geo-strategically, the CPEC development is significant for the governments of both Pakistan and China. However, since 9/11, Pakistan coped with significant hurdles to FDI because of the extremism and terrorism that country is experiencing (Hussain,

2017). Currently, Pakistan is in a high economic crisis. Investment has dried up due to a weak law and order situation. Furthermore, a country's economic dependency on the regional security situation and the conferred interests of international players such as the USA (Hussain, 2017) is a great challenge. CPEC development is important for Chinese geo-economics strategy to win the geo-security and geopolitical goals (Hussain, 2021).

Lastly, criteria factors having the least weight value are 0.020, for corruption (ETC 4.9); capital outflow (ETC 4.14); intra-regional conflicts (ETC 4.15); local business losses (ETC 4.1); Kashmir issue, especially Indian stance on GB, a gateway of CPEC (ETC 4.3); dependency on China (ETC 4.8); geopolitical threats to regional countries like India (ETC 4.4); the overlapping mandate of the Federal and Provincial authorities to tackle marine pollution and Life Below Water (ETC 4.19); financial threats to local industries (ETC 4.2); and cultural issues (ETC 4.6) are somehow manageable.

According to the research of Surahio et al. (2022) CPEC, to some extent, positively contribute to Pakistan's numerous development fields, that is, the energy sector, transport infrastructure, technology transfer, investments, business environment, and socioeconomic growth and satisfaction. However, it also has a negative trend in the indicators of political violence, corruption, security costs and threats, electricity cost and supply, debts, imports, and forestry. Countries that bear weak laws and rid situations and poor governance are prone to environmental, social, and corruption risks for indigenous investment projects (Zubedi et al., 2022). CPEC is supposed to be the Marshall Plan in the region. The CPEC will offer grounds for reducing disputes on account of regional and intra-regional financial connectivity in South Asia (Siddiqi, 2018). GB is the gateway to CPEC development. China has been investing in the disputed areas of GB, and AJ&K (CAI, 2016, De Jonge, 2017). Both two regions are disputed between Pakistan and India (Fazil, 2016). GB is underdeveloped, and having disputes and legal status could lead to numerous problems. Currently, the Government adopts a sector-based management approach in governing its CPEC coastal and marine areas whereas several federal and provincial entities have been given the authority to perform their economic and management activities separately. The repetition of the same activity by different actors and the overlap amongst undefined policies create conflicts amongst different user groups and degrade ecological functions of coastal and marine areas, which in turn, directly and indirectly, affect the livelihoods of local coastal dwellers. The chaotic situation introduces several challenges related to the protection of coastal and marine environments and the conservation of natural resources (Ullah et al., 2021b). The implementation of SEA in CPEC coastal and marine areas could actively promote the involvement of different inter governmental organizations, stakeholders, non-governmental organizations, marine researchers, planners, developers, and managers. Concerning marine development especially Gwadar port an interviewee **(EC-01)** stated that

"*Gwadar port development is an important element of CPEC, however, India is focusing on the development and functionality of Chabahar Port, very close to Gwadar CPEC port, to counter the strategic and economic significance of CPEC in the region. Therefore, both China and Pakistan need to work to cope with this challenge.*"

7.4. Conclusion

The CPEC is known as a game-changer development to boost the country's economy through FDI and create greater trade opportunities for China -Pakistan and regional countries. This study is an attempt to evaluate, weigh, and rank key strengths, weaknesses, opportunities, and threats related to key performance criterion factors for CPEC sustainability. In this context, the best performance criteria related to internal CPEC strength were, increased employment; followed by energy demand fluffiness; economic feasibility/ growth, trade cooperation; dedicated leadership; geostrategic position and FDI.

Similarly, in the context of internal weakness criteria and CPEC development, technological inefficiencies; lack of good governance in general; are the best performance criteria, followed by criteria, CC and environmental concerns; dumping; lack of good EG; increase environmental and health issues; security issues; and long-awaited policy document revision/update (e.g NEP 2005 & National Maritime Policy 2002).

In the context of external opportunity criteria, the best criteria were increased job opportunities; followed by regional connectivity; industrial development, advancement in technology; overcoming energy crises and economic boost; overcoming energy shortfall, and entrepreneurship. Similarly, the external threat-related criteria factors were determined as the exploitation of the natural resources; followed by CC disaster concerns (e.g., potential threat to the ecosystem; biodiversity and Northern area glaciers melting); environmental impacts; inconsistencies in EG, law and order situation in Baluchistan Province and mistrusted inter-Provincial and Federal harmony in CPEC plan implementation. In the context of the consistency index, it is concluded that the criterion related to the CPEC development opportunity's theme is more consistent than weakness, threat and strength-related criterion factors respectively. Opportunities and strengths with the best criteria status indicate the win-win conditions of CPEC development. However, the worst criterion factors related to CPEC opportunities and strengths; and best performance scale criterion factors related to weakness and threats need proper management for CPEC sustainability.

7.5. Policy implications

This study has numerous tbeoretical and practical contributions. In this context, EA, sustainability in general and Pakistan's EA system, CPEC development sustainability in specific are explored. This led to evaluating and discussing the strengths, weaknesses, opportunities, and threats related to criterion factors to the sustainability of CPEC development. In reality, the CPEC leads to environmental and CC concerns. CPEC is a group of the project, and EIA lacks to access the commutative and transboundary environmental impacts of CPEC development. Additionally, Pakistan's current EIA system has key issues, for example, insufficient coordination mechanism

and institutional capacities for EA, poor and substandard EIA report preparation, inadequate public participation, and weak implementation of mitigation measures. In this context, the following three main policy implications are established.

Firstly, SEA is a sustainable decision-making tool to assess the transboundary and commutative impacts of the strategic nature CPEC development plan. In Pakistan, except for the Federal and Punjab province, SEA is mandatory and an integral part of all Provincial EP Acts. The CPEC covers the whole territory of Pakistan. There is a need to harmonize the country's environmental regulations and legislative framework for the sustainability of the CPEC. In Pakistan, so far, no formal SEA has been practised. However, in China, the EIA for plans (i.e. SEA) was the enactment of the EIA Law in 2002 (Wu and Xu, 2007). China is the first Asia country to introduce formal SEA requirements (Annandale et al., 2021). There are no EP provisions in any of the treaties or agreements between both countries, and there is any stringent mechanism to assess environmental harm (Butt, 2021a). In this context, there is a need to integrate EP provisions in the CPEC plan, and to launch capacity-building programs for EIA and SEA.

Secondly, the study revealed that the consistency index (CI) value of criterion related to CPEC opportunity's theme is followed by weakness, threat and strength respectively. The CI values close to zero are considered highly consistent while values close to 1 indicate less consistency. In this context, the overall opportunities and weakness-related criteria factors to CPEC development are highly consistent and more important. The opportunities indicate a win-win situation. However, weaknesses and threats required attention from decision-making authorities. The weakness criteria, for example, technological inefficiencies (IWC 2.17); lack of a mechanism to transform SEZs into the eco-industrial park (IWC 2.18); increased environmental and health issues (IWC 2.11); CC and environmental concerns. (IWC 2.16); long-awaited policy document revision/update (e.g NEP 2005) (IWC 2.20); are critical to the sustainability of the CPEC plan.

Thirdly, the uniqueness of this research is to carry out Multi-Objective Optimization i.e. the criteria were weighted and ranked as the best and worst criteria for CPEC development. The multi-optimality provides the decision-makers with the freedom to incorporate higher-level information into their decision-making process (Rezaei, 2016). In this context, the results of this research work, help policymakers and CPEC-related authorities to understand the best and worst criterion factors for the sustainability of the CPEC plan. For example, the geostrategic position (ISC 1.10) is the best criterion factor for the internal strength of CPEC development. Similarly, technological inefficiencies (IWC 2.17) are ranked as the best internal weakness criteria factor. While mutual trade gain (EOC 3.4) is the best criteria factor for external opportunity theme, and criteria for geo-political threats to regional countries like India. (ETC 4.4) is the best external threat criteria for CPEC development and sustainability.

Chapter -8

8. OVERALL RESULTS AND DISCUSSION WITH CONCLUSIONS AND RECOMMENDATIONS

This chapter discusses key results in a consolidated form with conclusion drawn from each chapter, considering the implications of CPEC Plan in particular and BRI of China in general in the context of strategic environmental and social implications. This chapter also suggests further dimensions for EA of policies and plans with a futuristic view.

8.1. Results and Discussion

8.1.1 Climate change policy coherence

An important result of this study is that coherence across country's sectoral policies varies along various scales of coherence of CC policy. A better PC is seen in policy documents of federal government than provincial governments. Furthermore, CC strategies and policies seem to be more consistently tackled in water and agriculture policies than in energy policies.

At present, Pakistan is facing an energy crisis because of poor energy policies and high fiscal deficit; lack of use of modern technology; energy theft and increased circular debt (Khokhar, 2022) that severely affected country's trade/industrial sector and economic growth. The financing under CPEC Plan in energy sector development is about 20% of Pakistan's GDP and this investment is expected to raise energy growth from 4.5% to 14.6% (Duan et al., 2022). On the other hand, CPEC development will lead to a rise in energy demand by 41% in 2030 as a result of economic activity (Mirza et al., 2019).

It is expected that investment in the power sectors by the CPEC would provide great development opportunities, boost industrial development and growth, reduce the shortfall, improves productivity, and puts Pakistan on the path to sustainable growth. On the one hand, energy utilization is critical and does an important role in CC and ecological conditions (Cetin and Ecevit, 2017, Yasmeen et al., 2018, Hafeez et al., 2018). High energy consumption projects of China Belt Road Initiatives have more environmental impacts (Yuelan et al., 2022) and CC concerns. FDI through BRI will lead to more construction work and in the end, damages ecological condition and raise carbon emissions (Khan et al., 2020a, Khan et al., 2020b). However, renewable energy consumption reduces CO_2 emissions without adversely affecting GDP growth, and ensures energy efficiency (Magazzino et al., 2022).

Similarly, boost in economic growth enhanced energy demand, causing a positive association between energy consumption and resulting CO_2 discharges (Hussain et al., 2020a). The majority of CEPC-related energy projects are coal-based energy production projects. Numerous CC and environmental related concerns are related to these energy projects. The CO_2 emission is immediately associated with energy

utilization and production, industrial activities, and transport (Akbar et al., 2021, Hafeez et al., 2018). Hydropower generation plays a significant reduction in CO_2 emission reduction and to achieve the emission reduction targets. For example, Karot Hydropower Plant is the first hydropower development of CPEC Plan (2017-2030) of an installed capacity of 720,000 KW that will reduce 3.5MT of carbon emissions yearly (Xinhua, 2022).

In this context, Duan et al. (2022) concluded that for the complete conversion of grey to green energy, an amount of $57,683 M is needed. There is a robust association between energy utilization, environmental pollution, industrial and economic development Asumadu-Sarkodie et al. (2017). In this context, Bhat (2018) reported that increased economic growth, per capita GDP, urbanization and non-renewable energy consumption lead to degrading the environment.

The CC, developmental activities and increased energy consumption are greatly interlinked. The International agendas i.e the Paris Climate Agreement and the 2030 Agenda on SD, aim to shift the world to low-carbon and climate-resilient SD pathways (Iacobuţă et al., 2022). The SDGs are cohesive, indivisible, directly and indirectly, interdependent interacting and affecting each other (Helldén et al., 2022). A basic objective of the 2030 agenda for SD is to trade-offs between environmental sustainability, and economic progress (ESCAP, 2016) . CC PC is an important element of SDGs to maintain the trade-off between development, CC energy consumption and resulting CC environmental consequences. A multi-billion-dollar CPEC planned development Plan (2017-2030) will play an important role to achieve the country's planned SD goals and related targets.

However, the understanding of connections i.e., synergies and trade-offs amongst SDGs is critical to boosting PC between various development sectors. The spatial conflicts in the SDG connections and their incoherent and trade-off nature at the national and sub-national scales i.e., at the Provincial level are critical and need to be urgently covered in future research and development. Additionally, CPEC is a donor-funded development programme. There is a risk of significant trade-offs, especially various development sectors that might have conflicting interests as most CPEC projects and policies are donor-driven.

In this context, to ensure the sustainability of the CPEC Plan and to enhance economic and legal cooperation between Pakistan and China, there is a need to evaluate and understand PC and inconsistency among both countries' governance systems, especially in the context of environmental and CC governance setup. Similarly, both China and Pakistan need to review the EA policy instruments and CC related governance system to establish coherent environmental performance standards for climate-resilient and green CPEC development Plan (2017-2030).

Therefore, there is a need to develop coherence in federal and provincial energy policies that will help GoP to transform CPEC into a model green development plan in Chinese BRI in the region. In this context, there are also important implications with regards to e.g. reducing coal-based energy projects and environmentally damaging infrastructure activities in sensitive ecosystems.

8.1.2 Integrated disaster and environmental management

As far as the DM is concerned, based on a review of government documents and expert opinions, the extent to which national environmental policy, CC policy, DRR as well as DM plans are aligned. Whilst SEA has not been conducted for any DM policy or plan. Although DM and EA are well integrated into provincial EP acts, in national as well as in most of the provincial DM plans but a regulatory framework to enforce environmental integration in DM and projects under CPEC Plan is still needed. The results indicate that Pakistan's DRR policy instrument addresses the international agenda of DRR and disaster-resilient development. However, implementing this approach in development planning, disaster preparedness, cross-sectoral planning and EPI is hindered by numerous factors.

Socio-economic development, the state of the environment and a propensity for disasters are closely intertwined. Experts and practitioners argued that while DRR and CC risk management and environmental protection continue to evolve in multi-level governance, integrated policy planning and coordinated execution are limited in the country. Therefore, EPI across development and DM policies and plans is important. Pakistan as a state is extremely vulnerable to CC-induced environmental changes leading to disasters. In this context, faces losses estimated at more than $30 B, more than 10% of its GDP (Butt and Khan, 2022). Hence, DM is the most important intervention for economic, social and ecological losses as suggested by (Lalehzari and Kerachian, 2020, Sun and Khayatnezhad, 2021, Zhu et al., 2021).

The development under CPEC Plan (2017-2030) moves from North to South of Pakistan. The corridor is passing through a very fragile ecosystem comprised of mountainous areas with a diverse climate and environment, frequent extreme weather events and natural disasters that can hinder sustainability of the smooth execution of CPEC Plan (Li et al., 2022b) and the development of the local market (Nabi et al., 2018). The mountainous areas are highly sensitive to CC which offers important ecosystem services both for the adjacent zones and especially for adjoining valleys (Schneiderbauer et al., 2021). In this context, land degradation, water scarcity and mountainous geo-hazards are considerable challenges to development under CPEC Plan (Li et al., 2019). Similarly, disaster risks from flood is greater in the southeast than in the northwest on the route of CPEC (Wu et al., 2021b).

In this connection, Hussain et al. (2021b) presented landslide inventory and susceptibility along Karakorum Highway (i.e. a transportation corridor) of the CPEC-prone geological hazard area of Northern Pakistan. In addition to this, various landslide disaster hazards risk along the CPEC mountainous routes in Northern Pakistan. Chang et al. (2021) predicted higher potential threats to development of CPEC. From the perspective of landslide disaster and the CPEC route's susceptibility to KKH, Maqsoom et al. (2022) concluded that precipitation, slope angle, and soil type are key critical landslide influencing factors along the corridor. In this context CPEC comes under one of the potential geological disaster zones that poses a potential risk to the natural environment (Chen et al., 2022a). CPEC is a critical part of the BRI, and its

sustainability is subject to integrated management of numerous natural disasters which may lead to serious ecological vulnerability.
The EPI approach is central in managing CC, DRR, and DM at global, national, sub-national and local levels. The integration of DRR in EA tools is an important and considerable challenge that has constrained effective policy implementations. Therefore, CPEC development plan related CC and climate-related disaster risk and environmental challenges of mountainous regions and resulting impacts on the economy, and local culture are important areas to be researched. Similarly, a detailed study of DRR, environmental planning, and engineering solutions for the operational and under planning CPEC projects are required to ensure the sustainability of CPEC Plan. The climate engineering, CC and environmental protection prevention techniques and coordinated planning for CPEC development can significantly reduce CC disasters and environmental degradation and risks.

8.1.3 Environmental governance and sustainability of CPEC Plan

Another results in the context of Pakistan's current EG and sustainability of CPEC Plan is that the EG theme responsiveness was ranked as the most important for the sustainability of CPEC development followed by effectiveness; robustness and equity governance theme. Similarly, governance's main criteria factors, i.e., transparency is considered the best criterion, and criteria access to information/knowledge is the worst criterion.
Similarly, the best sub-criteria were determined are , for example, the capable visionary leadership is present to address environmental and CC concerns; effective human, financial, and technical capacity is present in relevant institutions (e.g., EPAs) to deal with environmental concerns of CPEC development; monitoring & evaluation, responses to non-compliance in CPEC projects; the stakeholder's communication and collaboration in the governance process; mechanisms are in place to ensure that means and rationales of decisions making are transparent for eco-friendly development under the CPEC Plan; policies and processes acknowledge respect for and incorporation of diverse perspectives, values, cultures, and rights; stakeholders' input is incorporated in planning and implantation; timely dispute resolution mechanism ; stakeholders capacity building to deal with environmental and CC concerns of CPEC development.
Similarly, sub-criteria factors ranked as the least significant governance criteria are; for example, effective mechanisms are in place to resolve conflicts between federal and provincial EPAs and implementation of environmental laws in letter and spirit; decision-makers (e.g., EPA) faced consequences for their decisions about EP and CPEC development; marginalized stakeholders' participation in the decision-making process; mechanisms are in place to ensure socio-economic costs and benefits are just and fairly distributed; known and unknown risks and opportunities are considered, analyzed, and planned policies exist that recognize the need to downscale environmental management and conservation models to fit local realities.
These findings are useful to address environmental concerns, to adapt and mitigate CC related risks of CPEC development. The recognized best governance criteria factors are

key important factors to enhance the sustainability of the CPEC Plan (2017-2030). The decision-makers may use these criteria of governance factors as a guideline to plan and execute CPEC development as an environment-friendly and climate-resilient development.

The EG refers to set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes (Lemos and Agrawal, 2006). The effectiveness of Pakistan's current EG is not only hinges on China's priorities and commitments, but also on political will and capacity of relevant institutions (e.g EPAs) to maintain, execute, and enforce strict environmental laws, regulations, and policies. Green trade (e.g cap and trade mechanisms), finance and investment, including green technology and innovation, are noticed as key tools through which CPEC-related BRI investment can accelerate growth in accomplishing the SDGs (UNDP and CCIEE, 2017).

The UN 2030 Agenda for SD Goals and the 2015 Paris Agreement recognize policy coordination and integrated and coherent policy and planning to promote climate-resilient and environment-friendly development. The green BRI is a key element in achieving a green transition in the regional economy, as well as an important factor of the UN's 2030 Agenda for SD (Feng et al., 2022). In this context, BRI related legal and regulatory framework need to become multilateral, transparent, and inclusive (Lorenzo, 2021) to attain synergies between BRI development and UN 2030 Agenda for SD, that might focus on global EG deficits (Dong et al., 2018).

The CPEC Plan (2017-2030) comprised of various transport, energy, agriculture, industrial sectors, and tourism development projects. It greatly focused on socio-economic development through cooperation, collaboration, coordination, and mutual benefits. Infrastructure development and connectivity, policy coordination, unrestricted trade, economic integration, and people-to-people connections are key development areas of Chinese BRI projects (Adhikari and Ma, 2022). In this context, CPEC development contributes to the execution of the UN 2030 Agenda even beyond Pakistan (Ali, 2018a). In this connection, under Joint Cooperation Committee of CPEC Plan implementation, GoP has established working groups related to CPEC Plan 2017-2030 key development areas of planning, energy sector development, transport infrastructure, Gwadar, industrial cooperation, security, international cooperation and coordination, socio-economic development, agriculture cooperation, science and technology, and information technology. However, a dedicated working group related to environmental sustainability, climate resilience development and DRR (management) is lacking in current institutional framework of CPEC, a threat to the sustainability of CPEC plan. In this context, to address enviornemntal and CC concerns of CPEC development a working group related to the environment, CC and DM need to be integrated with CPEC institutional framework for sustainable implementation of CPEC Plan 2017-2030.

In the context of BRI, China has established a policy framework for EP and to support global EG. The most appropriate guidelines on EG of BRI are i) Guidance on promoting a green Belt and Road and ii). The Belt and Road Ecological and Environmental Cooperation Plan (Coenen et al., 2021); call for policy coordination, environmental

knowledge sharing, green financing and capacity building (Paradise, 2022). These policies encourage green and low-carbon development, protect biodiversity, and address CC concerns of BRI projects. This guidance explicitly states that "promoting the green Belt and Road is an essential effort to participate in global EG (Belt and Portal, 2017) and repeatedly emphasize the goal of aligning the "green BRI" with the most important global sustainability agenda of 2030 Agenda for SD. Ironically, no such type of guidance framework has been established with Pakistan to make CPEC a green development plan. Therefore, Pakistan needs to establish policy guidelines on promoting green CPEC development in line with Chinese guidelines for green BRI.

8.1.4 Coherence across CPEC related policies and development plans

In context of coherence analysis of CPEC Plan with related development polices and plans, environmental and CC polices, and legal instruments, the main results of this assessment are:

(a) The documents of NEP, CCP and CPEC Plan lack consideration of comprehensive accountability and transparency-related measures.
(b) Federal and provincial EP acts lack provisions related to marginalized stakeholders' involvement in decision-making process.
(c) The tourism sector and measures for its sustainbility are not considered in Pakistan CC Act, federal and provincial EP Acts and National DM Act.
(d) Policies for energy, agriculture, transport, tourism and industrial sectors; environment and CC are not linked with development of CPEC plan. Similarly, the CPEC plan is not cohenernt with these policies.

Government consistent policies and governance functions, including harmonization amongst inter dependent policy sectors is the key element of SD. The SDG 17 of UN 2030 Agenda clearly demands PC and institutional coordination. Accordingly, enhancing PC and public, public-private, civil society and global partnership for SD is one of the strategic objectives of Pakistan National SD Strategy and Targets 17.13 and 17.14 have been set for this GoP (2017b). Literature on PC argues that lack of coordination may lead to policy incoherence; however, literature on coordination also sometimes points the reversed causality that incoherencies in policies or governance functions may obstruct aligned policy effects (Dombrowsky et al., 2022).

In this context, there is a need to establish a cross-sectoral coordination body to develop an institutional policy coordination mechanism to ensure PC across environmental policy instruments concerned with CPEC. Similarly, both China and Pakistan need to adopt a strict policy coordination transformation mechanism to ensure transparency, accountability and equal participation of all stakeholders including marginalized community to promote SD and mitigate CC, ecological and corruption risks related to CPEC Plan.

8.1.5 Sustainability of CPEC Plan (2017-2030)

As far as sustainability of CPEC Plan is concerned, SWOT analysis of EA system in Pakistan indicates that the internal strength criterion of geostrategic position is the best criterion and internal weakness criteria of increased dependency on China is the worst criterion. Furthermore, technological inefficiencies were identified as the best criteria and increased dependency on China as the worst criteria factors. External opportunities like increased job opportunities and regional connectivity were determined as the best criteria factors, while mutual trade gain as the worst criteria. Similarly, natural resources exploitation was identified as the best criteria and geopolitical threat to regional countries like India as the worst for the sustainability of the CPEC Plan. In terms of consistency, results indicate that the consistency index value of overall opportunities and weakness related criteria factors are highly consistent for the sustainability of CPEC development.

The BRI-related development negatively impacts the South Asian environment (Ali et al., 2022). The EA is a globally mandated tool to promote environmental sustainability and facilitate and achieve SDGs. Environmental Protection Agencies, in the mandated to implement EP act are weak and incompetent Khalid et al. (2022). The technical capacities of EPAs are not according to international standards. The FDI significantly exaggerates CC in BRI countries (Yuelan et al., 2022). Similarly, the FDI and resulting GDP growth take the lead role to boost CO_2 emissions. In this context, the government need to upgrade the country's EG system to make the country's environmental EA compatible with the Chinese EG system.In Pakistan, lack of coordination among the stakeholders during SEA or impact assessment SEA is not a mandatory requirement for projects as per law (Khalid et al., 2022). The CPEC - related CC (i.e. GHGs emissions) and environmental concerns are not encouraging at all. The government needs to develop a clearly defined strategy adherence to the countries environmental and CC policy instruments for sustainable green and climate-resilient development under the CPEC portfolio. In addition to this, both China and Pakistan need to work together on legislative amendments to safeguard the stability and sustainability of CPEC progress. Further research is needed to understand the legislative challenges regarding environmental protection and CC in BRI projects for Pakistan to achieve SDGs in both countries of China and Pakistan

The top BRI investment recipient countries, for example, Pakistan are ranked as low on environmental performance and are at greater risk to become pollution havens (Coenen et al., 2021). The Environmental performance of BRI linked corridor i.e., CPEC may be enhanced by establishing a coherent environmental framework. It might be attained by inaugurating an international coalition to ensure green BRI progress as revealed by China's Ministry of Ecology and the Environment (Zubedi et al., 2022). However, no special EA programme was made between China and BRI host countries to ensure the environmental sustainability of BRI corridors, for example, green CPEC development.

8.2. Conclusion

Based on assessment of anticipated environmental and CC impacts associated with development under CPEC Plan (2017-30), this study identifies that multi-sectoral PC, integration of environmental aspects in disaster risk management and effective EG, which are essential for environmental and social safeguards, and climate-resilient development under CPEC are missing.

This missing element will have implications in the implementation of CPEC Plan (2017-2030), which so far remained a standalone document as it does not consider country's CC and environmental policies, sectoral policies, and PC mechanism.

Credible synergies among CPEC Plan, sectoral developmental policies, CC and environmental policy instruments are missing.

The SWOT analysis of CPEC Plan identifies that opportunities are more consistent than weakness, threats, and strengths. Hence, CPEC development-related opportunities and strengths with the best criteria status indicate a win-win situation for sustainability of CPEC plan.

However, the worst criterion factors related to CPEC opportunities and strengths; and best performance scale criterion factors related to weakness and threats need consideration in decision making process to ensure sustainability of CPEC Plan.

While executing massive development projects of energy and infrastructure development under CPEC Plan, SD tools like SEA, EIA and DRR are not employed to mitigate significant impacts on environment and climate for its sustainability.

Despite presence of an adequate framework of governance for the environment, CC and disaster the performance in all three areas is still not satisfactory due to lack of PC, institutional capacity in all respects and transparency in decision-making process.

Institutional and policy reforms that establish holistic and systemic relation between development, disaster risk reduction, CC adaptation and mitigation, EA and sustainability is required.

Finally, mistrust and insecurity among federal and provincial governments is a potential threat to the sustainability of CPEC development plan.

8.3. Recommendations

1. Pakistan needs to develop national guidelines for green development under CPEC similar to "*Green development guidelines for overseas investment and cooperation*" and "*Guidelines for ecological and environmental protection of foreign investment cooperation and construction projects*" developed by China. Then special emphasis should be given to green investment, green trade, green finance, and green technologies. Similarly, green cooperation between enterprises and financial institutions should be intensified to create green jobs. In addition to this, green development knowledge sharing, and Pakistan's current EG should be updated.

2. Coordination improves effectiveness and helps in addressing environmental and CC concerns about CPEC development. Therefore, institutional coordination within Pakistan and with China is required for effective implementation of policy

instruments (*e.g* EIA and SEA) for green and climate resilient development under CPEC.

3. Governments should develop capacity of staff necessary for policy and decision-making, management, and legislative design for project planning, financing, development, execution, and evaluation of CPEC development.

4. Monitoring and assessing the eco-environment along the CPEC is of great significance to the green growth and SD of this corridor. The GoP in cooperation with the Chinese partner need to establish a well-defined monitoring and evaluation system for environmental and climate-resilient mechanism of CPEC related projects.

5. It is noteworthy that ecological restoration and protection measures should be stressed more significantly. In particular, the adverse impacts on protected areas should be minimized during construction of economic corridor. Meanwhile, ecological management in areas with ecological limitations should be strictly enforced to avoid further degradation of the environment. Furthermore, sustainable resource exploitation schemes should be adopted to hold back impacts of mountain disasters and human activities.

6. Both China and Pakistan need to prepare a mutual climate and environment friendly trade development agreement with long term objectives to gain win-win opportunities in the form of economic and infrastructure development. In this context GoP should sign agreements with China to ensure bilateral and multilateral environmental agreements, particularly for CPEC projects.

7. Even though FDI through CPEC is massive, its ecological effects must be properly evaluated. The SD aims and objectives should not be compromised because of the massive economic investments under CPEC. Pakistan is bordered by the world's high emitters, for example, China and India. The region is on the threshold of stepping up in CO_2 emissions because of rapid industrialization and economic development (Newell and Lane, 2020). Therefore, it is imperative to look for SD initiatives to able to reduce environmental degradation. Considering the climate vulnerability of Pakistan and targeted SDGs, green ICT-based infrastructural development should be targeted through CPEC to reduce the adverse effects of infrastructure development on the environment.

8. CPEC investment is primarily economic gain oriented and has not established any concrete guidelines and proper follow-up to safeguard against environment and mitigate CC impacts. There also exists a gap in policy reform, CC PC and its proper implementation for environment friendly and climate resilient CPEC development. Green development will help to address these gaps, hence is crucial as in recent

years country has witnessed unprecedented challenges of extreme weather events in the form of flash floods, heat waves and drought.

9. In this context, it is recommended to establish guidelines for environmental safeguards and transparency mechanisms for sustainability of CPEC. Currently, CPEC-related sectoral policies are lacking in transparency, hence need integration in the revised versions.
10. To consider environment, climate and DM related to projects under CPEC, a working group on "Environment, Climate and Sustainability" must be established in the existing Joint Cooperation Committee (JCC) in CPEC Authority.

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Annexure A: Questionnaire Survey (Research Objective -3)

Annexures A-C are instruments used for questionnaires-based surveys for this research. The information gathered from experts/stakeholders is in the context of climate-induced disasters, environmental concerns, and sustainability of the CPEC Plan (2017-2030). In this context, Annexure -A is to explore experts /stakeholders views on EPI in disaster management and sustainability of CPEC Plan 2017-2030. Similarly, Annexure B is about experts' opinions on Pakistan's EG and CPEC Plan sustainability, while the questionnaire in Annexure C is for experts to rate SWOT criteria factors/themes key strengths, potential weaknesses, opportunities, and possible threats related to CPEC development and implementation of the CPEC Plan 2017-2030 as green and climate-resilient development.

Sr No	**Question**	**Scale (1-5 Likert Scale / Yes, No Option)**
Q-1	Are you aware of the development-environmental degradation-disaster linkage?	A. Yes B. No
Q-2	How well do you think you understand the development-environmental degradation-disaster linkage?	5 = complete knowledge; 4 = comprehensive knowledge; 3 = satisfactory knowledge; 2 = rudimentary knowledge; 1 = no knowledge
Q-3	How do you rate the importance of environmental assessment integration in disaster management?	5 = Vey high; 4 = High; 3 = Medium; 2 = little; 1 = not importance
Q-4	How do you rate the importance of environmental policy integration in disaster management for sustainable development?	5 = Very important; 4 = Important; 3 = moderately important; 2 = a little bit of importance; 1 = no importance
Q-5	Do you think that disasters (floods, earthquakes, avalanches, etc.) are a potential threat to CPEC development?	A) Yes B) No
Q-6	Do you think that Environmental Impact Assessment reports sufficiently address disaster risk?	5 = very strongly; 4 = strongly; 3 = moderately; 2 = poorly; 1 = no knowledge
Q-7	How do you rate the sustainability of CPEC development within the existing country DM and environmental assessment setup?	5= high; 4 = medium; 3 = poor; 2 = no sustainability; 1 = no knowledge)
Q-8	In your opinion which component of sustainability is at risk due to CPEC development?	A) Economic, B) Social, C) Environmental
Q-9	How do you rate the economic sustainability of CPEC development within the existing country DM and EA setup?	5= high; 4 = medium; 3 = poor; 2 = no sustainability; 1 = no knowledge)

Q-10	How do you rate the social sustainability of CPEC development within the existing country DM and EA setup?	5= high; 4 = medium; 3 = poor; 2 = no sustainability; 1 = no knowledge
Q-11	How do you rate the environmental sustainability of CPEC development within the existing country DM and EA setup?	5= high; 4 = medium; 3 = poor; 2 = no sustainability; 1 = no knowledge)
Q-12	How do you rate the importance of EPI in DM for the sustainability of CPEC development?	5 = Very important; 4 = Important; 3 = moderately important; 2 = a little bit of importance; 1 = no importance
Q-13	Your suggestion for EPI in disaster management of Pakistan?	5 = strongly; 4 = considerably; 3 = moderately; 2 = a little; 1 = not in favor

Q-14 To what extent do the factors listed in the below table reduce EPI in DM for CPEC Sustainability? 1-5 Likert Scale. i.e. 5 = to a large extent. 4 = to a considerable extent; 3 = to a moderate extent; 2 = a little bit. 1 = not at all.

Sr No.	Main Factors	Sub Factors
i.	Political Commitment and leadership	Politicization
		Conflicting interest
		Corruption
		Government priority toward environmental protection, DM, and climate-resilient development
		Lack of consensus on policy development and policy implementation due to 18th constitutional amendment
		Government instability
ii.	Technological	Lack of appropriate technologies to implement policies
		Lack of skilled Personal
iii.	Structural	Functional overlap of organizations/departments
		Lack of structural obligation
		Functional structure of the governing system
		Powerless coordination system
		Public-Private sector isolation working
		Unclear borders for policy domains
iv.	Procedural	Involvement of irrelevant actors in policymaking
		Prolonged process of policymaking
		Prolonged draft polices status

		Budget allocation for policy development
		Poor design of policy-making processes
		Disconnection between policy formation phases
		Criterion lacking for policy development
		Misaligned policy instruments
		Disintegrated viewpoint toward policies
v.	International obligation	Weakness in international cooperation
		Weakness in the observation of international trends
vi.	Policy coordination	Conflicts of interest between Federal and provincial Government
		Inconsistencies between priorities and policies.
		Unclear boundaries for policy and Institution domains
		Policy coherence between country environmental protection agencies (EPAs) and DM Authorities (NDMA, PDMAs)
vii.	Integrated approaches	Lack of equal consideration of socio-economic, environmental and disaster concerns in development process
		Short term economic benefits base planning
		Ignorance of long term environmental and climate change concerns
		Short term socio-economics-based policy formation trend
		Policies discontinuation from every new government
viii.	Policy Effect	Delayed policy revision
		Short term policies
		Transboundary issues with region
		18th Constitutional amendment leads environment and DM as a provincial subject
	Public Participation	Public Participation Mechanism

		Stakeholder Participation
		Stakeholder consultation
		Stakeholder's concerns integration in policy formation
ix.	Peace and Conflicts	Terrorism
		Security Risk
		Conflicts among provinces for CPEC route
		Disaster and Environment as a provincial subject
x.	Monitoring & Evaluation	Mechanisms in place to monitor and evaluate EA during DM

Annexure B: Questionnaire Survey (Research Objective -4)

Question	Evaluation Scale
A. Do you think that effective EG is in place in Pakistan for environmental and social safeguards while implementing the projects under CPEC?	1= Very effectively; 2=Somewhat effectively; 3= Not very effectively; 4=Not effectively at all; 5= Don't Know
B. Are the relevant institutions capable of effectively implementing relevant policies and plans by enforcing rules and regulations for sustainable and green CPEC development?	1= Very effectively; 2=Somewhat effectively; 3= Not very effectively; 4=Not effectively at all; 5= Don't Know
C. If the institutional capacity of EG is weak, what are the reasons?	Open-ended

To what extent are the listed EG criteria below important for EG and CPEC green development? **Evaluation Scale** 1-9 Likert Scale

1= Equally important, 2= Equal to moderately more important, 3= Moderately more important, 4=Moderately to strongly important, 5= Strongly more important, 6= Strongly to very strongly important, 7= Very strongly more important, 8= Very strongly to extremely more important, 9= Extremely more important.

Main Criteria	Sub Criteria
1. Direction/mandate	1.1. Stakeholders' clear jurisdiction, scope, and goal for eco-friendly development
2. Capacity	2.1. The stakeholders contribute effectively to environmental protection
	2.3. Stakeholders have sufficient skills and resources
	2.3. Capable visionary leadership is present to address environmental and CC concerns
	2.4. Effective human, financial, and technical capacity is present in relevant institutions (e.g., EPAs) to deal with environmental concerns of CPEC development
	2.5. Effective mechanisms are in place to resolve conflicts between stakeholders (i.e Federal and Provincial Government, EPA) and implementation of environmental laws in letter and spirit.
3. Access to information/knowledge	3.1. Access to EPAs, to collect information and knowledge about environmental protection, For Example, EIA reports of development projects especially CPEC projects

	3.2. Whether information about an environmental concern related to CPEC development is produced and documented at EPAs and the Ministry of CC
	3.3. Monitoring & evaluation, responses to non-compliance in CPEC projects
	3.4. Accessibility of environmental information requests
	3.5. Publicized environmental information. For Example, EIA reports
4. Coordination	4.1. The stakeholder's communication and collaboration in the governance process
	4.2. The roles, functions, and mandates of concerned stakeholders are coordinated for green CPEC development
	4.3. A coordinating body or unit is present for improved EG and CPEC development
	4.4. Forum for discussion, debate, negotiating, and resolving trade-offs is present to make CPEC a green developmental model
5.Accountability/legitimacy	5.1. Decision-makers (e.g. EPA) faced consequences for their decisions about environmental protection and CPEC development
	5.2. Mechanisms are in place to ensure that means and rationales of decisions making are transparent for eco-friendly development under the CPEC Plan
6. Inclusion	6.1. Marginalized stakeholders' participation in the decision-making process
	6.2. Policies and processes acknowledge respect for and incorporation of diverse perspectives, values, cultures, and rights.
	6.3. Views of marginalized and vulnerable groups are considered and incorporated in the decision-making process
7. Participation	7.1. Stakeholder's input is incorporated in the planning and implantation
	7.2. Participation in legislation & decision-making and due account of comments in final policy documents
	7.3. Equal public participation in the development of EA reports for CPEC projects
8. Justice/ Rights	8.1. The rights of stakeholders are respected, and violations are prosecuted
	8.2. Mechanisms are in place to ensure socio-economic costs and benefits are just and fairly distributed

	8.3. Laws and policies are present to protect local rights, and mechanisms to ensure that groups have access to justice
	8.4.Accessibility of dispute resolution mechanisms
	8.5.Impartiality of dispute resolution mechanisms
	8.6.Timely dispute resolution mechanism
9. Innovation/ adaptation	9.1. The governance process and policies revision over time
	9.2. Long-term planning and foresight thinking are institutionalized.
	9.3. Known and unknown risks and opportunities are considered, analyzed, and planned for.
	9.4. Current plans and procedures to prevent the consequences of unexpected risks of development especially development under the CPEC Plan
	9.5. Capacity building to deal with environmental and CC concerns of CPEC development
	9.6.Existing Processes to revisit and evolve policies, institutions, and adapt actions
	9.7. Innovation and experimentation are encouraged, and success and failures are monitored
10. Multi-level	10.1 Stakeholders operating on different scales and participation in decision making
	10.2. Policies exist that recognize the need to downscale environmental management and conservation models to fit local realities
	10.3. Efforts are taken to understand and document the diverse contexts where policies are applied and to deliberated on necessary adjustments
11. Transparency	11.1. The process and mechanism are in place to deal with corruption and implementation of environmental laws in letter and spirit
To what extent are the thematic dimensions below (A-D) related to integrated EG is important for CPEC green development? 1= Equally important, 2= Equal to moderately more important, 3= Moderately more important, 4=Moderately to strongly important, 5= Strongly more important, 6= Strongly to very strongly important, 7= Very strongly more important, 8= Very strongly to extremely more important, 9= Extremely more important a. Effectiveness b. Robustness c. Equity d. Responsiveness	
D. Your opinion about the current EG system of Pakistan and CPEC sustainability.	

Annexure C: Questionnaire survey (Research Objective-5)

To what extent the criterion factors related to Strengths, Weaknesses, Opportunities, and Threats related t o CPEC sustainability and EG are important in the implementation of the CPEC Plan as green development.

Scale for Pairwise Comparison: 1= Equally important, 2= Equal to moderately more important, 3= Moderately more important, 4=Moderately to strongly important, 5= Strongly more important, 6= Strongly to very strongly important, 7= Very strongly more important, 8= Very strongly to extremely more important, 9= Extremely more important

Themes	**Criteria /Factor**
1. Strengths	1.1. Infrastructure development
	1.1. Economic feasibility
	1.2. Increase exports
	1.3. Increase employment
	1.4. Trade cooperation
	1.5. Cultural friendliness
	1.6. Energy demand fluffiness
	1.7. Technology diffusion
	1.8. Enhance foreign investment
	1.9. Geostrategic position
	1.10. Centralized planning and decentralized implementation practice
	1.11. Mutual defense and Strategic cooperation
	1.12. Dedicated leadership (e.g. Ten Billion Tree Tsunami Programme)
2. Weaknesses	2.1. Political instability
	2.2. Political willingness
	2.3. Financial constraints
	2.4. Corruption
	2.5. Affected local industries
	2.6. Lack of good governance in general
	2.7. Lack of good EG
	2.8. Lack of technical skill labour
	2.9. Increase dependency on China
	2.10. Long-term queued development
	2.11. Increase environmental and health issues
	2.12. Security issues
	2.13. Cultural issues
	2.14. Weak institutional setup for environmental protection and C
	2.15. Dumping
	2.16. CC and Environmental concerns
	2.17. Technological inefficiencies

	2.18. Lack of mechanism to transform Special Economic Zones into Eco-Industrial Park
	2.19. Lack of transparency and non-availability of clear information about China -Pakistan cooperation and initiatives to make CPEC a green development
	2.20. Long waited policy document revision / update (e.g NEP 2005 & National Maritime Policy 2002)
3. Opportunities	3.1. Economic empowerment
	3.2. Economic stabilization
	3.3. Foreign investment
	3.4. Mutual trade gain
	3.5. Private sector development
	3.6. Expanding business opportunities
	3.7. Less transportation cost
	3.8. Transportation development
	3.9. Time saving
	3.10. Direct access to trade through sea route
	3.11. Access of financial market
	3.12. Overcome energy shortfall
	3.13. Industrial development
	3.14. Advancement in technology
	3.15. Decrease travel distance
	3.16. Entrepreneurship
	3.17. Increase in exports
	3.18. Increase job opportunities
	3.19. Regional connectivity
	3.20. Overcome energy crises
	3.21. Development of Gwadar (Maritime economic development)
	3.22. Tourism sector promotion
	3.23. Capacity-building initiatives
	3.24. Promote cooperation on infrastructure, transportation, industrial collaboration, Gwadar, and energy security through CPEC
4. Threats	4.1. Local Business losses
	4.2. Financial threats to local industries
	4.3. Kashmir issue, especially Indian stance on Gilgit- Baltistan, a gateway of CPEC
	4.4. Geo-political threats to regional countries like India
	4.5. Economic issues
	4.6. Cultural issues
	4.7. Security issues
	4.8. Dependency on China
	4.9. Corruption

	4.10. Environmental impacts
	4.11. Natural resources exploitation
	4.12. CC disaster concerns (e.g. potential threat to ecosystem, biodiversity and Northern area glaciers melting)
	4.13. Incoherent Policies
	4.14. Capital outflow
	4.15. Intra-regional conflicts
	4.16. Extremism and Terrorism
	4.17. Inter-provincial dispute on CPEC route and Environmental Concerns
	4.18. 18th Constitutional Amendment of Pakistan and environmental protection (e.g marine resource conservation and Marine Pollution)
	4.19. The overlapping mandate of the Federal and Provincial authorities to tackle marine pollution and Life Below Water
	4.20. Inconsistencies in EG
	4.21. Mistrusted inter-Provincial and Federal harmony in CPEC Plan implementation
	4.22. Law and order situation in Baluchistan Province
	4.23. Political instability in Afghanistan
	4.24. COVID-19

Annexure D: Coding of Expert Participants

Key Experts / Participants	**Statement Coding**
Environmental Department	EPA-01 to EPA-07
Consultants	EC-01 to EC-06
Academia	AC-01 to AC-09
Ministries	Min-01 to Min-02
Researchers	R-01 to R-05
NGO	NGO-01 to NGO-03
INGO	INGO-01
CPEC Authority	CA-01 to CA-02
Planning Commission	PC-01to PC-02

Annexure E: Provisos of IEE & EIA in Pakistan Environmental Protection Act, 1997

Section/Sub-Section/ Clause	IEE /EIA Provisions
2 (xi) (xxiv)	definitions of EIA and IEE
12	Directs to fill IEE/ EIA for projects where required.
12: (a), (b), (4)	Government Agency to review IEE/EIA report and grant approval within four months periods
12(3)	Directs to carry out EIA with public participation
12(7)	Provide that Government Agency hold separate registers for IEE and EIA projects, that include brief specifics of each project and a summary of decisions taken thereon.
33(g)	Direct to laying down guidelines for IEE and EIA preparation, and procedures development for filing, reviewing, and approval.
17 (1)	Recognize Penalties in case of breaches or failure to comply with the provisions about EIA and IEE.
17(4)	About additional penalty, in case monitory benefits are accrued by offender/proponent.
20	Direct govt to create Environmental Tribunals (ET) as many as, it considers necessary.
22	Offers right to be aggrieved people to file an appeal with ET against any order/direction of federal /provincial agency within 30 days of the date of communication of order or direction
23	Provide the right to the aggrieved person to file an appeal to High Court within thirty days against order / any sentence of the order passed by Environmental Tribunal
33 (2) (g)	Recognize that Federal Agency may lay down guidelines about EIA & IEE preparation & development of procedures for their filing, reviewing, and approval.
33	Provide Power to Federal Agency to make regulations with the approval of the Federal Government.

Annexure F: Legal and regulatory provisions of IEE/EIA/SEA at Provincial Level

Environmental Protection Act	Section	Provisions for EA tool and relevant section, subsection
KP Act, 2014 (GOKP, 2014b)	2 (eee)	**SEA:** Definition of SEA: SEA means "analysis or series of analyses that are systematic, overall, and participatory to ensure that the principle of SD is the basis for and is integrated into the development of a policy, plan, or programme"
	12 (1)	Direct the Government to carry out SEA of the plan or policy e.g; socio-economic development plan; economic zones / industrial parks/estates; transport infrastructure; and tourism sector, etc;
	12(2)	Provide SEA statement descriptions and submissions. It direct to conduct and formulate SEA statement and submit it to Agency which may contain objectives, scale, and environmental characteristics; description of the natural, socio-economic and environmental conditions, etc;
	12(3)	Directed that the Agency shall, within 120 days of the filing SEA screening statement, complete in all respects i.e., SEA report circulation; public hearing; to review received comments; to modify policy or development plan according to environmental objectives if deems necessary:
	12(5)	Direct the Agency to maintain separate registers for SEA reports, that contain brief specifics of policy/ development plan including a summary of decisions taken thereon etc;
		IEE and EIA
	2 (s) (ff)	Definitions of EIA and IEE
	13	Directs project proponent to file EIA/EIA with Agency where required.
	13(a)(b)	To review IEE/EIA and accord their approval/resubmission after modifications as may be stipulated;
	13 (3)	direct to carry out a review of EIA with public participation
	13 (4)	Directs Agency to communicate EIA/ EIA review and accord approval within four months from the date of the IEE/EIA is filed complete in all respects as per the procedure.
	13(5)	The Government may in a particular case extend the aforementioned period of four months IEE/EIA approval if the nature of the project so warrants.
	13(8)	Direct the Agency to maintain separate Registers for IEE & EIA projects.
	11 (ii)	Prohibition of certain discharges or emissions provides that no person shall discharge effluents, emissions, or wastes -

		above load permitted in the conditions of an environmental permit or environmental approval or license
	18	Provide penalties in case of contravenes or fails to comply with the environmental permit of section 11 (ii) IEE and EIA (Section 13) and (Section 12) for SEA requirements
KP EA Rules, 2021 (GoKP, 2021)	2 (d) (e)(h)	Definitions of EIA, GEA, and IEE
	4	Directs projects proponent to file EIA or IEE or GEA with Agency as mentioned in Schedules-II, III, and IV respectively.
	5	Direction for the proponent to file an EIA, IEE, or GEA for a specific project with Agency if that said project may create an environmental hazard and are not fall within the categories as mentioned in Schedule-II, III, and IV.
	6	Direct Agency for guidelines preparation of IEE, EIA, or GEA of general and sectoral applicability.
	7	Direct proponent to pay non -refundable review fee at the time of submission of EIA, IEE, and GEA as per rates given in Schedule-V.
	8	Direct proponent to file copies of EIA, IEE, and GEA with Agency
	9.	About Preliminary scrutiny of IEE, EIA, and GEA with Agency
	10	Direct the Agency to review within due time
	11	Direct the Agency to conduct public Participation for EIA
	13,14	Provide decision about EIA, IEE, and GEA review, communication to proponents, and conditional approval
	15, 16, 17,18; 20, 22	Confirm compliance; deemed approval; extension in review period; validity period of approval; monitoring; cancellation of approval; registers of IEE, EIA, and GEA projects;
	Failed to provide any section about SEA, which is defined in Section 2 (eee) of KPEP Act, 2014. Similarly, under section 12(1) the act directs the KP government to carry out SEA of given plans and policies. Likewise, KPEPA 2014 failed to define General Environmental Approval as defined in section 2 (e) of KPEA rules 2021.	
Sindh EP Act, 2014 (GOSD, 2014a)		**IEE and EIA**
	2 (xv), (xxx)	Definitions of IEE and EIA
	17 (1)	Direct the project proponent to obtain approval to fill IEE and EIA with Agency before construction or operation of the project
	17 (2)(a)	Direct the Agency to review the IEE and accord its approval subject to terms and conditions as it may prescribe, or require submission of an EIA by the proponent

	17 (2)(b)	Direct the Agency to review EIA and accord its approval subject to terms and conditions as it may deem fit
	17(3)	Direct to carry out a review of EIA with public participation
	17(4)	Direct Agency to communicate a decision about IEE and EIA approval. For IEE within 2 months from the date that the IEE is filed, and within 4 months from the date that the EIA is filed complete in all respects following the regulations
	17(6)	The Agency shall maintain separate registers for IEE and EIA projects
	11	Prohibition of certain discharges or emissions and compliance with standards; to comply with the direction issued under section 17
		SEA
	2(l)	Definition of SEA "SEA " means an analysis of a proposed policy, legislation, plan, or programme to determine whether the principles of SD have been integrated therein and to identify its likely environmental effects and such components as requiring an IEE or EIA;
	18(1)	Direct Agency to carry out SEA of provincial PPPs, and legislation that may cause any environmental impact.
	18(a)(b)(c)	Direct that SEA containing e.g description of objective; assessment of adverse environmental effects; analysis of possible alternatives, etc.
	18 (2)	Direct the Agency to review SEA within 60 days of its filling; prepare a review report containing comments and recommendations and forwarded to initiating agency, authority local council or authority and duly considered by it and the competent authority before approval.
	19(1)	Direct Agency to carry out environmental monitoring of all projects in respect of which it has approved an IEE or EIA
	31	Direct Agency for public participation; to duly consider all comments received during public participation while reviewing the EIA or SEA, and decision or action is taken thereon shall be communicated to the persons who have furnished the said comments.
	37 (2)(g)	Direct the Agency to laying down guidelines for the preparation of IEE, EIA, and SEA, and development of procedures of their filing, reviews, and approval
Sindh EPA (EA) Regulations, 2021 (GoSD, 2021)	3.	Provide Projects requiring Environmental Checklist (EC). Direct proponent to file EC with the Agency for project falling Schedule-1, and the provisions of section 17 shall apply to such projects.
	4.	Provide Projects requiring IEE. Direct proponent to file IEE with the Agency for project falling in any category listed in

		Schedule-II, provisions of section 17 shall apply to such projects.
	5	Provide Projects requiring an EIA. Direct proponent to file an EIA for a project falling in Schedule -III, and the provisions of section 17 shall apply to such projects.
	7(1)(2)	Direct the Agency to issue guidelines; e.g, guidelines preparation of an EC or IEE or EIA reports; guidelines of general applicability, and sectoral guidelines for planning, construction, and operation of projects relating to the particular sector; guidelines for the preparation of EMP or Environmental Audit.
	8	Direct proponent to Review Fees; i.e.at the time of submission of an EC, IEE, or EIA tower a non-refundable review fee to the Agency as prescribed in Schedule-IV.
	9(1)(2)(a)(b)	Direct proponent to file required copies (both hard and soft form) of EC, IEE, or EIA with the Agency that accompanied by a prescribed application form of Schedule-V; and copy of receipt payment.
	11(1)(3)(4)(5)	Direct the Agency of public participation for EIA; to ensure the circulation of the EIA for comments; duly consideration of received comments before issuance of decision; and Agency may issue guidelines ensure effective public consultation, involvement, and participation in EIA assessment.
	12	Direct the Agency to conclude the review process of the EA /EMP within 15 days of the IEE and EIA within 30 and 60 days respectively after receiving of complete case.
	13(1)(2)	Direct proponent to submit documentary public hearing evidence (soft form) to the Agency within 03 days of public hearing:
	14(1)(2)	Provide conditional approval of EC or IEE or EIA or EMP or EA by the Agency; direct proponent to submit an undertaking to the Agency where Agency accords its approval subject to certain conditions;
	15(1)(2)(3)	Provide validity period of approval accorded by the agency is three years from the date of issue; provide to extend the validity period for a further period of three years; provided that the proponent may require to submit a fresh IEE or EIA if in its opinion changes in location, design, construction, and operation;
	16(1)(2)	Direct verification of any matter related to review or conditional approval related to EC or IEE or EIA or EMP or EA; the staff of the Agency shall be entitled to enter project site for verification; and proponent shall ensure the

		full cooperation of the project staff at the site to facilitate the inspection.
	17(1)	Provide cancellation of approval if conditions of approval have not been complied with, or that the information supplied by a proponent in the approved EC or IEE or EIA or EMP or EA list is incorrect,
	18	Direct the Agency to maintain separate registers to be maintained for EC or IEE and EIA projects.
	20(1)	Direct the Agency to EA guidelines to preparation of EA
	22(1)	The Sindh EP Agency (Review of IEE & EIA) Regulations 2014, shall, on commencement of these regulations, stand repealed
		It failed to recognize any section and sub-section about SEA which is recognized in Sindh Environmental Protection Act 2014.
Punjab EP (Amendment) Act 2017 (GoPB, 2017c) **This Act, which amended the Punjab EP Act, 1997 (XXXIV of 1997); was passed by the Punjab Assembly on 25 October 2017 (GoPB, 2017c)**	2 (xi) (xxiv)	Definitions of EIA and IEE
		IEE and EIA
	12(1)	Directs where proponent require to file IEE/ EIA with Agency
	12(2)(a)(b)	Directs the Govt. Agency to review IEE/IEE accord approval accordingly.
	12(3)(i)(ii)(iii)	Directs the Agency to review EIA with public participation and no information will be disclosed, for example about trade, techniques of a proprietary nature, or financial, international relations, national security or maintenance of law and order; matters covered by legal professional privilege, etc;
	12(4)	Directs the Govt Agency to communicate the decision of IEE/ EIA's approval or otherwise within periods of 4 months from the date the IEE/ EIA is filed.
	12(5)	Provide that Govt. may extend the 4 months of IEE/EIA approval if the nature of the project so warrants.
	12(7)	Directs the Govt. Agency to maintain separate registers for IEE and EIA projects
	17(1)	Provide penalties in case of contravenes or fails to comply with the provisions of section 12 of EIA and IEE. Like penalty up to [five million] rupees in case of violation of IEE/EIA requirement with an additional fine of one hundred thousand rupees per day in case of continuing contravention.
	33(2)(g)	Directs Provincial Agency to lay down guidelines for the preparation of IEE and EIA and Development of procedures for their filing, review, and approval;
		SEA
		It failed to recognize any section and sub-section about SEA

Balochistan EP Act, 2012 (GoBA, 2012)	2 (q) (ff) (aaa)	Definitions of EIA, IEE, and SEA respectively
		IEE and EIA
	15 (1)	Directs proponent to file an IEE and EIA with Government Agency for public and private sector project where required
	15(2)(a)(b)	Directs Government Agency to review IEE/EIA and accord approval accordingly.
	15 (3)(a)	Directs Government Agency to carry out EIA review with Public Participation
	15(4)	Direct Government Agency to communicate approval or otherwise within 4 months, from the date the IEE / EIA is filled according to the prescribed procedure.
	15(5)	Provide to extend four months review period of IEE /EIA if the nature of the project so warrants
	15(7)	Direct Government Agency to maintain separate registers for IEE and EIA projects
	15(10)	Directs cellular companies to obtain Environmental Approval before installation of Base Transceivers Station
	16	Provide that proponent shall remit fifty thousand rupees as an IEE review fee, and one hundred thousand rupees as an EIA review fee.
	17	Directs that project do not fall to filed IEE and EIA shall remit 25 thousand rupees as an Environmental approval fee to the Baluchistan EP Agency.
	19	Provide penalties in case of contravenes or fails to comply with the provisions of this act e.g., provision regarding IEE and EIA filing and approval
	41 (2) (g)	Direct the Balochistan EP Agency to lay down guidelines for IEE and EIA preparation and Development of procedures for their filing, review, and approval;
		SEA
	2 (aaa)	Define SEA as that SEA is a system of incorporating environmental considerations into PPPs, and strategies. It is sometimes referred to as SEA
	13(1)	Regulates the conditions, methods, and procedures according to which assessment of the impacts on the environment (hereinafter referred to as strategic assessment) or SEA of plans and programmes shall he carried out.
	13 (2)	The Government at all levels of administration and in every sector shall incorporate environmental considerations into policies, plans programmes, and strategies.
Gilgit-Baltistan EP Act, 2014 (GoGB, 2014)	2 (xi) (xxv) (xlii)	Definition of EIA, IEE and SEA respectively
		IEE and EIA
	16(1)	Directs proponent to filed IEE or EIA of projects where required, and obtained approval from the Agency in respect thereof

	16(2)(a)(b)	Directs the Agency to review the IEE /EIA and accord its approval, subject to terms and conditions as it may prescribe, deem fit to impose.
	16(3)	Directs the Agency to carry out review EIA with public participation.
	16(4)	Directs the Agency to communicate approval of IEE and EIA within 4 months from the date that the IEE or EIA is filed complete in all respects following the regulations; extend the aforementioned period of 4 months if the nature of the project so warrants.
	16(6)	Directs the Agency to maintain registers separately for IEE and EIA projects.
	18(1)	Directs the Agency for environmental monitoring of projects against approved EIA, to determine whether actual environmental impacts exceed the predicted level; or whether conditions of approval are being complied with
	19(3)	Directs the Agency to modify the approval about IEE and EIA, based on the review of the environmental audit report.
	21	Provides penalties in case of contravenes or fails to comply with the provisions of section 16 (IEE & EIA) shall be punishable with a fine
	30(1)(2)(3)(4)	Provide the Agency to publish details of the proposed project of which EIA has been received, and an invitation to the public to finish comments in a specific period; the Agency shall hold public hearings to receive additional comments; directs to duly consider all comments received while reviewing EIA or SEA, and decision to be communicated to persons who have finished the said comments; the Agency shall act in respect of proposed policy, legislation, plan, or programme in respect of which a SEA has been received and shall forward all comments received to the Environment Protection Department, which shall duly consider the same before finalizing its report under section 17.
	31	Provide the right to citizens to obtain any information from government Agency about the environment, including information about filed IEE or EIA by the proponent of a project; with exception of information related to e.g., trade, financial, etc.
	37(G)	Directs the Agency to lay down guidelines with the approval of the Government for preparation of IEE, EIA & SEA, and develop procedures for their filing, review, and approval.
		SEA
	2 (xlii)	Provide SEA definition as "SEA" means an analysis of a proposed policy, legislation, plan, or programme to determine whether the principles of SD have been integrated

		therein and to identify its likely environmental effects and such components as requiring an IEE or EIA;
	17(1)	Directs Govt Agencies, councils, and authorities responsible to formulate policies, PPPs, legislation, and donor-driven initiatives by NGOs and also private sector plans and programmes shall, before submitting the same to the competent authority for approval, forward to the provincial Environment Protection Department for SEA.
	17(1)(a)(b)(c)(d)	Provide composition of SEA report that contain a description of objectives and characteristics of the proposed policy, plan or programme and legislation that are in harmoniousness with the principles of sustainable development; assessment of adverse environmental effects caused in implementing proposed policy, plan, programme, and legislation, along with proposed preventive, mediatory and compensatory measures; to analysis possible alternatives; to identify components of the policy, plan or programme and legislation if any require to carry out separate EIA in due course.
	17(2)	Directs EP Department to review the SEA in consultation with the Agency and sectoral Advisory Committees, within forty days of its filling, prepared a report containing comments and recommendations which shall be initiated to Agency/ Local Council or Authority and competent authority before approval of proposed policy, plan or programme and legislation.
Azad Jammu and Kashmir EP Act, 2000	2 (xi) (xxiii)	Definitions of EIA and IEE respectively.
		IEE and EIA
	11(1)	Directs proponent to file IEE or EIA of projects where required
	11(2) (a)(b)	Directs to review the IEE and EIA and accord approval.
	11(3)(1)(2)	Provide that to review an EIA public participation shall be carried out and information related to (e.g trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, national security, etc) will not be disclosed during such public participation
	11(4)	Directs the Agency to communicate approval or otherwise of IEE or EIA within 4 months from the date the IEE or EIA is filed completed.
	11(5)	Direct that in a particular case Government may extend the aforementioned approval period of 04 months if the nature of the project so warrants
	11(7)	Direct the Agency to maintain separate registers for IEE and EIA projects.

	16	Provide penalties to contravenes or fails to comply with provisions of this act e.g. section 11 related to IEE and EIA shall be punishable with fine
	32 (g)	Directs the Agency to lay down guidelines for the preparation of IEE and EIA, and development procedures for their filing, review & approval.
		SEA
		The act failed to integrate provisions for SEA.
Azad Jammu & Kashmir EPA Review of IEE & EIA Regulations, 2009	3,4,5	Directs proponent about projects requiring filling IEE or EIA with the Agency
	6	Provide guidelines for the preparation of IEE and EIA and other guidelines e.g for general applicability and sectoral guidelines
	7	Directs proponent to pay non-refundable review fee at the time of submission of IEE and EIA
	8(1)(2)(a)(b)	Provide filing of an EE and EIA. i.e., Ten hard copies and two electric copies to file with the Agency; each report accompanied an application and copy of the receipt showing payment of the review fee.
	9(1)	Directs the Agency to Preliminary Scrutiny of IEE and IEIA within ten days of filing.
	10	Provide a public notice to call public hearings and participation in EIA projects
	11	Directs the Agency to carry out review IEE in forty-five days, and of the EIA within ninety days, after issuance of confirmation of completeness
	12	Directs the Agency that on review completion communicate the decision with the proponent
	13(1)(2)	Provide details accords approval of IEE and EIA by the Agency subject to certain conditions. Conditions of approval
	14	Directs the Agency and proponent about the confirmation of compliance regarding the conditional approval
	15	Provide extension in the review period of IEE and EIA
	16	Directs the Agency and proponent about the validity period of approval of IEE and EIA
	17	Direct Agency to enter and inspect the project, the proponent ensures full cooperation and to facilitate the inspection
	18(1)(2)	Provide monitoring of the project; once approval is issued, the proponent submits a report to the Agency on completion of the project; After the issue of the confirmation of compliance, the proponent shall submit a yearly report on the operational performance of the project, with reference to conditions of the approval and maintenance and mitigatory measures adopted for the project.
	19(1)(2)(3)(4)	Directs the Agency about the cancellation of approval; provide a chance to proponent to hear why the approval should not be canceled

	20	Direct to maintain separate registers for IEE and EIA projects
	21(1)(2)(3)	Directs the Agency to designate the environmentally sensitive area; proponent to file an EIA with the Agency for projects located in the environmentally sensitive area; direct the Agency to issue guidelines to assist the proponent in EIA process etc;

Annexure G: Stakeholders and sub-criteria performance, results of BWM-mV model (Research Objective -3)

Table 1: Stakeholders and sub-criteria performance

Sub-Criteria	AC	EC	EPA	INGO	MI	NGO	OT	RS	Average Performance
C 1.1	5.375	5.529	5.143	5.250	7.333	4.500	5.000	6.600	5.591
C 2.1	6.500	5.176	5.714	6.500	6.333	5.000	5.400	5.800	5.803
C 2.2	6.750	5.588	5.000	6.000	6.333	4.000	5.667	5.600	5.617
C 2.3	6.625	6.412	6.000	6.750	7.333	5.000	5.600	5.200	6.115
C 2.4	6.375	6.059	5.714	7.500	6.667	4.500	6.200	6.200	6.152
C 2.5	6.375	5.824	4.857	4.250	6.333	4.000	5.200	5.400	5.280
C 3.1	6.542	5.471	4.429	6.500	7.333	4.500	5.133	5.400	5.663
C. 3.2	6.292	5.647	5.000	5.750	6.333	5.000	4.733	4.600	5.419
C 3.3.	6.875	4.882	4.857	6.000	7.667	4.500	5.267	7.200	5.906
C. 3.4.	5.917	4.941	5.286	5.750	7.667	4.500	5.600	6.400	5.758
C 3.5	5.792	5.529	4.857	6.000	7.000	4.500	5.867	6.000	5.693
C 4.1	6.542	5.176	6.571	5.250	8.000	4.000	5.733	7.200	6.059
C 4.2	6.000	5.294	6.286	6.500	8.333	4.000	6.333	6.200	6.118
C 4.3	5.750	5.647	5.857	5.750	6.333	4.000	5.467	5.200	5.501
C 4.4	5.667	5.118	6.000	4.500	8.333	1.000	5.267	5.200	5.136
C 5.1	6.125	5.412	5.429	5.250	7.000	3.500	5.267	7.000	5.623
C 5.2	6.375	5.706	5.429	5.000	6.667	5.000	5.200	5.400	5.597
C 6.1	6.125	5.471	5.143	4.750	5.333	8.500	5.600	5.800	5.840
C 6.2	6.792	5.235	5.143	5.500	6.667	7.000	5.333	6.600	6.034
C 6.3	6.500	4.882	5.000	5.000	7.333	7.500	5.600	6.200	6.002
C 7.1	7.000	5.588	5.000	5.750	7.333	7.500	5.733	6.200	6.263
C 7.2	6.375	5.353	5.714	5.500	8.000	7.500	6.067	5.600	6.264
C 7.3	6.000	5.471	5.429	5.250	6.667	8.000	5.467	5.800	6.010
C 8.1	6.750	5.412	5.286	4.750	8.333	1.000	5.467	5.600	5.325
C 8.2	6.167	5.824	5.143	5.750	7.333	3.000	5.200	5.200	5.452
C 8.3	6.458	5.471	5.000	5.250	7.667	4.000	6.333	6.200	5.797
C 8.4	6.250	5.529	4.857	6.500	8.000	1.000	5.400	6.200	5.467
C 8.5	6.583	5.294	5.857	6.750	7.333	1.500	5.667	5.800	5.598
C 8.6	6.667	4.882	6.000	6.000	8.000	4.000	6.400	6.200	6.019
C 9.1	6.292	5.353	5.714	6.000	7.000	4.500	6.133	6.000	5.874
C 9.2	7.292	5.941	5.000	6.000	7.333	3.500	5.533	6.000	5.825
C 9.3	6.625	4.647	6.571	6.000	5.667	3.500	5.467	6.200	5.585
C 9.4	6.292	5.294	5.857	6.000	6.333	3.000	5.667	6.200	5.580
C 9.5	6.792	6.059	5.857	6.000	8.333	5.000	5.800	6.400	6.280
C 9.6	6.458	5.529	5.857	6.000	7.667	4.500	5.733	5.200	5.868
C 9.7	6.167	5.176	5.857	6.250	8.333	4.500	5.667	5.800	5.969
C 10.1	6.417	4.941	6.571	6.000	7.667	6.000	4.533	6.200	6.041
C 10.2	6.208	5.471	4.857	5.500	7.000	7.000	4.600	5.800	5.805
C 10.3	6.333	5.647	4.571	5.750	6.667	7.500	5.267	5.600	5.917
C 11.1	6.625	5.353	5.143	6.250	8.000	7.500	6.200	5.800	6.359

Calculation results of the BWM-mV model (Research Objective -3)

Table 2: Calculation results of the BWM-mV model

Theme	Weight	Main Criteria	Weight	Sub Criteria	Local Weights	Global Weights	Performance	Gap
T1	0.189	C1	0.051	C.1.1	1	0.051	5.591	0.000
		C2	0.066	C2.1	0.130	0.009	5.803	0.682
				C2.2	0.130	0.009	5.617	0.523
				C2.3	0.273	0.018	6.115	0.000
				C2.4	0.390	0.026	6.152	0.000
				C 2.5	0.078	0.005	5.280	0.159
		C3	0.051	C.3.1	0.206	0.011	5.663	0.440
				C.3.2	0.098	0.005	5.419	1.000
				C.3.3	0.353	0.018	5.906	0.000
				C.3.4	0.137	0.007	5.758	0.760
				C.3.5	0.206	0.011	5.693	0.560
T2	0.189	C4	0.066	C.4.1	0.492	0.032	6.059	0.000
				C.4.2	0.295	0.019	6.118	0.059
				C.4.3	0.148	0.010	5.501	0.647
				C.4.4	0.066	0.004	5.136	1.000
		C5	0.092	C.5.1	0.4	0.037	5.623	1.000
				C.5.2	0.6	0.055	5.597	0.000
T3	0.135	C6	0.057	C.6.1	0.2	0.011	5.840	1.000
				C.6.2	0.5	0.029	6.034	0.000
				C.6.3	0.3	0.017	6.002	0.688
		C7	0.057	C.7.1	0.563	0.032	6.263	0.000
				C.7.2	0.313	0.018	6.264	0.344
				C.7.3	0.125	0.007	6.010	1.000
		C8	0.153	C.8.1	0.127	0.019	5.325	0.700
				C.8.2	0.070	0.011	5.452	1.000
				C.8.3	0.190	0.029	5.797	0.233
				C.8.4	0.127	0.019	5.467	0.867
				C.8.5	0.190	0.029	5.598	0.433
				C.8.6	0.296	0.045	6.019	0.000
T4	0.486	C9	0.076	C.9.1	0.123	0.009	5.874	0.675
				C.9.2	0.185	0.014	5.825	0.200
				C.9.3	0.057	0.004	5.585	1.000
				C.9.4	0.092	0.007	5.580	0.950
				C.9.5	0.327	0.025	6.280	0.000
				C.9.6	0.123	0.009	5.868	0.675
				C.9.7	0.092	0.007	5.969	0.875
		C10	0.051	C.10.1	0.3	0.015	6.041	0.214
				C.10.2	0.2	0.010	5.805	1.000
				C.10.3	0.5	0.026	5.917	0.000
		C11	0.280	C.11.1	1	0.28	6.359	0.000

Annexure H: Criteria Weighting Determination using BWM

Table -1 presents a pairwise comparison of the best and the worst criteria. In this context, criterion geostrategic position (ISC 1.10) was determined as the best criteria and the criteria increase dependency on China (IWC 2.9), as the worst sub-criteria related to the main criterion dimensions.

Table 1: Main criteria-pairwise comparison vector

Criteria	Best/worst criteria	Strengths (IS)	Weaknesses (IW)	Opportunities (EO)	Threats (ET)
Best to others	Best: strengths (IS) ISC 10	1	2	3	5
Others to the	Worst: weaknesses (IW) IWC 9	4	1	9	2

Table 2 indicates the evaluation of criteria in the context of Internal Strength criteria. The criteria of geostrategic position i.e. (ISC 1.10) was identified as the best criterion and the criteria of cultural friendliness i.e. (ISC 1.6) was the worst criterion of sub-criteria of the main Internal Strength Criteria (ISC).

Table 2: Internal Strengths (IS:1-13)-pairwise comparison vector

Criteria	Best/worst criteria	1	2	3	4	5	6	7	8	9	10	11	12	13
Best to others	Best: IS 10	7	5	6	2	2	8	2	2	2	1	8	6	2
Others to the worst	Worst: IS 6	2	2	2	6	6	1	8	5	6	8	2	2	7

Table 3. presents the assessment of the experts for the main criteria of Internal Weakness Criteria (IWC). In this context, the criteria technological inefficiencies i.e. (IWC 2.17) were identified as the best, and the criteria increase dependency on China i.e. (IWC 2.9) as the worst for the sub-criteria of the main group internal weakness (IW).

Table 3: Internal Weaknesses (IW:1-20)--pairwise comparison vector

Criteria	Best/worst criteria	1	2	3	4	5	6	7	8	9	10
Best to others	Best: IWC 17	3	3	3	3	4	3	3	8	9	6
Others to the worst	Worst: IWC 9	9	9	9	8	8	9	9	4	1	6

Criteria	Best/worst criteria	11	12	13	14	15	16	17	18	19	20
Best to others	Best: IWC 17	2	3	7	4	3	2	1	2	3	2
Others to the worst	Worst: IWC 9	9	9	5	7	9	9	9	9	9	9

In the context of external opportunities criteria assessment, Table 4 demonstrates the results. The criterion increases job opportunities i.e. (EOC 3.18) and criteria regional connectivity i.e. (EOC 3.19) was defined as the best criteria and the criterion mutual trade gain i.e., (EOC 3.4) as the worst criteria for the sub-criteria of the main criteria theme external opportunities (EO).

Table 4: External Opportunities (EO:1-24)-pairwise comparison vector

Criteria	Best/worst criteria	1	2	3	4	5	6	7	8	9	10	11	12
Best to others	Best: EO18, 19	5	6	5	7	4	3	5	3	5	4	4	2
Others to the worst	Worst: EO4	2	2	2	1	3	4	2	4	3	3	3	5
Criteria	**Best/worst criteria**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Best to others	Best: EO18, 19	2	2	4	3	3	1	1	2	2	4	4	3
Others to the worst	Worst: EO4	6	6	3	4	4	7	7	6	5	3	3	4

Table 5 describes the results related to external threats criterion factors. The criterion is natural resource exploitation. i.e. (ETC 4.11) was defined as the best and geopolitical threats to regional countries like India i.e. (ETC 4.4) as the worst for the sub-criteria of the main group external threats (ET). Similarly, Table 6 depict stakeholder's performance.

Table 5: External Threats (ET:1-24)-pairwise comparison vector

Criteria	Best/worst criteria	1	2	3	4	5	6	7	8	9	10	11	12
Best to others	Best: ET 11	9	9	9	9	6	9	6	9	8	2	1	3
Others to the worst	Worst: ET4	3	4	2	1	9	2	9	4	7	9	9	9
Criteria	Best/Worst criteria	13	14	15	16	17	18	19	20	21	22	23	24

Best to others	Best: ET 11	5	8	8	6	6	5	9	6	5	6	8	9
Others to the worst	Worst: ET4	9	9	8	9	9	9	5	9	9	9	8	6

Table 6: Performance of stakeholders (Research Objective -5)

Criteria	AC	EC	EPAs	INGOs	MI	NGOs	OT	RS	Average
(ISC) 1.1	4.450	6.667	5.750	5.500	6.500	7.000	6.000	5.000	5.8583
(ISC) 1.2	4.600	6.583	5.750	7.500	7.500	7.000	6.063	6.800	6.4745
(ISC) 1.3	5.150	6.750	5.250	6.000	6.500	4.000	5.313	7.000	5.7453
(ISC) 1.4	5.200	7.000	7.000	7.000	7.000	7.000	6.063	6.600	6.6078
(ISC) 1.5	5.350	6.583	6.750	6.500	7.000	6.000	6.625	5.800	6.326
(ISC) 1.6	4.400	6.000	5.750	3.500	5.500	6.000	6.188	6.400	5.4672
(ISC) 1.7	5.750	6.500	7.000	7.500	6.000	7.000	6.438	6.400	6.5735
(ISC) 1.8	5.650	6.417	5.250	5.000	6.000	5.000	6.438	6.800	5.8193
(ISC) 1.9	5.550	6.750	6.000	6.500	7.000	5.000	6.313	6.400	6.1891
(ISC) 1.10	6.200	6.500	6.000	6.000	7.000	5.000	6 500	6.600	6.225
(ISC) 1.11	4.600	5.500	6.250	5.000	6.500	6.000	6.500	4.800	5.6437
(ISC) 1.12	5.150	6.250	6.250	4.500	5.500	6.000	5.875	5.800	5.6656
(ISC) 1.13	5.600	6.333	5.750	4.500	6.000	8.000	6.813	7.000	6.2495
(IWC) 2.1	5.750	6.583	5.500	7.500	5.000	1.000	5.688	6.600	5.4526
(IWC) 2.2	5.500	6.417	5.750	8.500	4.500	1.000	6.438	6.400	5.5631
(IWC) 2.3	5.200	6.833	6.500	4.500	5.500	6.000	6.125	7.600	6.0322
(IWC) 2.4	5.400	6.667	6.250	3.000	3.500	6.000	6.313	6.400	5.4412
(IWC) 2.5	5.200	6.083	6.750	4.000	6.500	7.000	6.313	6.200	6.0057
(IWC) 2.6	5.600	5.917	5.750	7.500	6.000	7.000	5.875	6.600	6.2802
(IWC) 2.7	5.300	6.417	6.000	5.000	6.500	7.000	6.313	6.800	6.1662
(IWC) 2.8	4.500	5.667	6.000	4.500	7.000	7.000	6.250	5.400	5.7896
(IWC) 2.9	5.300	5.083	4.500	6.000	5.500	7.000	3.750	6.800	5.4916
(IWC) 2.10	5.000	5.667	5.250	4.500	5.500	7.000	6.188	6.400	5.6881
(IWC) 2.11	6.100	5.833	6.750	4.000	8.000	6.000	6.438	6.200	6.1651
(IWC) 2.12	5.900	5.917	6.750	6.500	7.000	6.000	5.625	5.600	6.1615
(IWC) 2.13	4.700	5.583	6.500	2.500	7.500	7.000	6.313	5.800	5.737
(IWC) 2.14	5.450	6.333	6.250	4.000	7.500	7.000	5.438	6.400	6.0463
(IWC) 2.15	5.150	6.000	7.000	4.500	7.000	7.000	6.563	6.400	6.2016
(IWC) 2.16	5.550	6.333	7.000	5.000	7.000	6.000	6.438	6.800	6.2651
(IWC) 2.17	6.100	6.083	8.250	4.500	7.000	6.000	6.188	6.800	6.3651
(IWC) 2.18	5.850	6.333	6.750	4.500	6.500	5.000	6.500	5.600	5.8791
(IWC) 2.19	6.000	5.667	6.500	4.500	6.000	7.000	6.063	6.000	5.9662
(IWC) 2.20	6.150	5.833	6.500	4.500	6.000	6.000	6.813	6.800	6.0745
(EOC) 3.1	5.900	5.750	6.000	8.500	6.500	7.000	6.500	5.800	6.4937
(EOC) 3.2	5.900	6.083	6.250	8.000	5.000	7.000	6.125	6.000	6.2947
(EOC) 3.3	5.950	5.917	7.250	6.000	5.500	4 000	6.563	6.600	5.9725

(EOC) 3.4	6.350	5.917	6.250	4.000	6.000	6.000	5.813	6.000	5.7912
(EOC) 3.5	5.750	6.667	6.250	4.000	7.500	5.000	6.875	6.200	6.0302
(EOC) 3.6	6.200	6.667	6.500	7.500	7.500	4.000	6.438	6.200	6.3756
(EOC) 3.7	6.150	6.500	8.250	3.500	7.000	4.000	6.188	5.400	5.8735
(EOC) 3.8	6.100	6.667	6.750	7.000	7.500	5.000	6.188	7.400	6.5756
(EOC) 3.9	6.450	6.417	6.750	4.500	6.500	5.000	6.438	4.600	5.8318
(EOC) 3.10	6.000	6.583	6.250	6.500	6.500	4.000	6.813	4.800	5.9307
(EOC) 3.11	5.800	6.583	7.750	7.000	7.000	5.000	6.438	5.800	6.4213
(EOC) 3.12	6.350	6.083	7.250	8.000	6.500	5.000	7.000	6.800	6.6228
(EOC) 3.13	6.200	6.750	6.250	8.000	8.000	5.000	7.125	7.000	6.7906
(EOC) 3.14	6.150	6.833	6.750	6.000	7.000	7.000	7.188	7.000	6.7401
(EOC) 3.15	5.950	6.583	7.250	6.500	6.500	6.000	6.188	5.800	6.3463
(EOC) 3.16	6.200	6.500	8.000	7.000	6.000	7.000	6.750	5.400	6.6062
(EOC) 3.17	6.200	6.833	6.250	6.500	7.500	7.000	6.688	5.600	6.5713
(EOC) 3.18	6.300	6.917	7.000	7.000	7.500	7.000	6.938	6.800	6.9318
(EOC) 3.19	6.700	6.750	6.750	7.000	7.000	7.000	6.750	6.600	6.8187
(EOC) 3.20	6.700	6.167	5.500	8.000	6.500	7.000	7.125	6.600	6.699
(EOC) 3.21	6.300	6.917	6.000	7.000	5.000	8.000	7.000	6.400	6.5771
(EOC) 3.22	5.950	6.750	6.500	4.000	6.500	8.000	6.500	6.200	6.3
(EOC) 3.23	5.900	6.250	8.250	4.000	5.500	8.000	6.625	6.600	6.3906
(EOC) 3.24	6.400	6.500	7.000	4.500	7.000	7.000	6.688	6.000	6.386
(ETC) 4.1	5.300	5.083	6.500	4.500	8.000	5.000	5.688	6.200	5.7838
(ETC) 4.2	5.350	5.167	6.250	4.500	4.000	6.000	6.125	6.600	5.499
(ETC) 4.3	5.900	4.750	5.500	3.500	2.000	5.000	4.813	6.600	4.7578
(ETC) 4.4	5.400	4.833	6.500	4.500	1.000	5.000	5.125	6.400	4.8447
(ETC) 4.5	6.150	5.833	7.750	4.000	6.000	6.000	6.500	6.400	6.0791
(ETC) 4.6	4.800	4.417	6.500	3.000	5.000	5.000	6.563	6.400	5.21
(ETC) 4.7	6.100	5.833	7.000	6.500	5.500	5.000	6.313	6.400	6.0807
(ETC) 4.8	5.500	4.667	4.750	7.000	5.000	6.000	6.375	6.200	5.6865
(ETC) 4.9	6.200	6.750	5.000	3.000	2.500	6.000	6.063	6.600	5.2641
(ETC) 4.10	6.250	6.667	6.250	5.000	6.500	7.000	7.563	7.000	6.5287
(ETC) 4.11	6.450	7.083	6.500	5.500	8.000	8.000	7.438	6.400	6.9213
(ETC) 4.12	6.400	6.417	7.000	5.500	7.000	8.000	7.000	6.000	6.6646
(ETC) 4.13	6.600	5.917	6.750	5.000	7.500	7.000	6.688	4.200	6.2068
(ETC) 4.14	5.850	5.583	6.250	4.500	5.000	7.000	6.938	5.400	5.8151
(ETC) 4.15	6.100	5.500	6.500	3.000	5.500	7.000	6.500	6.400	5.8125
(ETC) 4.16	6.250	5.583	6.500	4.000	5.500	7.000	6.750	6.400	5.9978
(ETC) 4.17	5.550	6.167	7.500	5.000	4.500	7.000	6.625	7.000	6.1677
(ETC) 4.18	6.000	5.667	7.000	4.500	5.000	7.000	7.250	7.200	6.2021
(ETC) 4.19	5.700	5.167	5.750	4.000	4.500	7.000	6.313	6.200	5.5787
(ETC) 4.20	6.100	5.750	6.250	5.000	6.000	9.000	6.688	6.600	6.4235
(ETC) 4.21	6.150	5.917	6.500	5.000	5.000	8.000	6.875	6.800	6.2802
(ETC) 4.22	6.200	5.583	7.500	4.000	6.500	8.000	6.250	6.600	6.3291
(ETC) 4.23	6.550	5.833	6.250	4.000	3.500	8.000	5.813	6.200	5.7682
(ETC) 4.24	5.300	6.167	6.750	3.500	6.000	8.000	6.250	5.400	5.9208

The SOLVER in EXCELL was used to determine optimal weights linear optimization and optimal value i.e., consistency index value. In this context see Table 7 which

depicts the results of optimal weight, performance, and gap. The local weight of each sub-criterion in the respective to the main criterion theme is determined to evaluate the importance of each criterion.

Results details of the BWM-mV model (Research Objective -5)

Table 7: Calculation results of the BWM-mV model

Main Criteria Dimension	Sub-Criteria	Local Weights	Performance	Gap
Strengths (D1)	Infrastructure development. (1.1)	0.025	5.548	0.894
	Economic feasibility. (1.2)	0.035	5.839	0.571
	Increase exports. (1.3)	0.030	5.71	0.714
	Increase employment. (1.4)	0.089	6.145	0.233
	Trade cooperation. (1.5)	0.089	6.145	0.233
	Cultural friendliness. (1.6)	0.022	5.452	1.000
	Energy demand fluffiness. (1.7)	0.089	6.29	0.072
	Technology diffusion. (1.8)	0.089	6.048	0.340
	Enhance foreign investment. (1.9)	0.089	6.145	0.233
	Geostrategic position. (1.10)	0.111	6.355	0.000
	Centralized planning and decentralized implementation	0.111	5.484	0.965
	Mutual defense and Strategic cooperation. (1.12)	0.111	5.677	0.751
	Dedicated leadership (e.g. Ten Billion Tree Tsunami Programme). (1.13)	0.111	6.194	0.178
Weaknesses (D2)	Political instability. (C2.1)	0.050	5.903	0.296
	Political willingness. (C2.2)	0.050	6.000	0.222
	Financial constraints. (C2.3)	0.050	6.032	0.198
	Corruption. (C2.4)	0.050	5.887	0.309
	Affected local industries. (C2.5)	0.038	5.871	0.321
	Lack of good governance in general (C2.6)	0.050	5.919	0.284
	Lack of good EG. (C2.7)	0.050	6.000	0.222
	Lack of technical skill labour. (C2.8)	0.019	5.468	0.630
	Increase dependency on China. (C2.9)	0.006	4.984	1.000
	Long-term queued development. (2.10)	0.025	5.597	0.531
	Increase environmental and health issues. (2.11)	0.075	6.177	0.086
	Security issues. (C2.12)	0.050	5.919	0.284
	Cultural issues. (C2.13)	0.021	5.548	0.568

	Weak institutional setup for environmental protection and CC (C2.14)	0.038	5.790	0.383
	Dumping. (C2.15)	0.050	5.968	0.247
	CC and Environmental concerns. (C2.16)	0.075	6.161	0.099
	Technological inefficiencies. (C2.17)	0.102	6.290	0.000
	Lack of mechanism to transform Special Economic Zones into Eco-Industrial Park. (C2.18)	0.075	6.113	0.136
	Lack of transparency and non-availability of clear information about China -Pakistan cooperation and initiatives to make CPEC a green development. (C2.19)	0.050	5.952	0.259
	Long-awaited policy document revision/update (e.g NEP 2005 & National Maritime Policy 2002). (C2.20)	0.075	6.274	0.012
Opportunities (D3)	Economic empowerment. (C3.1)	0.021	6.145	0.804
	Economic stabilization. (C3.2)	0.017	6.081	0.891
	Foreign investment. (C3.3)	0.021	6.194	0.739
	Mutual trade gain. (C3.4)	0.015	6.000	1.000
	Private sector development. (C3.5)	0.026	6.274	0.630
	Expanding business opportunities. (C3.6)	0.035	6.419	0.435
	Less transportation cost. (C3.7)	0.021	6.210	0.717
	Transportation development. (C3.8)	0.035	6.435	0.413
	Timesaving. (C3.9)	0.021	6.226	0.696
	Direct access to trade through the sea route. (C3.10)	0.026	6.242	0.674
	Access to the financial market. (C3.11)	0.026	6.306	0.587
	Overcome energy shortfall. (C3.12)	0.052	6.597	0.196
	Industrial development. (C3.13)	0.052	6.710	0.043
	Advancement in technology. (C3.14)	0.052	6.694	0.065
	Decrease travel distance. (C3.15	0.026	6.242	0.674
	Entrepreneurship. (C3.16)	0.035	6.484	0.348
	Increase in exports. (C3.17)	0.035	6.468	0.370
	Increase job opportunities. (C3.18)	0.067	6.742	0.000
	Regional connectivity. (C3.19)	0.067	6.742	0.000
	Overcome energy crises. (C3.20)	0.052	6.661	0.109

	Development of Gwadar (Maritime economic development). (C3.21)	0.075	6.597	0.196
	Capacity-building initiatives. (C3.22)	0.075	6.290	0.609
	Tourism sector promotion. (C3.23)	0.075	6.323	0.565
	Promote cooperation on infrastructure, transportation, industrial Gwadar, collaboration, and energy security through CPEC. (C3.24)	0.075	6.468	0.370
Threats (D4)	Local Business losses. (C4.1)	0.020	5.565	0.779
	Financial threats to local industries. (C4.2)	0.020	5.613	0.750
	Kashmir issue, especially Indian stance on Gilgit- Baltistan, a gateway of CPEC. (C4.3)	0.020	5.210	0.990
	Geo-political threats to regional countries like India. (C4.4)	0.020	5.194	1.000
	Economic issues. (C4.5)	0.030	6.226	0.385
	Cultural issues. (C4.6)	0.020	5.371	0.894
	Security issues. (C4.7)	0.030	6.161	0.423
	Dependency on China. (C4.8)	0.020	5.613	0.750
	Corruption. (C4.9)	0.022	6.000	0.519
	Environmental impacts. (C4.10)	0.090	6.710	0.096
	Natural resources exploitation. (C4.11)	0.120	6.871	0.000
	CC disaster concerns (e.g., potential threat to ecosystem, biodiversity and Northern area glaciers melting). (C4.12)	0.060	6.581	0.173
	Incoherent Policies. (C4.13)	0.036	6.290	0.346
	Capital outflow. (C4.14)	0.022	6.016	0.510
	Intra-regional conflicts. (C4.15)	0.022	6.032	0.500
	Extremism and Terrorism. (C4.16)	0.030	6.194	0.404
	Inter-provincial dispute on CPEC route and Environmental Concerns. (C4.17)	0.030	6.161	0.423
	18th Constitutional Amendment of Pakistan and environmental protection (e.g marine resource conservation and Marine Pollution). (C4.18)	0.036	6.355	0.308
	The overlapping mandate of the Federal and Provincial authorities to tackle marine pollution and Life Below Water. (C4.19)	0.020	5.726	0.683
	Inconsistencies in EG. (C4.20)	0.030	6.242	0.375

	Mistrusted inter-Provincial and Federal harmony in CPEC plan implementation. (C4.21)	0.075	6.323	0.327
	Law and order situation in Baluchistan Province. (C4.22)	0.075	6.177	0.413
	Political instability in Afghanistan (C4.23)	0.075	6.016	0.510
	COVID-19. (C4.24)	0.075	5.823	0.625

The criteria were ranked in descending order to indicate their importance (weight value). In this context, analysis indicates that criteria related to internal strength (IS) for example, (ISC 1.13), (ISC 1.12), (ISC 1.11), and (ISC 1.10) were the most important criteria followed by (ISC 1.5), (ISC 1.4), (ISC 1.8), and (ISC 1.9). Similarly, in the context of internal weakness (IW), the criteria (IWC 2.17) were the most important followed by (IWC 2.18), (IWC 2.11), (IWC 2.16), (IWC 2.20), and (IWC 2.7) respectively. Regarding external opportunities (EO) related criteria, analysis indicates that (EOC 3.21) is the most important criteria followed by (EOC 3.22), (EOC 3.23), (EOC 3.24), (EOC 3.19) and (EOC 3.18). Similarly, external threat (ET) related criteria, analysis ranked the criteria (ETC 4.11) as the most important followed by criteria of (ETC 4.10), (ETC 4.21), (ETC 4.22), (ETC 4.23), (ETC 4.24), and (ETC 4.12).

In the context of gap value, the analysis indicates that criteria related to internal strength were ranked and followed in descending order of (ISC 1.6), (ISC 1.11), (ISC 1.1), (ISC 1.12), (ISC 1.3]) and (ISC 1.2) respectively. Similarly, analysis shows that internal weakness-related criteria (IWC 2.9) were the most important followed by (IWC 2.8), (IWC 2.13), (IWC 2.10), (IWC 2.14), (IWC 2.5) and (IWC 2.4) respectively. Regarding external opportunities criteria analysis, ranked the criteria i.e (EOC 3.4) the most important followed by (EOC 3.2), (EOC 3.1), (EOC 3.3), (EOC 3.7) and (EOC 3.9). Similarly, in context, external threat criteria (ETC) were ranked as follows in descending order (ETC 4.4), (ETC 4.3), (ETC 4.6), (ETC 4.1) and (ETC 4.2) respectively.

Similarly, the consistency index value for the main criteria and sub-criteria are shown in Table 8. A consistency index value is developed to check the reliability of the final results. A value close to zero is desired for consistency. These values are close to zero, which shows a high degree of consistency (see Table 8) and lastly, the utility group is established (see Table 9)

Table 8: Consistency index (CI) value

Strength	Weakness	Opportunity	Threat
0.067	0.048	**0.037**	0.060

Table 9: Group utility

Strength	Weakness	Opportunity	Threat
0.395	0.211	0.365	0.395