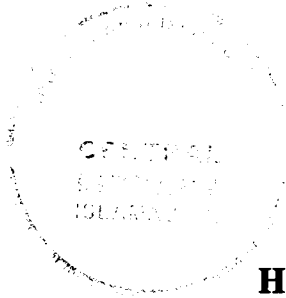


**IMPACT OF 18TH AMENDMENT ON
ENVIRONMENTAL GOVERNANCE IN
PAKISTAN**



PhD Thesis

Hafiz Muhammad Naseer
Reg. No. 12-FBAS/PHDES/F13

**DEPARTMENT OF ENVIRONMENTAL SCIENCE
FACULTY OF BASIC AND APPLIED SCIENCES
INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD
PAKISTAN**

2022

Accession # TH 27299 K.

PhD

363.7
NUI

Environmental policy - Pakistan

" Law - "

Decentralization in government - "

Constitutional amendments - "

Pakistan. Constitution (1973). Eighteenth Amendment

Environmental protection Pakistan

**IMPACT OF 18TH AMENDMENT ON
ENVIRONMENTAL GOVERNANCE IN
PAKISTAN**



PhD Thesis

Hafiz Muhammad Naseer
Reg. No. 12-FBAS/PHDES/F13

Supervisor

Dr. Muhammad Irfan Khan
Professor

**DEPARTMENT OF ENVIRONMENTAL SCIENCE
FACULTY OF BASIC AND APPLIED SCIENCES
INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD
PAKISTAN**

2022

**IMPACT OF 18TH AMENDMENT ON
ENVIRONMENTAL GOVERNANCE IN PAKISTAN**



*A thesis submitted to the
Department of Environmental Science,
Faculty of Basic and Applied Sciences in partial fulfillment of the
requirement for the award of degree of Doctor of Philosophy,
International Islamic University, Islamabad.*

By

Hafiz Muhammad Naseer
Reg. No. 12-FBAS/PHDES/F13

Supervisor

Dr. Muahmmad Irfan Khan
Professor

**DEPARTMENT OF ENVIRONMENTAL SCIENCE
FACULTY OF BASIC AND APPLIED SCIENCES
INTERNATIONAL ISLAMIC UNIVERSITY, ISLAMABAD
PAKISTAN**

2022

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**IN THE NAME OF ALLAH,
THE MOST GRACIOUS, THE MOST MERCIFUL**

وَأَمَّا مَا يَنْفَعُ النَّاسَ فَيَمْكُتُ فِي الْأَرْضِ كَذَلِكَ يَضْرِبُ اللَّهُ الْأَمْثَالَ

**“What is Beneficial to the People Endures in the Earth.
That is how ALLAAH Illustrates Examples.”
(Al-Quran: Al-Ra‘d-13:17)**

INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD

Faculty of Basic and Applied Sciences

Department of Environmental Science

Dated: 11-05-2022

FINAL APPROVAL

This is to certify that the research work presented in this thesis, entitled “**IMPACT OF 18th AMENDMENT ON ENVIRONMENTAL GOVERNANCE IN PAKISTAN**” was conducted by **Mr. Hafiz Muhammad Naseer Reg# 12/FBAS/PhDES/F13** under the supervision of Prof. Dr. Muhammad Irfan Khan. This thesis is submitted to the Department of Environmental Science after receiving “Pass” comments by two foreign evaluators and acceptance of the Doctoral Advisory Committee, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Environmental Science. No part of this thesis has been submitted anywhere else for any other degree.

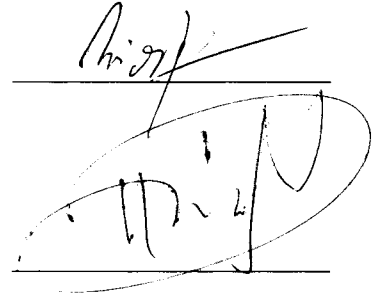
COMMITTEE

Supervisor

(Dr. Muhammad Irfan Khan)

Professor

Department of Environmental Science, IIU

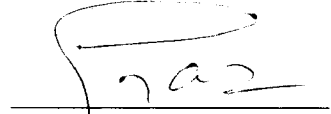


Internal Examiner

(Dr. Islam-Ud-Din)

Assistant Professor

Department of Environmental Science, IIU

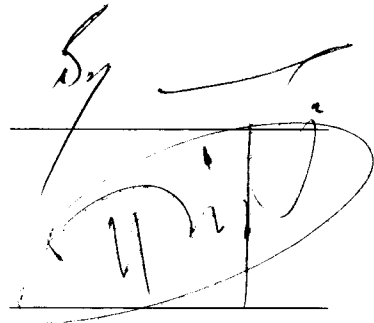


External Examiner

(Prof. Dr. Afsar Mian)

Former Dean, F/O Sciences

University of Agriculture, Rawalpindi

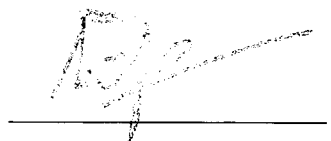


External Examiner

(Prof. Dr. Muazzam Nizami)

Chairman, Forestry and Wildlife Management

Department, University of Haripur



Incharge, DES

(Dr. Islam-Ud-Din)

Assistant Professor

IIUI

Dean, FBAS

(Professor. Dr. Muhammad Irfan Khan)

Faculty of Basic and Applied Sciences

IIUI

DECLARATION

I, Hafiz Muhammad Naseer, candidate for the PhD in the Department of Environmental Science, enrolled under Registration No. 12-FBAS/PHDES/F13, hereby declare that the knowledge contributed by analyses of data collected and results derived to draw conclusion presented in this thesis titled “IMPACT OF 18TH AMENDMENT ON ENVIRONMENTAL GOVERNANCE IN PAKISTAN” 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, two research articles from this research thesis have been published:

1. Education Policy Coherence with Environmental Governance Mechanism after 18th Constitutional Amendment in Pakistan, Volume 19(4), Ilkogretim Online 19(4), recognized by HEC and listed as “X” category in HJRS 2020, and
2. Challenges of Environmental Governance for Protection of World Cultural and Natural Heritage Sites, Volume 17(9), PalArch’s Journal of Archaeology of Egypt/ Egyptology recognized by HEC and listed as “Y” category in HJRS 2020.

Date: 12-05-2022

Deponent
Hafiz Muhammad Naseer

FORWARDING SHEET BY RESEARCH SUPERVISOR

The thesis entitled “Impact of 18th Amendment on Environmental Governance in Pakistan” submitted by PhD Candidate Hafiz Muhammad Naseer (Registration Number: 12-FBAS/PHDES/F13) in partial fulfillment of PhD degree in Environmental Science has been completed under my guidance and supervision. The thesis has been evaluated by two experts in the field from Australia and United Kingdom. Their suggestions have been incorporated in this updated manuscript. He has defended his thesis before the Doctoral Thesis Review Committee. He has also published research articles in “X” category journal. I am satisfied with the quality of student’s research work and allow him to submit his thesis for local evaluation and further processing required for award of PhD Degree in Environmental Science as per academic regulations of International Islamic University, Islamabad.

Dr. Muhammad Irfan Khan
Professor
Department of Environmental Science
International Islamic University
Islamabad

DEDICATION

I dedicate this effort to my late parents (Ghulam Ayesha - Ammi G & Hazrat Maulana Muhammad Amir - Abbu G), respected teachers, fellows & friends and family members (Brothers; Qari Abdul Kareem, Abdul Aleem & Muhammad Munir, Sisters; Atiya Bibi, Raziya Bibi, Sumayya Bibi, Maimoona Bibi & Rehana Bibi, Wife; Mrs. Aneesa Bibi and Loving Daughters; Safiyah Eemaan, Musfirah Eeqaan and Onaisah Naseer.

Hafiz Muhammad Naseer

ACKNOWLEDGMENTS

I am very grateful to *ALLAAH, THE ALMIGHTY* for without His Grace and Countless Blessings, this study would not have been possible. Countless Peace and Mercy be upon The Last Prophet *Hazrat Muhammad (Peace be Upon Him)*, Who is the Bright Source of beneficial and fruitful knowledge for the whole universe.

I would like to express my sincere & heartiest gratitude to my supervisor *Prof. Dr. Muhammad Irfan Khan*, the founder of the Department of Environmental Science and Dean Faculty of Basic and Applied Sciences IIUI for his continuous support during my Ph.D study and research, for his patience, motivation, enthusiasm and immense knowledge.

I would like to extend deepest gratitude to my former teachers; *Prof. Dr. Zafar Mahmood Khalid, Prof. Dr. Javed Iqbal Qazi, Dr. M. Afzal Ghauri and Dr. Shahid Baig* for my support.

Acknowledgements are also due to the Head of the Department of Environmental Science, *Dr. Islamud Din* and to my all fellows, colleagues and friends including; *Dr. Kanwar Muhammad Javed Iqbal, Dr. Nadia Akhtar, Dr. Anwar Ghani, Dr. Zafeer Saqib, Dr. Maria Ali, Dr. Asma Gul, Mr. Haseeb Sajjad, Dr. Syed M. Saqlain, Dr. Asad Ghufuran, Dr. Sarah Amir, Dr. Bashir Ahmad, Dr. Asif Mir, Dr. Ali Imran Bokhari, Dr. Abdul Wahab Jan, , Dr. Shaheen, and Dr. Shaista Shahzada for their guidance and consistent moral support and encouragement.*

I am also thankful to all the staff at the Department of Environmental Science including Mr. Mujeeb Gul, Mr. Hafiz Abid Ur Rehman, and Mr. Munawar Shah.

Last, but not the least, I would also like to say special thanks to my wife who has supported me patiently during completion of this task.

H. M. Naseer

ABSTRACT

The governance comprises of policy, legal and institutional frameworks. Many states around the world are not recognizing their environmental responsibility towards citizens 'environmental rights' as part of what constitutes 'human rights' for improving environmental governance. Policies, laws and institutions dealing with protection and conservation of environment constitute the framework of environmental governance. Pakistan although developed a reasonable framework of environmental governance but due to political instability and constitutional amendments, the framework of environmental governance has also gone many changes, hence it could not achieve desired objectives. In 2010, the parliament of Pakistan devolved dealing of some subjects including environment: pollution and ecology to provinces under 18th amendment in the Constitution of Pakistan, 1973. After this amendment, provinces were given authority to legislate for environmental protection in their jurisdiction. This study is aimed at exploring whether this amendment brought positive impact on environmental governance in Pakistan over a decade or not? For this purpose, six criteria with twenty indicators for assessing environmental governance were set at federal, provincial, local levels. Data were collected through a field survey on a structured questionnaire cum MCDA's SAMRT scoring matrix using six criteria and twenty indicators. Results were validated by Kruskal-Wallis test for examining normality of sample by looking at diversity of responses by the respondents. Pearson Correlation test was performed for understanding the interlocking of different variables (criteria) of the study. Principal Component Analysis was carried out to overcome the challenge of multi-col-linearity at three different tiers of governance and analyzed and presented as Scree and Bi-plot. Environmental Governance Index Score at Federal remained at top among all constituencies for all criteria from C1 to C6 except C4-Adequate Institutional Capacity where provinces achieved a little bit more score getting better position. Based on the results, the study concluded that environmental protection and conservation performance in terms of pollution control, climate action, urban planning, sustainable resource exploitation, and green growth is found poor, which may be a result of weak enforcement of environmental protection rules and regulations due to inadequate institutional capacity, lack of clarity in institutional mandates, poor coordination among federal and provincial bodies, and lack of horizontal and vertical coherence. In a nutshell it is deciphered that

the 18th constitutional amendment could not bring desired positive impacts in the last ten years. Finally, the study also suggested some measures to improve environmental governance in Pakistan.

Contents

List of Figures	ix
List of Tables	xi
List of Acronyms	xiii
1 INTRODUCTION	1
1.1 Environmental Governance	1
1.2 Background	2
1.3 Context of the Study	7
1.3.1 Pre 18th Amendment Phase	7
1.3.2 Post 18th Amendment Phase	8
1.4 Problem Statement	8
1.5 Research Question	9
1.6 Aim and Objectives	9
1.7 Significance of the Study	10
1.8 Organization of the Thesis	11
2 LITERATURE REVIEW	12
2.1 Environmental Governance	12
2.1.1 Governance and Environmental Governance	13
2.1.2 Environmental Governance Approaches	21
2.1.3 Environmental Governance – A Multi-Level Process	25
2.1.4 Factors Affecting Environmental Governance	30
2.1.5 Social Aspect of the Nexus of Environmental Governance & Heritage Preservation	31

2.2	State of Environmental Governance of Developed Countries	32
2.3	State of Environmental Governance in Developing Countries	35
2.4	Environmental Governance System in Pakistan: (Policy, Legal and Institutional Arrangements at National, Sub-national and District Stages) .	38
2.4.1	Multilateral Environmental Agreements of Pakistan	43
2.4.2	18th Constitutional Amendment and the Case of Environmental Governance in Pakistan	44
2.4.3	Education Policy and Environmental Governance After 18th Amendment in Pakistan	47
2.5	Synthesis from Literature Review	47
3	RESEARCH METHODS	50
3.1	Context and Scope	50
3.2	Study Area	51
3.2.1	The Government of Pakistan	51
3.2.2	Constitutional Status of Provinces and Other Administrative Areas	53
3.2.3	Khyber Pakhtunkhwa	55
3.2.4	Punjab	58
3.2.5	Sindh	59
3.2.6	Balochistan	62
3.2.7	Azad Jammu and Kashmir	64
3.2.8	Gilgit-Baltistan	66
3.2.9	Jurisdictional and Territorial Scope	68
3.3	Research Approaches, Methods and Procedures	68
3.3.1	Document Study	69
3.3.2	Secondary Data Collection	70
3.3.3	Selection of Criteria and Indicators	70
3.3.4	Assigning Criteria Score	72
3.3.5	Primary Data Collection Procedure	72
3.3.6	Data Entry, Cleaning and Analysis	78
3.3.7	Statistical Analysis	78

4	RESULTS: PART-I: ENVIRONMENTAL GOVERNANCE FRAMEWORK	82
4.1	General Summary	82
4.2	Environmental Governance Framework of Pakistan	83
4.2.1	The Federal Context - Federal Capital Islamabad	83
4.2.2	Khyber Pakhtunkhwa Environmental Governance Framework	88
4.2.3	Punjab Environmental Governance Framework	90
4.2.4	Sindh Environmental Governance Framework	96
4.2.5	Environmental Governance Framework in Balochistan	98
4.2.6	Environmental Governance Framework in Azad Jammu and Kash- mir	106
4.2.7	Gilgit Baltistan Environmental Governance Framework	107
4.3	Discussion: Post 18th Amendment Contextual Analysis of Environ- mental Governance Framework in Pakistan	110
4.4	Conclusion: Post 18th Amendment Contextual Analysis of Environ- mental Governance Framework in Pakistan	114
5	RESULTS: PART-II: ENVIRONMENTAL GOVERNANCE INDEX	116
5.1	Environmental Governance Index: An Overview of Pakistan	116
5.2	Statistical Validation of Results	118
5.3	Province wise Breakdown of Environmental Governance Indices in Pak- istan	127
5.3.1	Environmental Governance Index of Province Punjab	127
5.3.2	Environmental Governance Index of Province Sindh	129
5.3.3	Environmental Governance Index of Province Balochistan	130
5.3.4	Environmental Governance Index of Province Khyber Pakhtunkhwa	131
5.3.5	Environmental Governance Index of Azad Jammu and Kashmir	132
5.3.6	Environmental Governance Index of Gilgit-Baltistan	132
5.4	Environmental Governance in Pakistan after 18th Amendment	136
5.4.1	Criteria 1: Clarity of Mandates	140
5.4.2	Criteria 2: Environmental Governance Framework	141
5.4.3	Criteria 3: Regulatory Framework	141
5.4.4	Criteria 4: Adequate Institutional Capacity	142

5.4.5	Criteria 5: Harmonized Arrangements	142
5.4.6	Criteria 6: Performance	143
5.5	State of Environmental Governance in Khyber Pakhtunkhwa	144
5.5.1	Criteria 1: Clarity of Mandates	144
5.5.2	Criteria 2: Environmental Governance Framework	145
5.5.3	Criteria 3: Regulatory Framework	145
5.5.4	Criteria 4: Institutional Capacity of Provinces	146
5.5.5	Criteria 5: Harmonized Arrangements	146
5.5.6	Criteria 6: Performance	146
5.6	State of Environmental Governance in Punjab	147
5.6.1	Criteria 1: Clarity of Mandates	147
5.6.2	Criteria 2: Environmental Governance Framework	148
5.6.3	Criteria 3: Regulatory Framework	148
5.6.4	Criteria 4: Institutional Capacity of Provinces	149
5.6.5	Criteria 5: Harmonized Arrangements	149
5.6.6	Criteria 6: Performance	150
5.6.7	State of Environmental Governance in Selected Districts of Punjab	150
5.7	State of Environmental Governance in Sindh	151
5.7.1	Criteria 1: Clarity of Mandates	151
5.7.2	Criteria 2: Environmental Governance Framework	151
5.7.3	Criteria 3: Regulatory Framework	152
5.7.4	Criteria 4: Institutional Capacity of Provinces	152
5.7.5	Criteria 5: Harmonized Arrangements	153
5.7.6	Criteria 6: Performance	153
5.7.7	State of Environmental Governance in Selected Districts of Sindh	153
5.8	State of Environmental Governance in Balochistan	154
5.8.1	Criteria 1: Clarity of Mandates	154
5.8.2	Criteria 2: Environmental Governance Framework	155
5.8.3	Criteria 3: Regulatory Frameworks	156
5.8.4	Criteria 4: Institutional Capacity of Provinces	156
5.8.5	Criteria 5: Harmonized Arrangements	157

5.8.6	Criteria 6: Performance	158
5.8.7	State of Environmental Governance in Selected Districts of Balochistan	158
5.9	State of Environmental Governance in Azad Jammu and Kashmir	159
5.9.1	Criteria 1: Clarity of Mandates	159
5.9.2	Criteria 2: Environmental Governance Framework	159
5.9.3	Criteria 3: Regulatory Framework	159
5.9.4	Criteria 4: Institutional Capacity of Provinces	160
5.9.5	Criteria 5: Harmonized Arrangements	160
5.9.6	Criteria 6: Performance	160
5.9.7	State of Environmental Governance in Selected Districts of AJK	160
5.10	State of Environmental Governance in Gilgit-Baltistan	161
5.10.1	Criteria 1: Clarity of Mandates	161
5.10.2	Criteria 2: Environmental Governance Framework	162
5.10.3	Criteria 3: Regulatory Framework	162
5.10.4	Criteria 4: Institutional Capacity of Provinces	162
5.10.5	Criteria 5: Harmonized Arrangements	163
5.10.6	Criteria 6: Performance	163
6	DISCUSSION	165
6.1	Discussion	165
6.2	Analysis	167
7	CONCLUSIONS AND RECOMMENDATIONS	169
7.1	Conclusions	169
7.2	Recommendations	171
	Bibliography	172
	Appendices	198
	Annexures	211

List of Figures

2.1	Conceptual Framework of Environmental Governance	22
2.2	Level of Governance	26
3.1	Political Map of Pakistan	52
3.2	Map of Province Khyber Pakhtunkhwa of Pakistan	56
3.3	Map of Province Punjab of Pakistan	59
3.4	Organogram of Secretariat Punjab Assembly	60
3.5	Map of Province Sindh of Pakistan	61
3.6	Map of Province Balochistan of Pakistan	63
3.7	Map of Azad Jammu and Kashmir, Pakistan	65
3.8	Map of Gilgit Baltistan, Pakistan	67
3.9	Flow Chart of Research Design for the Study	69
4.1	Organizational Hierarchy of MOCC	84
4.2	Organogram of Department of Forestry, Environment and Wildlife	88
4.3	Organogram of EPA-KP, Government of KP	90
4.4	Organogram of EPA, Punjab	93
4.5	Organogram of ECC & CDD, Government of Sindh	97
4.6	Organogram of SEPA	98
4.7	Organogram of Department of Environment, Sports and Youth Affairs, Balochistan	101
4.8	Organogram of Balochistan Environmental Protection Council	102
4.9	Organogram of BEPA, Government of Balochistan	104
5.1	Criteria based Index of Environmental Governance in Pakistan	119

5.2	Criteria wise and Constituency wise Overall Environmental Governance Index	120
5.3	Radar of Environmental Governance Index at Different Constituencies .	121
5.4	Constituency wise Environmental Governance Index; Federal & Provincial Levels	122
5.5	Environmental Governance Index of Pakistan: District Level	123
5.6	Pearson Correlations for Environmental Governance in Pakistan	123
5.7	Scree plot for Selecting the Desired PCs.	126
5.8	Biplot of First Two PCs.	164

List of Tables

3.1	Formulated Criteria and Indicators for the Study	70
3.2	SMART Scoring Questionnaire cum Matrix.	74
3.3	Sampling Locations for the Study	78
4.1	Environmental Policies, Acts, Rules and Regulations Enacted in Federal Capital Islamabad after 18th Amendment	87
4.2	Environmental Policies, Acts, Rules and Regulations in Khyber Pakhtunkhwa after 18th Amendment 91	
4.3	Environmental Policies, Acts, Rules and Regulations in Punjab after 18th Amendment	94
4.4	Environmental Policies, Acts, Rules and Regulations in Sindh after 18th Amendment	99
4.5	Environmental Policies, Acts, Rules and Regulations in Balochistan after 18th Amendment	105
4.6	Environmental Policies, Acts, Rules and Regulations in AJK after 18th Amendment	107
4.7	Environmental Policies, Acts, Rules and Regulations in Gilgit Baltistan after 18th Amendment	109
5.1	Environmental Governance Index of Pakistan	117
5.2	Summary of KW Test Results based on Governance's tiers	121
5.3	Summary of KW Test Results based on Respondents' Gender	122
5.4	Pearson Correlations (Criteria wise) for Environmental Governance	124
5.5	Summary of Statistics of Principal Components (PCs)	125

5.6	All the Six PCs associated with 6 criteria (variables)	125
5.7	Environmental Governance Index of Province Punjab	128
5.8	Environmental Governance Index of Province Sindh	129
5.9	Environmental Governance Index of Province Balochistan	130
5.10	Environmental Governance Index of Province KP	132
5.11	Environmental Governance Index of Province AJK	133
5.12	Environmental Governance Index of Province GB	133

List of Acronyms

AJK	Azad Jammu and Kashmir
AJK-EPA	Azad Jammu and Kashmir Environmental Protection Agency
AJK-EPC	Azad Jammu and Kashmir Environmental Protection Council
AJKEQS	Azad Jammu and Kashmir Environmental Quality Standards
ANOVA	Analysis of Variance
APIs	Areas of Particular Importance for Biodiversity & Ecosystem Services
BEPA	Balochistan Environmental Protection Agency
BEPC	Balochistan Environmental Protection Council
BEQS	Balochistan Environmental Quality Standards
BTS	Base Transceiver Station
CCD	Climate Change Division
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CM	Chief Minister
CSCCC	Civil Society Coalition for Climate Change
CSR	Corporate Social Responsibility
DG	Director General

E	East
ECC & CDD	Environment, Climate Change and Coastal Development Department
EDO	Executive District Officer
EHI	Environmental Health Index
EIA	Environmental Impact Assessment
ENGOS	Environmental Non-Governmental Organizations
EP	Environmental Performance
EPA	Environmental Protection Agency
EPAs	Environmental Protection Agencies
EPCO	Environmental Pollution Control Organization
EPCs	Environmental Protection Councils
EPD	Environmental Protection Department
EPI	Environmental Performance Index
EPO	Environmental Protection Order
ERI	Environmental Rights Initiative
EVI	Ecosystem Vitality Index
FANA	Federally Administered Tribal Areas
FATA	Federally Administered Tribal Areas
FLL	Federal Legislative List

GB	Gilgit-Baltistan
GB-EPA	Gilgit Baltistan Environmental Protection Agency
GB-EPC	Gilgit Baltistan Environmental Protection Council
GBEQS	Gilgit-Baltistan Environmental Quality Standards
GCISC	Global Change Impacts Studies Centre
GEG	Global Environmental Governance
GHGs	Greenhouse Gases
Govt.	Government
HDI	Human Development Index
HEC	Higher Education Commission
HP & EP	Housing, Physical and Environmental Planning
ICT	Islamabad Capital Territory
IEE	Initial Environmental Examination
IRF	Islamic Relief Fund
IUCN	International Union for Conservation of Nature and Natural Resources
IWMB	Islamabad Wildlife Management Board
KII	Key Informant Interviews
KP	Khyber Pakhtunkhwa
KP-EPA	Khyber Pakhtunkhwa Environmental Protection Agency

KPEQS	Khyber Pakhtunkhwa Environmental Quality Standards
KW Test	Kruskal Wallis Test
LCA	Life Cycle Assessment
LEG	Local Environmental Governance
LG	Local Government
LGO	Local Government Ordinance
LEG	Local Environmental Governance
MDGs	Millennium Development Goals
MEA	Multilateral Environmental Agreement
MEAs	Multilateral Environmental Agreements
MinFAL	Ministry of Food, Agriculture and Livestock
MOCC	Ministry of Climate Change
MoE	Ministry of Environment
N	North
NBC	National Biosafety Centre
NCS	National Conservation Strategy
NDRMF	National Disaster Risk Management Fund
NEAP	National Environmental Action Plan
NEECA	National Energy Efficiency and Conservation Authority
NEG	National Environmental Governance

NEP	National Environment Policy
NEQS	National Environmental Quality Standards
NFC	National Finance Commission
NGO	Non-Governmental Organization
NWFP	North-West Frontier Province
P & D	Planning and Development
Pak-EPA	Pakistan Environmental Protection Agency
PB	Planetary Boundaries
PC	Principle Component
PC*	Pearson Correlation
PCA	Principal Component Analysis
PEPA	Pakistan Environmental Protection Act
PEPC	Pakistan Environmental Protection Council
PEPO	Pakistan Environmental Protection Ordinance
PEQS	Punjab Environmental Quality Standards
PM	Prime Minister
PPAF	Pakistan Poverty Alleviation Fund
R&D	Research and Development
RD	Rural Development
S	South

S & GAD	Secretary Services and General Administration Department
SACEP	South Asia Cooperative Environmental Program
SCDA	Sindh Coastal Development Authority
SDGs	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SEPA	Sindh Environmental Protection Agency
SEPC	Sindh Environmental Protection Council
SEPT	Sindh Environmental Protection Tribunal
SEQS	Sindh Environmental Quality Standards
UK	United Kingdom
UN	United Nation
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nation Conference on Environment and Development
UNCHE	United Nation Conference on the Human Environment
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nation Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
US	United States

W	West
WCS	World Conservation Strategy
ZSP	Zoological Survey of Pakistan

Chapter 1

INTRODUCTION

1.1 Environmental Governance

The concept of environmental governance emerged in political ecology (Cornea et al., 2017) and environmental policy (Driessen et al., 2012) that advocates for sustainable development as a way of managing all human activities including political and social as well as economic to exercise power over natural resources (Rist et al., 2007). The governance comprises of policy, legal and institutional frameworks (Wabelo, 2020). Hence, environmental policies, laws and institutions dealing with protection and conservation of environment constitute the framework of environmental governance (Gulbrandsen, 2010; Haas, 2015; Wabelo, 2020). This understanding of environmental governance helps to comprehend the role of state and government dealing with ecological, social and economic impacts of human activities in the context of sustainable development goals set for 2030 (Armitage et al., 2012b). The past three and a half decades have witnessed a dramatic rise in environmental concerns (Cohen, 2006). This is reflected not only in the growth of environmental consciousness in civil society and establishment of environmental institutions (Ho, 2001) but also in development of environmental policies, legislation, regulations and other interventions by states as well (Schwartz, 2004) as global instruments in the form of United Nations (UN) conventions and Multilateral Environmental Agreements (MEAs) (Wiersema, 2009). People have also understood the role of the state and its instruments for protection and conservation of environment

Armitage et al. (2012b). At the same time, awareness has also been raised among people about responsibilities of the state and rights of citizens to live in environmentally sound conditions to contribute in sustainable development.

United Nations Environmental Program (UNEP) launched the “Environmental Rights Initiative” (ERI) to underscore the primacy of the environment for a sustainable future at the 37th session of the Human Rights Council, held in Geneva on March 6, 2018. The initiative aimed at recognizing citizens’ environmental rights as part of what constitutes ‘human rights’ for improving environmental governance around the world considering that many states are not recognizing their environmental responsibility.

Pakistan has also developed a good framework of environmental governance in the last two and a half decades for protection and conservation of environment; and to deal with issues of climate change. But due to political instability and interventions in the constitutional framework by intermittent military rules and constitutional amendments, the framework of environmental governance has also gone through many changes.

1.2 Background

Environmental concerns attracted the world’s attention after a rapid increase in human population and sharp growth in industrialization resulting in various types and multi-forms of pollution at large and devastating climatic changes inclusive of all progressive developments across the biosphere. The first ever international environmental step taken was the United Nation Conference on the Human Environment held on 5-12 June, 1972 in Stockholm, Sweden, which lead to the foundation of United Nations Environment Program (UNEP).

This was the time when draft bill for Constitution of Pakistan, 1973 was under preparation, which was reviewed and signed by all political leaders on 20th October 1972 and resulted in declaration of adopting the constitution in the National Assembly of Pakistan on 2nd February 1973. The parliament ratified the constitution unanimously on 19th April 1973 and it came into force from 14 August 1973. While, the draft of the Constitution of Pakistan, 1973 was in the final stage, so no article pertinent to environmental protection, pollution control and management could be added in the main

text of the constitution. However, “Environmental Pollution and Ecology” were added in the “Concurrent Legislative List” given in the Fourth Schedule of the constitution made under section (1) of Article 70. It provided powers to both federation and the provinces to legislate on subjects mentioned in the list but no legislation was done both at Federal and Provincial level. The legislation at Federal level only was available till 18th amendment in the Constitution.

Initial framework of environmental governance in Pakistan could be traced back to Pakistan Environmental Protection Ordinance (PEPO) of 1983 promulgated by the military ruler of that time. It was considered as cornerstone of environmental legislation of the country at national level, where realm of laws go no further than the statutes book (Hassan, 1996). The Pakistan Environmental Protection Agency (Pak-EPA) was established in 1985 under the PEPO 1983. Following the continuity, in response to World Conservation Strategy (WCS) developed in 1980, documentation of National Conservation Strategy (NCS) started by the Environment and Urban Affairs Division of Federal Government of Pakistan in 1989 with technical assistance from International Union for Conservation of Nature (IUCN). The cabinet of Pakistan approved the NCS on 1st of March 1992 (Runnalls, 1995) which served as “De-facto Environmental Policy of Pakistan” till 2005, when National Environmental Policy was launched.

Later on, at the occasion of “UN Conference on Environment and Development (UNCED)” June 03 to 14, 1992, Pakistan again proved as a front-runner, Chaired G77 in the Earth Summit in Rio de Janeiro, Brazil (Kovar, 1993), the declaration of which is also known as Agenda 21, which emphasized balancing environment and development. At national level, Pakistan started the process of a comprehensive enactment by the parliament on environmental protection (Hassan, 2007). Hence, Pakistan Environmental Protection Act (PEPA) of 1997 was enacted by the parliament, which provides for establishment of Pakistan Environment Protection Council (PEPC) headed by the Prime Minister of Pakistan (Naureen, 2009). The PEPC approved the National Environmental Action Plan (NEAP) in 2001 (Hussain and Sabri, 2014). Thus Pakistan has established an upright framework of environmental governance over a period of almost twenty (20) years. NEAP successfully developed the National Environmental Policy of Pakistan in 2005 after thorough consultation with stakeholders which got published by Ministry of Environment (MoE), Pakistan (Bank, 2006).

Pakistan signed the Stockholm Declaration on 6th of December 2001, ratification made on 17th of April, 2008 and entered into force on 16th of July 2008 after the six-member delegation which participated in Stockholm Conference appraised the parliament on Stockholm declaration about management of human environment, on return to Pakistan (Yakubu, 2017).

Environmental governance in the constitution of Pakistan was lying under the provision of fundamental and basic human rights to the citizens and a framework did exist before the 18th amendment in the Constitution of 1973. The policy, law, rules and regulations on environment have been framed and institutions have also been established to achieve objectives of conservation, prevention, protection and rehabilitation of natural environment (Leach et al., 1999). Till 2010, the environmental governance framework of Pakistan was totally based on the legislation promulgated by federal government, while provincial environmental protection authorities were executing the rules and regulations provided by the federal government. Hence, there was no legislation and policies at provincial level in the subject of environment.

In 2010, the distinguished and historic 18th amendment, with variety of changes was carried out successfully by the parliament resulting in decentralization of authoritative powers to the provinces in different subjects, including environment and its concerned matters (Ali, 2015). Afterwards various complications and implications came at front both at federal and provincial levels. Till now, the environmental governance at provincial, sub provincial and local levels are striving hard to achieve the desired goals of environmental protection but are unable to present an agreeable circumstances even after a reasonable time period of ten (10) years of the amendment. The reflection of environmental issues in totality presents presence of variety of problems in the environmental governance of the country.

The eighteenth (18th) amendment, passed in 2010 was a step to refresh the federal framework and to search for the answers to questions about the citizens' rights for healthy living environment. According to the original constitution of 1973 which requires an active participation of citizens to claim their constitutional rights, states in Article 38 (a-f) about the provision of basic needs of the citizens with improved standard of living and equal opportunities. The entitlements is also required as it has become

more easier in the light of “Right to Information” and digital upraise providing a direct engagement in social media and through emails.

The concurrent legislative list with entries from one (1) to forty seven (47), including the entry number twenty four (24. Environmental Pollution and Ecology) from the Schedule-IV under article 70(4) stood omitted in the Constitution (Eighteenth Amendment) Act 10 of 2010. Thus, the provinces have the momentous opening to legislate in their matters like environment and enact laws as per powers vested in them for matter not falling in the federal concurrent list. After this, the provinces were supposed to develop their own environmental policies, legal and institutional framework. The 18th amendment, on one hand, has empowered the provincial units through decentralization of powers in terms of sanctioned with higher portion of assets and resources while on the other, it has taken aback the whole environmental governance framework of the country making it disorganized at large.

Ten years before the 18th amendment, a Local Government Ordinance (LGO) 2001 introduced devolution to district levels and set an Executive District Officer (EDO) Law responsible for the “Environment”. The LGO – 2001 was considered as weakening the provinces. In 2010, almost after a decade, provinces were strengthened at high pace including the fiscal resources under 18th amendment. Environmental governance framework including departments, institutes and organizations along with human resource, funds and responsibilities rerouted toward provincial and local boundaries from the federal center excluding the concerned existing in the jurisdiction of Islamabad Capital Territory (ICT). As a result, the provincial institutions were started to be restructured and reorganized. The relevant legislation and policy framework also started its developing phase in all provincial administrative units of the country.

It is a common understandings that the subsequently abolished PEPA 1997 for provinces of Pakistan left a constant and consistent impression to the environment of Pakistan. Post 18th amendment scenario has loudly raised the serious questions (Begum et al., 2018) to disclose the destiny of highly important sector attracting the worldwide attention especially, at the time when climatic changes are posing threats at high-point. After transference of supremacies to provinces and decentralization of authorities has rung the distressing bells not only at local, provincial or national level but also at inter-

national level (Mumtaz and Ali, 2019). It is an important question for experts of environmental governance to find out the most important and ultimate reforms necessarily required to right-size the federal capital and its provincial units to fortify environmental policies and governance framework in country with a fiscal discipline and self-restraint accountability.

Moreover, current situation also demands to assess whether provincial units are sufficiently prepared to transact with the challenges confronted subsequent to 18th amendment and how the provinces arrange the policy and legal framework following the establishment of institutions to frame rules and regulations. It is not an exception of assessing to what extent the provinces will be successful in removing the lacks of effective environmental governance framework and building the capacity of all infrastructure especially in challenging environmental circumstances when issues are exponentially evolving. The experts can also suggest better way if the provincial units will be putting the excuse of having reduced budget as compared to required one.

Globally, Pakistan is bound to various Bilateral and Multilateral Environmental Agreements (MEAs) which need uninterrupted arbitration and to address these, the execution chant is “Think Global, Act Local”. It gives an expression of importance and position of environmental concerns in the recent time. National bindings for MEAs, without any doubt, seek the joined promise and determination at national level to monitor and report particularly the issues beyond the lines of geographic boundaries.

Institutions always stand responsible for enforcement of law and implementation of policies that map the capacities of the institutions, as per governance framework, some principles are to be set at national level on which policies are made. To find out how successful was the policy and law, monitoring and evaluation is a way, which lies on some criteria and every criteria comprises indicator(s).

Thus after ten years of the 18th amendment in the Constitution of 1973 and over 37 years of promulgation of PEPO 1983, to provide the nation a future focused and challenging vision with realistic and unique mission, leading to a purposeful and effective policy of a longer time line, to set uniform and reasonable set of laws followed by the establishment of proactive institutions having complete set of rules and regulations embodied with honest and skilled human resource and diversified enforcement agencies on

the topic of environment, no impact on the society as a whole can be seen unfortunately, although it can be seen in papers.

Therefore, in this scenario, on the basis of selected important criteria with some indicators, a post 18th amendment analysis of the environmental governance framework has been done, together with the capabilities and downsides of the newer statutory mandate to catch a way to an upright mode of environmental governance in Pakistan. For this, a deep routed study is the dire need of the time to find out the impact of 18th amendment in the constitution on environmental governance system of Pakistan not only at local, provincial and federal level but also at international level with respect to implementation of MEAs.

1.3 Context of the Study

Pakistan is a developing country with political, environmental and institutional instability and facing climatic changes threats at higher pace. Dwindling resource supply, climatic extremities and natural disasters makes the sustainable development more susceptible to be compromised in favor of economic growth. Recent decision regarding using coal reserves for energy production is one of such examples. This is very reason that despite preparing legislative documents at par any developed country, environment situation in Pakistan is not much improving. Pakistan has taken steps for development of environmental governance very early as compare to other developing country since its participation in 1972 Stockholm Conference on Human and Environment. First legislative document Pakistan Environmental Protection Ordinance (PEPO) was prepared in 1983, which was quite early as compare to other countries of the region.

Development of environmental governance framework in Pakistan can be divided in two phases i.e. pre-devolution (Pre-18th amendment) phase and post devolution (Post-18th amendment) phase.

1.3.1 Pre 18th Amendment Phase

Pre-devolution phase starts from 1983 and lasts till 2010. During these years environment and pollution was a federal subject i.e. only federal government can make

laws whereas provincial authorities only implement those laws. Significant development in promulgating environmental laws can be traced back since Pakistan developed its first environmental legislative document in 1983 known as Pakistan Environmental Protection Ordinance (PEPO) 1983. However, from 1983 onward, further developments remained stagnant in overall governance framework. Environmental movement gained spark in Pakistan after its becoming the signatory to Earth Summit in 1992 with formulation of National Conservation Strategy (NCS) in the same year. After that in 1997, Pakistan Environmental Protection Act, 1997 superseded the PEPO 1983 followed by the establishment of Pakistan Environmental Protection Council (PEPC), environmental protection agencies at federal and provincial levels. Rules and regulations to translate the PEPA, 1997 were promulgated. National Environmental Policy of Pakistan was launched in 2005 to achieve the objectives of sustainable development. The country's first National Environmental Policy of 2005 addressed different sectoral and cross-sectoral issues, and provided separate guidelines for each sector.

1.3.2 Post 18th Amendment Phase

In 2010, 18th amendment was made in 1973 Constitution of Pakistan. After this amendment, provinces were given authority to legislate for environmental protection in their jurisdiction. Since then, the provinces along with Gilgit Baltistan and Azad Jammu and Kashmir governments have developed their own environmental protection acts. However, these documents need to be translated through regulation for implementation. Institutional and policy framework after devolution is still in infancy.

1.4 Problem Statement

The environment of Pakistan with a resource compromised economy surrounded by geo-political insecurities, vulnerabilities to climate change (Landberg, 2019), natural and anthropogenic disasters coupled with growing population and development (Fahad and Wang, 2020; Hussain et al., 2020), is facing serious challenges (Khan et al., 2011) despite existence of an adequate framework of governance for protection, conservation and rehabilitation of environment. The 18th amendment in the constitution of 1973, which abolished the "Concurrent Legislative List" and devolved the mandate of legisla-

tion on the subject of Environmental Pollution and Ecology from federation to provinces that resulted in reorganization of the existing framework of environmental governance at provincial level but without repealing the Pakistan Environmental Protection Act of 1997, which has legal jurisdiction on all over the country being a federal law; and that has intensified the crisis of environmental governance in Pakistan. The Government of Pakistan is signatory to so many multilateral environmental agreements at international level and is under obligation to fulfill the commitments made thereunder; whereas, the responsibility of implementing those multilateral environmental agreements has been devolved to provinces after 18th constitutional amendment that also poses a challenge of environmental governance to federal government as international agreements are implemented through instruments of law made by the parliament of Pakistan but under 18th constitutional amendment legislation on the subject of environment has to be made by the provincial assemblies, which are under no obligation to fulfill the requirements of multilateral environmental agreements signed by the federal government.

1.5 Research Question

It is of great concern that existent environmental governance framework should be analyzed in connection with resources available and institutional capacities. Situation demands analysis of existing policies, legislative and institutional framework after the 18th Amendment. Therefore, a thorough evaluation of the environmental governance in Pakistan, and its direct and indirect effects on environment and sustainable development are of utmost importance. In the context, following was the research question for this study: “Whether the 18th constitutional amendment was able to bring positive impact on environmental governance in Pakistan in line with true spirit of devolution of powers to provinces since 2010?”

1.6 Aim and Objectives

The study aimed at exploring implications for environmental governance after devolution of the subject environment to provinces under 18th amendment in the Constitution of Pakistan, 1973. Whereas, the specific objectives were:

1. To get insight into the environmental governance system at federal, provincial and local levels including other administrative units/areas;
2. Setting criteria with indicators for evaluation of environmental governance in Pakistan after 18th amendment at federal, provincial and local levels including other administrative units/areas; and
3. Evaluation of environmental governance in Pakistan after 18th amendment against the set criteria.

1.7 Significance of the Study

The 18th constitutional amendment has changed the entire framework of environmental governance in Pakistan and devolved the responsibility to provinces, hence, it is important to analyze and evaluate the existence and effectiveness of framework of environmental governance developed by provinces in terms of availability of policy, legal and regulatory instruments and capacity of institutions. Therefore, this study is of great significance in documenting the impact of 18th amendment in 1973's constitution on environmental governance and repercussions of devolving without proper and well-planned framework and its direct and indirect effects on environment and sustainable development. This study provides a comprehensive and critical analysis of post-eighteenth amendment environmental governance in Pakistan against a set of criteria and indicators. This study also identifies distortions in policies and institutional mandates. This study highlights that on one hand the devolution to legislate on environmental pollution and ecology provides opportunity to resolve environmental problems at sub-national level but at the same time variation in ambient air and water quality standards of different provinces may create some problems. It is hoped that this study will be helpful for think tanks and organizations involved in policy-making as well as for decision makers in improving the overall environmental governance system in Pakistan as governance has become an integral component to environmental protection, conservation and rehabilitation.

1.8 Organization of the Thesis

This thesis is organized in subsequent sporadic, yet, interlinked chapters.

Chapter 1 titled as “Introduction” including the background and context of the study, problem statement, research question, aim and objectives and significance of the study.

Chapter 2 titled as “Literature Review” deals with the contemporary research orientations in the field of environmental governance and elaborates prevailing inclinations of contemporary literature regarding various themes of environmental governance. It also deals with literature about environmental politics, decentralization and various indicator base approaches of evaluation, specifically evaluating the environmental governance.

Chapter 3 with a title of “Research Methods” gives a methodological framework for systematic literature review as well as the approaches adopted to achieve research objectives.

Chapter 4 comprises “Results” and presents Part-1 of results about post 18th amendment formation of environmental governance framework of federal capital, provinces, Gilgit Baltistan and Azad Jammu and Kashmir. The chapter starts with a general summary and ends with a discussion followed by a conclusion.

Chapter 5 having title of “Environmental Governance Index of Pakistan” comprises Part-2 of results and presents post 18th amendment Environmental Governance Indices of federal capital, provinces, districts of Pakistan and of Gilgit Baltistan and Azad Jammu and Kashmir on the basis of data collected and analyzed. The chapter also presents; the statistical validation and graphical presentation of the results obtained and ends up with a conclusion.

Chapter 6 has title of “Discussion” provides an in-depth discussion and analysis.

Chapter 7 with a title of “Conclusions and Recommendations” extracts conclusions of the study and suggests recommendations providing directions for future research.

Chapter 2

LITERATURE REVIEW

2.1 Environmental Governance

The human and the earth are in dire need of securing the foundation for a straight and serious approach to Global Environmental Governance (GEG) (Park et al., 2008; Speth and Haas, 2007) originating from Local Environmental Governance (LEG) and passing through National Environmental Governance (NEG) and Regional Environmental Governance (REG). The increasing human population with engrained political economy a globalizing economy on the planet than ever before has brought up the sensation and feelings of environmental consequences of all small and large actions than ever before (Friedman, 2017; Lipschutz, 1992; Nef, 1999; Park et al., 2008; Speth and Haas, 2007).

To achieve the goal of sustainable development in terms of environmental governance at national as well as global levels, an insight and deep examination of institutional mechanisms and arrangements which can lead towards a comprehensive context on sustainable global environmental governance is an important work to be done at all levels and to be shared globally (Bäckstrand, 2006; Biermann et al., 2017; Sneddon et al., 2006; Spangenberg et al., 2002).

2.1.1 Governance and Environmental Governance

The general idea of governance is the capability of the government to style and put into effect rules to deliver services despite of the type of government, democratic or not. Although the good governance and democracy are mutually supportive but democratic accountability cannot be included compulsorily in the definition of governance (Gerlak et al., 2020). The Greek verb or “kubernáo” or kybermetes means to steer, navigation or helmsman ship, the symbolic sense, first being attested in Plato, is thought to be the origin of the word “Governance The history of mankind is evident enough that the environment and governance are as old as the mankind itself. One may add the environment is elder than the human being, brought it up and then affected by the human activities in a way or the other. The ancient global governance practices and methods founded the stone of modern theme of nation building since late nineteenth century and are significant characteristics of globe of twenty first century (Hillman, 2002).

Human being is a complicated social animal with respect to its behavior towards nature that both the polluter and environmentalist, living on the planet at the same time with different manners. The human being, in totality, are unable to calculate the consequences and penalties of their activities on the environment and the formation of more complex systems means lesser information to be known about their widespread impacts (Woodwell, 2002).

In a broader sense, environment, in terms of biosphere and its surroundings, has become the most important concern of a human being of mother earth irrelevant of boundaries giving birth to a multi-disciplinary field of “Environmental Science(s)” much sharply evolved to many sub-disciplines of studies and research over a pointedly very short period of time, amongst them is the dogma of “Environmental Governance” with its own importance in context to devising the environmental legislation to formulate the policies and laws followed by the establishment of institutions to work according to the prescribed rules and regulations along with appropriately qualified, skilled and trained human resource, exercising the powers vested in them and performing the functions responsible for, thus moving to the achievement of objectives of conserving the natural resources, rehabilitation of the environment and its prevention and protection from all types of pollution en route for making the doctrine of sustainable development a

truth. To strengthen the environmental governance, a lengthy procedure which is not able to be achieved in a short period, means a better natural resource management and efficient implementation of environmental legislation along with building capacities at an individual as well as community level and raising awareness among public on the concerned issues (Gerlak and Heikkila, 2019).

Environmental governance, as IUCN defines “is the means by which society determines and acts on goals and priorities related to the management of natural resources. This includes the rules, both formal and informal, that govern human behavior in decision-making processes as well as the decisions themselves”. Suitable law related structures globally, nationally, regionally, and locally are imperative for an overall effective environmental governance (do Rosário Bernardo, 2014).

As described by the UNEP, “Environmental governance at the national, regional and global levels is critical for the achievement of environmental sustainability and ultimately sustainable development. Considering the undivided nature of the environment and its inextricable with the social and economics dimensions of the sustainable development, decision-making process and the work of institutions must be well-informed, articulate, non-fragmented, comprehensive and integrated, and must rely on sufficient normative frameworks and enabling conditions.” (Schmalensee, 2012).

“Governance” is highlighted as well-liked but imprecise; and this term is referred; including:

- a) nominal condition;
- b) governance as corporate;
- c) involving a new management of public;
- d) good governance;
- e) a socially setup of cybernetic nature; and
- f) auto-establishing setups (Lockwood et al., 2010).

“An inclusive system of actors, institutions and norms that establishes responsibility and accountability, and builds trust and capacity to cooperate in policy-making, decision-making, implementation and enforcement, in the field of environment.” (Armitage et al.,

2012b).

Environmental Governance is written off as multifaceted vibrant issues consistently evolving fresh knowledge, shaping the understanding of system and providing information about more effective policies (Gerlak et al., 2020). It is the method through which the community decides & follows up on objectives and needs identified with the administration of normal assets and incorporates the principles, official and casual, that oversee social conduct in deciding procedure just as the actual choices (Melica et al., 2018; Morsetto, 2017).

Environmental governance is an extra precise context that tries to find constructive social-ecological upshots including an ethical footing of stewardship and responsibility (Lockwood et al., 2010) aims to upkeep optimistic green outcomes by founding in effect combined policy making series of processes and the analysis and interpretation of diversified systems of environmental governance are at peak in continuous debates across the globe (Hillman, 2002). The idea of Environmental Governance was firstly forested by the call in Agenda 21 (also known as The Earth Summit of Rio de Janeiro, Brazil) which caught global attention, not only in the decision-making with respect to environmental policy and its management but to disclose it to the public for their participation to strategize solution to problem, authenticate its effectiveness by practicing thus approaching to an overall sustainable framework (Aven and Renn, 2018).

To encompass the aforementioned themes, in a broader sense, environmental governance can be stated as a combination of normative, law centered formal governing involvement and societal paradigm influencing the interaction of people with environment, entailing a heterogeneous, multi-level and multi-actor impression and procedure of adjustment logically aims to modify the behavior of human in relation to environment to boost environmental benefits and usage idealistically, pursuing protection and preservation of adequate environmental resources for current and yet to come generations, at the same time (Melica et al., 2018); (Morsetto, 2017). Similarly, it can be defined as the guidelines, procedures and behavior that impact the powers being exercised with in the discipline of environmental policy, especially in context with particularly as regards to ingenuousness, involvement, responsibility, usefulness and consistency (Shukla).

Researches and policymakers have pointed out the principles of what environmental

governance may look like as it:

- Involves environment in each step of determining way forward and taking action.
- Conceptualize human settlements, politics and economy under the umbrella of environment
- Focuses on the connection of people to their environment and their habitat.
- Encourages transformation from linear systems to circular ones.

Similarly, a variety of rules, techniques and instruments relate to the effective management of environment like:

- preservation;
- conservation; and
- use of the resources (natural), etc.

Furthermore, the holistic scope of environmentally friendly governance may cover:

- institutions of formal and informal nature,
- regulations, processes and systems of inclusive decision-making that allows all stakeholders to present and incorporate their individual demands
- the associations with the environment on a varying degree

All cycles and foundations, both formal and casual, that include the principles, qualities, conduct and sorting out systems utilized by residents, associations and social developments just as various vested parties as a reason for:

- linking up their inclinations,
- defending their disparities and
- exercising their privileges and commitments as far as getting to and utilizing regular assets

Five dimensions are found that structure the base of environmental governance assessment including

- Transparency,
- Public Involvement,
- Access to the Justice System,
- Ensuring Compliance and accountability
- Efficiency and Effectiveness.

The concept of environmental governance does highlight the key actors persuading environmental conclusions and their purposes, the organizations in they interact, and probable outcomes of their association. The ground philosophy of environmental governance describes the environmental property rights to not be taken as an easy task, hence the authorities ought to standardize through economic, secretarial, legal and other sources, considered as significant abstract for being of environmental governance (Vollmer et al., 2021). The mechanism of governance includes; policy framework, legal framework, followed by institutional framework and uplifting to good environmental governance by together with participatory framework. The mechanism of development comprises; policy; what commitment of the government is? Planning; how to fulfill the commitment? And Implementation; who will fulfill the commitment (Gupta et al., 2010)? The relationship of governance and development stands upon the baseline of compliance and enforcement followed by the rule of law, thus achieving a good environmental governance to obtain the objective sustainable development.

The vast realm of environmental governance undoubtedly encompasses the management of environmental assets and depicts the routes through which objectives and needs of characteristic asset the board are set and followed up on. Natural administration requires a fitting authoritative component (Kotzé, 2020). As natural science is referred to the advanced world as a dynamic science, every one of the formal and casual standards of dynamic cycles is concentrated under environmental administration which has become a significant device of current political framework. Ecological concerns have acquired a critical spot in political dynamic interaction. Government strategies, worldwide settlements, and normal practices at nearby level influence climate of the globe straightforwardly or by implication in without a doubt. Along these lines, ecological administration is an expansive term which manages many cross-sectoral issues and has

establishes in all areas imaginable. To accomplish the objective of maintainable turn of events, insurance and preservation of climate and control of contamination, it is important to investigate every one of the parts of natural administration (Pillay and Buschke, 2020).

Countless studies have been done to explore the ideas that are to be incorporated to ensure a good environmental governance, keeping in view the impacts. A research studied the impact of visualization by identifying three key factors in environmental governance i.e. Understandable; Meaningful; and Engaging. Numerous instruments are applicable when recognizing the governance of the ecosystem services depending on the scope of the activity and the country, namely: Environmental Impact Assessment (EIA), Spatial Planning, Sectoral Environmental Planning, Ecosystem Inventories, Direct Regulation, Protected Areas Regulation (Morkūnaitė et al., 2019).

In order to identify and deal with the risk management, a series of eight instruments that should be incorporated by the governments in case of a risk were presented. These include: proper weight-age to the values that measure the risk factor; for managing risk uncertainties, stakeholders also need to be involved; risk associated with human lives; environment should be given low value; risk perception needs to be carefully incorporated in the risk governance; and the three risk management strategies include: risk informed, precautionary & discursive strategies; transparency and openness of the government to the public about risk nature and their management; government should allocate risk management responsibilities for the best risk control; mediation is also required in case of marketplace fiasco. It was suggested that these principles can play a significant role for the improvement in the current global policies and will be helpful to politicians and bureaucrats in implementation of risk management policies (Jordan and Adger, 2009).

Similarly, three focused environmental sustainability methods along with their indicators for the environmental sustainability have been established. These methods include: planetary boundaries (PB); life-cycle assessment (LCA); Sustainable Development Goals (SDGs). LCA indicators can be applied for assessing the sustainability at large scale. PB is also a science-based indicator like LCA. But PB works at a global level, providing good scientific assistance for political decisions relevant to environmental sustainability. The focus of SDGs is primarily on the social dimension of the emphasis of all

three sustainable approaches and their respective indicators were on the following factors: chemical pollution, eutrophication, fresh water use, modification in biodiversity, acidification, climate change and ozone depletion (Young and Gasser, 2002).

A study extended over three decades of data reviewed the governance of the smart covering of earth. Issues to the environmental governance with respect to the smart earth practice were recognized. They directed a basic audit for distinguishing major questions of Smart Earth identified with environmental governance. They investigated 5 major problems faced by the governance of the environment: figures, constant guideline, projecting administration, open source and sensing of population. Results showed that e-waste would be a key problem in the successive years and will cause new ecological issues for the public authority foundations and the framework heads (Bakker and Ritts, 2018).

Another research investigated the integration of environmental governance practices to comprehend relationship of energy, food and water. It distinguished 3 significant holes in this relationship pertinent to governance: circumstances and collaboration for the cross-area management, elements past cross-area coordination, and political variables as evolving determinants. The limit of the nexus should be reevaluated in the light of food, water and energy assets as characteristic natural systems and furthermore incorporate development of compelling foundations for the effective use of these assets. This dissimilarity is the main driver of the separation among the nexus and governance (Weitz et al., 2017). A novel study planned & implemented a structure to examine the degree of control system situations resulting in the water-level variation in the Mekong Delta of Vietnam. The examination of essential and auxiliary information uncovered restricted possibilities for the adaptive freshwater methodologies because of certain boundaries. Some limitations in horizontal & vertical integration & public participation, insufficient knowledge & information sharing, inadequate policy formulation & implementation and improper allocation of financial resources were observed (Ha et al., 2018).

Waste generation and management has been an integral part of environmental governance. A research examined the waste originating from metropolitan(s) to see the response of regional administrators and how the specialists are managing the difficulties

of development, environmental modification and assets deterioration. They explored the capacities of community administration targeting the ladder of waste production. Three administration systems were recognized: Traditional bureaucracy, public administration and network administration. They utilized the advancement in metropolitan waste from 3 Norwegian City districts: Oslo, Bergen and Drammen to feature the qualities and shortcomings of the governance framework. The current operational tactics showed that the environmental concern of metropolitan waste framework is considered as a trial of framework enhancement than a framework modification. Results revealed that there exists no best governance system, however there is need to permit their conjunction and the characteristics of explicit systems to handle in the long run for sustainable metropolitan regions (Bugge et al., 2019).

A study under the IUCN suggested a structure to ensure the appraisal and assessment of the arrangement of administration and governance of protected areas. The appraisal process incorporate numerous phases including the Entry and Representing; cultural artifacts; organizations and involved people; preservation; investigation through matrix system of the areas; Three-dimensional Examination and the governance practices; Inventory, planning and preservation position of Areas of Particular Importance for Biodiversity and Ecosystem Services (APIs); current Loss and Hazard Examination of APIs; APIs governance Three-dimensional Examination; the status and quality of governance practices. Assessment measure contain: Authority alternatives to fortify protection; Lawful choices to perceive different administration kinds; legal and various selections to benefit governance (Karlsson-Vinkhuyzen et al., 2018).

Standards of characteristic ecological reserve administration through an orderly method were created to identify effective governance practices. First ideas from a specialist board are required dependent on the literature related to standards. At that point, sorting of the draft arrays along with their analysis is finished by the help of the administration specialists from Australia. 8 standards got characterized under this cyclic approach, i.e. Lawfulness; Clarity; Answer-ability; All-inclusiveness; Justice; Incorporation; Competence; Adaptableness (Lockwood et al., 2010). A related research identified the obstructions for including ecosystem services along with the economic aspect which seems to be applying colossal tension on these resources. Application of a scientific system formed through the writing on incorporating the environmental poli-

cies alongside the theory of governance studying 4 cases i.e. agribusiness, aquaculture and agro ranger service casing provisional authority in a varying context. Governance & decision making in the aforementioned examples looked varied in comparison to public policy machinery of government bureaucracies. The analysis results showed the efforts to incorporate in these cases with some amount of synchronization along with the harmonization between major players. It also identified some additional barriers & levers that are considered as external factors in the Environmental Policy Integration's mainstreaming efforts (Karlsson-Vinkhuyzen et al., 2018).

2.1.2 Environmental Governance Approaches

Idea of environmental governance is profoundly established in the idea of social environmentalism. As per the idea of social environment, social orders should get feasible. Impractical social orders are baffled by various types of social frailty, disparity and clashes (Ashfaq and Rui, 2018; Berkes, 2017; Jamil and Siddiqui, 2020). Such social orders will undoubtedly bring about demolishing environmental conditions and depleted assets. This disarray in friendly environmentalism is essentially because of an absence of good intuition in a social relations emergency. Indeed, moral development in a general public is a sine qua non for complete goal of ecological issues (Shahbaz, 2013). In examination with market environmentalism, the obligation to satisfying social environmentalism rises above private inspirations for some type of social fairness. This view joins with thoughts of equity and vote based system and characteristic of some type of pondered and aggregate concession to how to address the connection of force in the public eye (Faisal, 2017). A sane society is required to supply whatever number free individuals as would be prudent with the obligation of taking an interest in the public sphere. This open arena is pervaded with interests and values of investors. In this framework, haggling with one another and attempting to choose in regards to regularizing plan is significant for a general public (Armitage et al., 2012b).

Capacities and asset requirements at all levels, yet explicitly at the neighborhood metropolitan level, more extensive admittance to environmental data like discharge information, environmental justice, and incorporating natural observations into sectoral strategy and exercises, stay demanding for viable environmental governance.

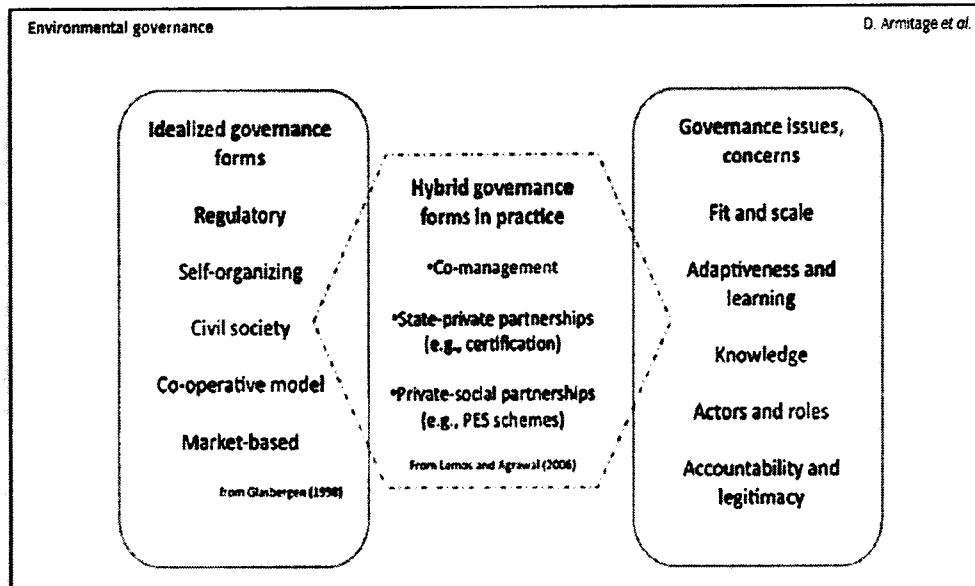


Figure 2.1: Conceptual Framework of Environmental Governance

Administration, including its social, political and financial measurements, works at each degree of human enterprise, be it the family, town, district, country, locale or globe. Although governments are significant parts in how the climate is overseen, misused and preserved, entertainers outside government are similarly significant (Butz and Cook, 2016; Khan et al., 2020; Meadowcroft and Steurer, 2018). The exercises of nongovernmental associations like environmental gatherings, community gatherings and worker's guilds have become advocates efficient, increasingly pleasant ecological adoptions. The way an organization or industry operates, its affiliations and the exchange of them gives an insight about how they will cooperate for operations, such as clean energy production. Governance furthermore integrates purchasers particularly when our individual decisions and activities impact public consumer, or alter the manners of corporation. Environmental administration is just compelling if it prompts reasonable and sustainable administration of environments. Frequently, frail governance causes ecological debasement. Improving the cycles and organizations we use to settle on significant environmental selections, will bring better outcomes, with less ecological effect and more attractive conveyance of the expenses and advantages identified with natural re-

sources (Gkatsou et al., 2014; Klein and Müller, 2012). The figure above mirrors the truth of hybrid administration approaches arising out of idealized models, and the key ideas or subjects helpful in understanding the results (ecological, social) of these hybrid approaches.

The environmental management in any country depends on the cooperation of different parties. The government as a key player represented in the ministries and its related bodies which assist the initiatives that are implemented on the local level in the government concerning the issue of environmental management and the protection (Karlsson-Vinkhuyzen et al., 2018; Lavrinenko et al., 2019). Accordingly, the most important part of governmental side is represented in the environmental affairs offices at local levels which are given rights by the law for environmental management. Therefore, main objective of ministries is to implement a decentralized approach to environmental management through improving the environmental affairs offices and specifying their roles. Other organizations and methods are applied to be able to cope with the environmental problems. Efficiency of these actors contributes to good environmental governance. Among other actors are Non-Governmental Organizations (NGOs), and the presence and involvement of these non-government parties aids the assurance of effective environmental administration, providing solutions for various problems (Hernandez et al., 2018; Hillman, 2002; Khan et al., 2020; Lo et al., 2019). . An enormous number of researches for the evaluation of governance have been directed in different areas including social, ecological, development areas for the prosperity of the general public. It is argued that science can work alongside policymakers and work with them in the governance measures. The research showed that science assumes a huge part in the governance interaction i.e., making uncertainty, making ambiguity, administrative requirements, lessening vulnerability, providing innovations and scientific instruments for evaluation (Havice and Campling, 2017; Okpara et al., 2018).

To support the claim, administration of metropolitan estate sales in the country of Zimbabwe was researched. A blend of essential and auxiliary information was utilized in the examination. Essential information was gathered through interviews with authorities in the metropolitan land markets and inhabitants of the city. Auxiliary information was gathered from the primary partners associated with the land metropolitan business sectors. The outcomes indicated that gathering of institutional performers work under

explicit lawful system. No discussion exists that carries these gatherings to address the regular issues influencing the capacity of metropolitan land markets. An intricacy in the conventional property enlistment framework was additionally noticed. There is a need to frame property registration framework than can be managed by poor people. An information base is additionally needed in the proper area that can work for the helpless enrollment frameworks. A broad vault office is likewise needed for improving the productivity of land enlistment. Eventually, a program structure was built up that will gather the data in the underlying years. That will likewise give equal specialized help to key foundations for bringing great worldwide governance practice. In the later years, the program structure will zero in on focused mediation on residency redesigning and dealing with various thoughts for research for powerful policy arrangements for metropolitan land markets (Thornton et al., 2018).

Another study explored the part of governance framework and subsidizing components in current vital execution plans and practices seen in 14 European Urban areas. The data was gathered from territorial arranging specialists. The significant focal point of the study was on the force specialists, which shape up the governance framework and financing systems in planning. The cross-case correlation demonstrated that in the public authority framework execution, arrangement and inclusion of intrigued partners is vital. Results additionally uncovered that in certain areas, private vested parties have really bartering power for exchange. It was additionally seen that during these arrangements with the private vested parties, execution techniques are focused on, systems are detailed, and subsidizing components are created. It was recommended to accomplish restrictive execution plan, it is crucial to go past multi-partner association and the coordinated effort of inter-scalar government. It is additionally extremely important to dissect first the financing sources and examine what gathering is winning or who is losing (Sidibé et al., 2018).

A survey on the meaning of government part at domestic scale in decision making was conducted. The choices made shall help in different spatial planning measures. Good governance principles identified with spatial planning activities by utilizing the information on legislative and NGOs for accomplishing more effective degrees of governance by investigating innovation. It was discovered that there is need to change the governance measures by including indigenous communities in the dynamic of spatial

planning of the urban areas (Virtudes, 2016). Similarly, a research investigated the association among the Bitumen administration framework and the local area challenges in the Bitumen belt, Nigeria. Essential information was gathered through semi-organized meetings and central gathering conversations done in Agbabu, the thickly inhabited local area in 2007 and 2011 Nigeria. He investigated ambiguities inborn in the excavating structure of neo-liberal nature for reserve mining during the capitalistic era. The environmental issues in the Bitumen extraction populace were serious. Decrease in the area of cultivable property was additionally noticed. Resources of water close to the mining area are defiled and triggering difficulties in respiration, culinary activities and consumption. The financial difficulties contain: power, medical services office, cleared streets, and sporting offices were likewise noticed. It was recommended that issues bearing bitumen networks should be tended to in the asset governance system to shield it's sustainability and acknowledgment. (Adeniyi, 2014). Planned models for evaluation of metropolitan flexibility of energy and inspected in a research for the interaction of measures with the given framework. The rules characterized for framework contained provision and delivery; Standby and Storing; Clean and Green Establishment; Blue Infrastructure; Municipal Infrastructure; Conveyance; Modernization. The standards characterized related to the assets and their interconnection, including: Clean Energy; Energy-water Connection; Energy-food-water Interplay (Melica et al., 2018). A groundbreaking research shared the models for crafting and adopting the performance of indicators to evaluate the degree of environmental governance. Choice of indicators comprises of numerous means including: Matching the sort of marker of any element type with the outcome for accomplishing the ideal objective; measuring the outcome as straightforwardly as possibly; planning for the financially savvy the board; consideration of information sources during choice of indicators; making markers operational; making goals of markers; ensuring the affect-ability of pointers to any change; dis-aggregation of markers applicable to population (Ngan et al., 2019).

2.1.3 Environmental Governance – A Multi-Level Process

Environmental governance is divided into three levels i.e. local governance, state governance, and global governance. This multi-level and multi-dimensional interaction is seen by many as the key to resolving many of the world's environmental problems.

The provinces and regional circles of government are the execution arms of government. The fruitful authorization and execution of the environmental administration structure subsequently relies generally upon the extent of assets, talents and viability of these circles. Provincial governments have a significant task to carry out in setting regional standards and guidelines, while likewise helping local governments do exercises to oversee and ensure the governance. Provincial government has an established order to lead its business in a manner that is predictable with sustainable development standards and to coordinate environmental issues into its planning measures (Awan et al., 2020; Khalid and Khaver, 2019). Notwithstanding, along with the resistance looked at national level, there are numerous requirements looked by both provincial and regional government that are forestalling the governance and policy of environmental governance everywhere.

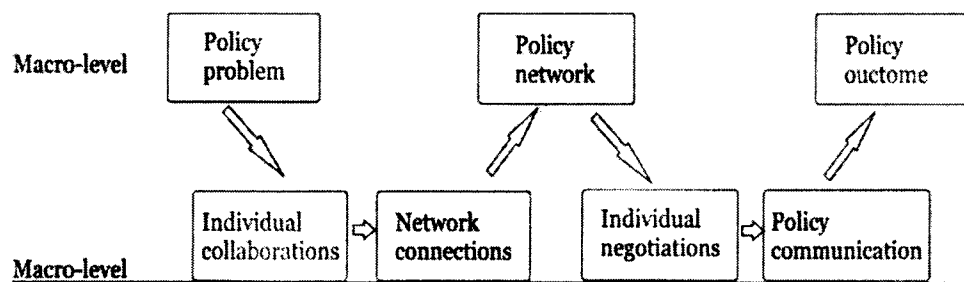


Figure 2.2: Level of Governance

The linking between system theory and governance is explained by the micro-macro connections. The linkages shown in the figure describe the various links that governance theory and the ideas of emergence and complexity have.

With reference to scope classified, “environmental governance” is divided into three levels i.e.,

1. Worldwide and national ecological administration which manage the trans boundary parts of nature obliteration - which has been innately imbricated in a world environmental plan;
2. National level administration manages the idea of “eco-administration” is utilized

concerning peaceful settlements between regional people and state over ecological assets, environmental laws and strategies.

3. Local environmental administration which offers accentuation to the role of regional civil society for environmental issues just as the job of local government towards the governance in light of its closeness to them; it additionally views as vital for administration any huge economic improvement activities at the local level.

Establishments and law, interest, rights and portrayal, authority level, responsibility and openness, property rights and tenure, markets and monetary streams, science and risk harmonization into different areas are the main components to be considered in environmental governance.

The governance model based on effective mechanism, where coordinated effort of organizations is seen without jobs or allocated posts beforehand. The description of empirical governance takes the organizations, takes a gander at the cycles wherein they are shaped, and afterward at how the organization works together to make strategy. The model doesn't recommend a specific approach result, however ought to have the option to deliver any results, given reasonable governance courses of action.

Policy reactions are to be presented in case of a policy related concerns on a bigger scale. The role of governance is to warrant that it is made by means of organizations that are, thusly, comes from exchanges at singular-level. A two-stage process in ensuring effective governance: clarifying the how's and why's of administration systems set up itself in the activities of independent associations, and the other relating to the development of policy.

The need for policy drives the parties to start a network-construction system: one party identifies it does not have some asset to react to the trial and consults the others for assistance. Promotion of performance is ensued. Yet, the actions are not liberated: keeping up associations is simpler than setting up from the scratch, and data regarding the new accomplices is accumulated through existing organization links. In total, a mind boggling design of co-operations and correspondence emerges, regularly balancing out into a transient harmony, or if nothing else designs that show some steadiness (Kivimaa et al., 2017).

While the thought of administration proposes directions for exploration as far as exploring the connection among state and supplementary partners, in any event in a normalizing level (for example popularity based or great administration structures), fitting and pertinent models are as yet missing for non-industrial nations. Similar examinations on metropolitan environmental administration could be useful in understanding the metropolitan ecological risks concerning what networks are associated with and how they are adjusted, if with or against one another and why (Van der Molen, 2018). For information development purposes, yet additionally for policy definition and estimation of the general society accomplishments towards a more sustainable development, metropolitan ecological administration pointers are a useful and a fundamental instrument. Building up a metropolitan ecological administration appraisal model permit correlations of the aftereffects of investigation of ventures executed or under execution, to make a logical reason for the plan of supportable institutional courses of action in future.

The field of environmental governance is a vastly developing field with regards to anthropogenic environment, and researches with suggestions for preservation exercises. Populaces, chosen authorities, government organizations and workplaces predict that these processes must achieve wide range of purposes of economic nature and environmental stewardship development (Rosilawati et al., 2018). Such assumptions are progressively perceived as governance challenges. In this work we will examine the idea of ecological administration and identifies central questions that preservation researchers and strategy creators should progressively face, including issues of organizational development; adaptivity, flexible nature, scholarship; the assembly of information from assorted fonts; the rise of innovative entertainers and their role in administration; shifting assumptions regarding responsibility and authenticity.

Conventional “command and control” mode of governance has played its role in maintaining ecosystem and sustainable supply of resources. Yet, the process has achieved a deep social cost to be paid (Azam and Emirullah, 2014). Organizations and actors in the conservation field are familiar with the environmental costs that include recession in the availability and provision of ecological services. This situation is sometimes referred to as “the pathology of natural resource management.” Consequently, participatory governance framework has evolved in which, governments are now adapting to a

bottom-up approach where the government itself is not the top decision source. Instead, outcome decisions now incorporate every sort of problem from all stakeholders (Nunn et al., 2014).

Research describes eight major characteristics of good governance: transparent, responsive, participatory, accountable, equitable, inclusive, effective and efficient. Practically a good governance framework means following and implementing the rule of law through consensus oriented ideal political design for social, environmental and market-arranged development. A decent governance system guarantees reliable utilization of political force and public assets by the state. Obviously, the board and governance are not totally unrelated. Management uncertainties include vulnerability, exchange, pondering, and effects on societal functioning. Acceptance of the goods and the bads in the board and management is critical as the perplexing nature of the environmental issues worldwide is on varying nature (Auras et al., 2013).

TH 27299
Customary ideas of what governance suggests (great administration), how governance transpires (through the state), and what governance measures try to accomplish (effective asset use) are changing. Five key ideas or issues in environmental governance describe the reasons: acknowledgment of the significance of development; encouraging adaptivity, ability of be flexible, and getting the hang of; co-producing information through assorted bases; understanding the rise of new stakeholders and changing assumptions regarding responsibility and legality.

Environmental governance is, no doubt a dynamic arena and the determinations for enhancing improvement are being undertaken by the countries. The Islamic Republic of Pakistan is has been determined to make efforts at all levels of environmental governance which may lead to changes in the categorization of environmental governance performance.

As provincial governments build up their own environmental regulation, it is absolutely critical that they consent to embrace standard principles which can therefore strengthen individual provinces and not the opposite. Also, the federal and sun-national governments should start quickly to arrange an assignment of forces so that subjects on the federal lists don't get away from the net of environmental policy. For Pakistan's international responsibilities under environmental engagements, a planning instrument is

required. Notwithstanding responsibility matters, extension of various forms of connections in between stakeholders, oddly, makes the mix of data, thoughts and viewpoints further troublesome, make great administrative difficulty, and temporarily, seem wasteful (Naureen, 2009).

2.1.4 Factors Affecting Environmental Governance

Organizational and legal bodies primarily form the prospects for environmental governance on various political, economic, and social levels. Adaptation usually appears progressively between various players as a fairly prearranged and independent procedure identified by political investments, invention, and societal education (DeCaro et al., 2017; Duit, 2016). Along with effective and adaptive legal and institutional frameworks, the need to civic education and participation of various stakeholders is necessary in order to make environmental governance sustainable as properly educated officials and public will be able to understand and relate with the principles and the underlying actions that come with the governance (Middeldorp and Le Billon, 2019).

Public and stakeholder awareness is a major factor in the adaptation of good environmental governance practices. Societal learning could be a positive outcome of hands-on governance as it could result in indispensable advances for a sustainable development. Collaborative environmental governance requires various subjects to be in a similar position of knowledge and awareness (Ciplet et al., 2018; Ciplet and Roberts, 2017; Homsy et al., 2019; Vatn, 2018). Due to the popular view that governance is a matter for the government, promotion of the idea of a lack of ownership among the public prevails. In this regard, the governments' policies and finances should support the education base and the public awareness and activism campaigns to develop a desire for bottom-up environmental governance. Moreover, the availability and quality of the awareness provided is crucial, along with the provision of accessible channels to cooperate and get involved. NGOs and their promotion can have a significant part in the capacity building of the multitudes, along with the provision of well-connected outlets for aid and participation (Berkes, 2017; DeCaro et al., 2017; Lihua et al., 2020).

This practice predominantly is effective for the emerging economies that struggle with a sustainable environmental governance to involve public to take control of their re-

gional resources and their governance to alleviate the problems with sub-national environmental governance, taking some pressure off the government to regulate and ensure environmental governance at grass root levels (Jordan and Adger, 2009).

2.1.5 Social Aspect of the Nexus of Environmental Governance & Heritage Preservation

Along with the focus on natural environments and their services, the scope of environmental governance also covers the built environments, especially the ones with historical significance (Spennemann and Graham, 2007). The heritage sites of cultural and scientific value are at a risk of being vanished due to the snowballing effect of climate change and the overall ineffective governance. Research provides evidences that the current standing of these resources is at risk due to the lack of adaptive and co-evolutionary governance (Stone, 2015). The erstwhile global environmental governance structures have been observed to overlook the power of regional community involvement through capacity building in order to protect and preserve these heritage assets and the natural resources associated to them (Kotzé, 2020). The World Heritage Convention is a regulative instrument that has supported the involvement of communities in the heritage resources, and vice versa. Further, the state parties have been mandated to recognize the role of all stakeholders, particularly the indigenous communities so as to encourage social development, which is to be linked with the premise of the sustainable development goals (Phillips, 2015). This way, countries can maintain conservation efforts while stimulating social, economic and environmental state of affairs of the relevant communities. This could be conceivable if the environmental governance structures, nationally, sub-nationally, and locally, are defined (Parthesius, 2011). Where the cross-cutting responsibilities and tasks could strengthen the inter-connectivity of institutions, lack thereof could result in an unproductive protection and preservation efforts of the aforementioned resources and the associated benefits (AtKisson, 2009; Young and Gasser, 2002). Strengthening of regional, local governments, and the communities and indigenous authorities through capacity building measures, and their involvement in the decision making process can ensure the aforementioned outcomes. Empowering communities to protect the cultural resources in their region could prove to be a symbiotic undertaking for both. The nexus of environmental governance and heritage

preservation is a natural one, the understanding of which could offer immense benefits in terms of regional social, economic stability of the local communities and the preservation of invaluable heritage resources (Manglis et al., 2020).

2.2 State of Environmental Governance of Developed Countries

In the past, the inability to ensure the effective environmental governance in the western world has been an issue. The state actors were deemed ineffective and insufficient to suitably implement good environmental governance in the longer run (Ciplet and Roberts, 2017; Middeldorp and Le Billon, 2019). The inability to impose environmental regulations and ensure their compliance by the government led to the rise of the involvement of non-governmental stakeholders that supplemented governments to address the environmental problems. Such actors comprise of Environmental Non-Governmental Organizations (ENGOS) and for-profit organizations that take interest in the systematic alteration of the system for a sustainable governance (Wu et al., 2018). Similarly, the increasing neo-liberal trend of the privatization of the environmental resources has been adapted by various countries. This approach aims to solve environmental problems by privatization, commercialization, and commodification of environmental resources and their services/delivery (Adeniyi, 2014; Anshelm et al., 2018; Fougère and Bond, 2018). The dissolution of state governance occurs in order to enhance market mechanism and public-private partnership. Under this approach, the responsibility of dealing with environmental calamities is shared by all sectors, rather than a singular mean. Another key factor of this kind of governance is transparency – being a major issue in achieving effective environmental governance- in the form of ‘governance by disclosure’ and ‘empowerment through information’ (Asante et al., 2020).

Development has been argued to challenge a change in the institutional basis for many of the environmental resources and factors. Not long ago in these countries, the environmental governance was dominated by public regulations based on economic and legal pillars but with time, it seems to have shifted towards a more privatized approach. Programs such as payment for ecosystem services, carbon markets, and even private decision-making and certifications have become common in the developed world which

has the ability to reduce its environmental impact by placing good environmental governance practices (Sen and Ganguly, 2017).

The trend is seen in countries like Canada, where the state encourages the Neo-liberal instruments in action, and supports the expansion of opportunities for private profit making. A major benefit of this approach is that it requires less financial support from governments and the relevant ministries, hence taking the pressure off the state actors, be them political, institutional or economic (Job et al., 2017). Various kinds of environmental resources have experienced this particular approach of governance in the first world countries; water resources being a prominent example. Water services include water delivery for domestic uses, waste-water treatment and incorporation/use, and irrigation. Globally, there are various astounding examples where the infrastructure and the services were both shifted to the private body and some cases where only the services were privately hired while the infrastructure was publicly owned (Alkon and Wong, 2020; Lihua et al., 2020; Wang et al., 2020; Wei et al., 2020). The systems with the private ownership of water resources is called the UK system which refers to the exemplary way the public water services of UK and Wales were shifted to have a private status. The challenge that this sort of privatization of a basic resource presents is the monopoly of the existing actors, which hinders the development and the ultimately the application of effective environmental governance practices. Moreover, the reason privatization companies focus on medium to high income countries is that there is a profit margin, an approach which has affected developing countries and their journey towards good environmental governance. On the other hand, this approach has its own repercussions as discussed by (Mustafa and Reeder, 2009). (Mustafa and Reeder, 2009) construe that privatization of water has resulted in issues related to access and quality of water in Belize City.

Along with increased transparency and effective management, there are other ways that the recent privatization has ensured the sustainable environmental governance. Certifications are one of the ways private businesses employ to ensure to the consumers that their product/service holds certain environmental, economic, and social standards. The increasing stress on the states by international treaties and regulations to maintain a certain standard is obliged by the private firms, which were being dismissed by the previous owners and producers, threatening the presence and implementation of good

environmental governance (Prakash and Potoski, 2006). The trend of eco-friendly, organic and cruelty-free products is one a rise in the developed nations, hence the additional certifications about the life-cycle of the product, especially in the food sector as it has a large consumer base and health-related factors (Van der Ven et al., 2018). This ensures the good practices in every step, adhering to the environmental governance as a whole. Similarly, corporate social responsibility is also a concept under the umbrella of private rule-making, hence making it a voluntary action (Adeniyi, 2014; Brown and Kasser, 2005; Hillman, 2002; Kumar and Murck, 1992; Kuzdas et al., 2015; Wilshusen and MacDonald, 2017; Zhang et al., 2019). This concept promotes incorporation of a wider range of stakeholders in a corporation without compromising the profit-making approach and the sustainability of the businesses (Ashfaq and Rui, 2018; Ikram et al., 2019; Stenberg et al., 2017).

Correspondingly, the Neo-liberalization of the climate regime has radically altered the doctrines which control the international action on the adaptation and mitigation of climate change, the institutional measures which warrant compliance, and the decision making procedure which ultimately determines procedural impartiality (Munene et al., 2018; Myers et al., 2018; Nakano et al., 2017; Ochieng et al., 2016). Increasing incorporation of this concept by the gigantic economies and the biggest polluters of the world namely the US and China. is an indication that the existing systems and practices could benefit from this exercise in order to achieve the sustainability goals that have been set by the international coalition, through a good environmental governance overall (Aldieri and Vinci, 2018; Boğa-Avram et al., 2018; Stone, 2011; Zaheer, 2019).

There seems to be a rise in new issues related to environmental governance with time, and these new problems require modern solutions to for better governance. Many existing policies and practices have been proved inefficient for the modern needs of the medium to high income nations, which have also agreed to comply with various international treaties and goals to curb their externalities (Elavarasan et al., 2021). This calls for a need for new researches that can present effective governance practices to deal with the novel issues that the developed world is facing. In this regard, research publications on climate change, urban environmental governance, natural resource governance and many relevant topics have seen a surge. The US, China, and UK have been the hub of these studies in the past decade and are continuing with the trend. With these

latest researches presenting new ideas for effective environmental governance, there is a need to incorporate these concepts and practices to ensure a sustainable development of these nations (Abid et al., 2021; Naureen, 2009).

2.3 State of Environmental Governance in Developing Countries

With the increasing degradation of environmental resources and the carrying capacity in the recent past, developing countries are facing a bilateral challenge: the protection of the environment and economic growth (Javeed et al., 2020). This conundrum highlights the importance and brings the issue of lacking environmental governance to the front. A key factor that differentiates developing countries from the developed ones (Europe and the west generally), apart from economic and social growth, is the condition of environmental resources, pollution, and stakeholders' attitude towards it (Sarker et al., 2019; Shah et al., 2020; Zhang et al., 2019). And since there is development currently on the rise in the developing world, the decrease in environmental quality has been noted (Khalid and Khaver, 2019);(Khan, 2019). This pattern fits the popular Environmental Kuznets Curve theory, which suggests the presence of a U-shaped graph among the economic development and the excellence of the environment. Environmental quality here refers to the CO₂ emissions which are rising with the increasing economic development in the developing world, while in the developed countries where there is a steady growth pattern; the environmental pollution shows a decreasing configuration (Ike et al., 2020). Due to the lack of suitable environmental governance patterns, the developing countries, especially in the Asian region have seen a colossal environmental degradation at the cost of economic development (Mamat et al., 2019). The current progress happening in the developing countries is energy intensive, and the energy sources comprising mostly of non-renewable. Researches have shown a significant relationship between energy and the environment (Campos-Guzmán et al., 2019; Ike et al., 2020). Since the energy acquisition is mostly fossil-based, it puts an enormous pressure in the environment as there is a huge amount of exhaust and emissions from these processes (Arts and Buizer, 2009; Aven and Renn, 2018; Bayyurt and Yılmaz, 2012; Bugge et al., 2019; Hajjar et al., 2019). Similarly, the inefficient dated processes and the lack of incorporation

of latest practices and technologies have resulted in a huge loss of ecosystems, natural resources, along with a risk to the well-being of human beings (Hens et al., 2018; Khan, 2019; Wu et al., 2018). On the flip-side, the boost in the economic growth gives a glimmer of hope as the sufficient financial resources and technological advancements brought about by the development could result in the acceleration of effective environmental governance and conservation of resources/pollution regulation (Gustafsson and Lidskog, 2018; Morrison et al., 2019; Pillay and Buschke, 2020; Smits et al., 2017). An empirical analysis of India to examine connection amongst Green House gases (GHGs) discharges, financial progress and energy requirement shows that snowballing GHGs productions are a result of the swelling energy demand (which is still largely based on nonrenewable), which is a requirement for the intended economic growth. The research suggests opting for cleaner energy sources, along with an effective institutional and infrastructural improvement to ensure good environmental governance that will lead to a sustainable economy (Armin Razmjoo et al., 2020; Gouldson et al., 2016; Moorthy et al., 2019; Ringel and Knodt, 2018; Swain and Karimu, 2020).

As a repercussion of climate change, a surge in extreme disaster events has been experienced worldwide (Islam et al., 2019). Philippines is a major example of a developing country that is among the top countries expected with regards to worst impacted by global warming and climate change (Gera, 2016). The governance structure of the nation is currently in a dilemma as the institutional framework for public participation exists, but there is a resistance from the prevailing actors that has presented a hurdle in the much needed public participation (Awan et al., 2020; Homsy et al., 2019; Lihua et al., 2020; Virtudes, 2016; Woodwell, 2002; Zhang et al., 2019). Moreover, the lack of effective governance has led to a monopoly that doesn't allow non-state actors such as ENGOs to engage in the process of disaster risk reduction, preparedness and adaptation measures. Similar is the case for SriLanka and Bangladesh where the horizontal partnership through institutionalizing instruments for combined resources to spend in converging interests is lacking (LÓPEZ-MARRERO, 2010; Romero and Emanuel, 2017).

The Environmental Performance Index (EPI) is a tool that has been extensively adopted as an indicator instrument for the environmental trends, and the national tool for measurement for countries of monitor their advancement with the environmental policy and

governance goals (Bhandari, 2013). In 2016, the EPI comprised of two sub-indicators i.e. the Ecosystem Vitality Index (EVI) and the Environmental Health Index (EHI), each accounting for 50 percent of the total score. EHI deals with the possible health impacts on humans from various kinds of environmental pollution, where EVI accounts for the vitality of the ecosystems of a country, keeping in view the perspectives related to environmental governance and conservation of species, including forest and water resources, biodiversity, fish stocks, energy and climate. According to this criterion, it was revealed that nations with the highest environmental quality were Switzerland, France and Denmark, with most of the other countries being in Europe. Along with that, North America boasted high environmental performance due to their stable economic and social setup. Asia and South America maintained the second tier level of Environmental Performance (EP) with regard to their increasing economic development but faulty environmental governance patterns. African countries showed third-tier performance, most of which are currently suffering from erratic political situations and relatively regressive economic development (Bhandari, 2013). Judging from the aforementioned global EPI results, it is safe to say that the environmental performance and governance is closely linked to economic growth as well as the political scenarios. Isolating the greater regional case of Asia, the performance of western Asia is superior, while east and Southeast Asia fall behind it. The poorest environmental performance is recorded in the Central and South Asia – where Pakistan is located (Index, 2014).

Asia is the largest continent in the world in terms of landmass and population and hosts most of the developing countries of the world. Many of the Asian nations are currently under-developed and emerging economies and the swift unrestricted economic growth has resulted in the severe destruction of the environment and natural resources, resulting in a shattered national environmental and health sector while contributing to climate change (Salik et al., 2015). While there are excellent examples of good environmental governance and overall development in Asia, namely Singapore and Japan, still the continent as a whole is dealing with unsustainable development. The issues that have been highlighted in the literature summarize that there is a lack of investment by the governments on the environmental protection, assurance of which would ultimately lead to lesser emissions. In this regard, data regarding the drop in fixed capital, depletion of natural resources, pollution and relate damages and lack of investment in

human capital should be at the disposal of policymakers to ensure informed decision making, keeping in view the national and global goals and targets (Arts and Buizer, 2009; Bayyurt and Yılmaz, 2012; Gupta et al., 2010; Karlsson-Vinkhuyzen et al., 2018; Rojas, 2020). Less developed countries have a major issue of corruption on various levels to abuse resources to appeal foreign investors whose aim is generally to exploit the resources; while this can super charge the economic development of the nation in the short term, but it would result in the serve depletion of resources in the foreseeable future, and there is a dire need to implement checks to ensure the sustainable allocation of resources (Bhandari, 2013; Bildirici and Gokmenoglu, 2020; Zimmerer, 2015). Similarly, the privatization of products and services under Neo-liberalism could benefit the governments as they would have fewer things to deal with. This move could ensure effective management and distribution of environmental resources, while guaranteeing effective governance through the involvement of ENGOs and public involvement (Ahmad et al., 2016; Azam and Emirullah, 2014; Boğa-Avram et al., 2018; Cipler and Roberts, 2017; Nahuelhual et al., 2018; Pattberg and Widerberg, 2015; Stenberg et al., 2017). Moreover, public capital and different types of social capital progressively taking an interest can compel governments' environmental administration practices and institutional changes, for example, the foundation of a focal ecological assessment group and sound public credit channels, which are helpful for building an advanced environmental administration framework and upgrading the public authority's environmental governance viability (Lehtonen, 2004; Ye et al., 2020).

2.4 Environmental Governance System in Pakistan: (Policy, Legal and Institutional Arrangements at National, Sub-national and District Stages)

The provincial and the regional ranks of the administration are the execution arms of government. The fruitful authorization and execution of the environmental governance system subsequently relies generally upon the extent of assets, abilities and related capability of these circles. Provincial government has a significant task to carry out in setting provincial standards and principles, while additionally helping local governments'

complete exercises to oversee and safeguard the environment. Provincial government has a constitutional order to direct its business in a manner that is predictable with sustainable development ideologies and to incorporate environmental issues into its policy measures (Awan et al., 2020; Gouldson et al., 2016)). Nonetheless, notwithstanding the imperatives looked at national level, there are numerous limitations looked by both sub-national and local government that are forestalling the authorization and execution of environmental governance countrywide (Khan et al., 2018, 2020; Tiwari and Joshi, 2015).

In the context of social equity and environmental governance, the conceptualization of ecological issues as clashes over environmental assets stresses that the decision of governance institutes involves social equity as opposed to of productivity (Shahbaz, 2013). In any case, the decision of governance organizations doesn't decrease to the limited inquiry of who are (to be) its monetary victors and failures: social equity is more extensive and more mind boggling than that. Additionally, qualities and inspirations of specialists impact what is viewed as specifically institutional decisions. New institutional examination on environmental governance has once in a while recognized inspirations, for example, environmental stewardship yet normally it shares the ordinary monetary presumption, which specialists look to improve their own government support or services (Gerlak and Heikkila, 2019). A more nuanced treatment of qualities and inspirations is expected to comprehend ecological contentions and their goal. Foundations and law, investment, rights and portrayal, Authority level, Accountability and straightforwardness, property rights and residency, markets and monetary streams, science and hazard Integration into different areas are the main eight variables to be considered in environmental administration (Pattberg and Widerberg, 2015).

The system based administration model, where joint effort of associations is exactly seen without jobs or positions appointed a need. The theory of empirical governance makes the organizations, takes a gander at the cycles wherein they are shaped, and afterward at how the organization teams up to make strategy. The hypothesis will assist us with understanding approach results. The model doesn't propose a specific approach result, yet ought to have the option to create any results, given reasonable administration courses of action (Boğa-Avram et al., 2018).

Policy matters on a bigger level are in need of a respective policy related reaction. Effective governance demands that the strategy is made through organizations that are, thus, evolved from independent level of collaboration. There are additionally two stages of governance, the first clarifying the how's and why's of the network build up themselves by the efforts of singular associations, and the other that how organizations create policies (Berkes, 2017; Vatn, 2018). The policy necessity drives the stakeholders to start the cycle of organization building: one actor acknowledges it comes up short on some asset to react to the test, and goes to another for help. This triggers others to act. However, the demonstrations are not free: keeping up associations is simpler than setting up new ones, and data on potential new accomplices is assembled through current organization links. In whole, an intricate construction of collaborations and correspondence emerges, frequently settling into a transitory harmony, or possibly designs that show some security (Homsy et al., 2019; Jordan and Adger, 2009; Koebele, 2019). The micro-macro connection reveals the relationship between governance and systems theory (Flynn and Hacking, 2019).

While the thought of governance proposes ways for research as far as examining the connection among state and non-state entertainers, at any rate in a normative level (for example popularity based or great administration structures), suitable and material models are as yet missing for non-industrial nations (de Oliveira, 2019). Studies on metropolitan environmental governance could be useful in understanding the metropolitan environmental explorations concerning what communities are associated with and how they are adjusted, if with or against one another and why. For information development purposes and furthermore for arrangements explanation and estimation of the general public accomplishments towards a more practical development, metropolitan environmental administration pointers are a useful essential method. Building up a metropolitan environmental governance evaluation model permits examinations of the consequences of investigation of tasks carried out or under execution, to make a logical reason for the plan of economic institutional courses of action in future. Guidance of international level will be approached through relevant institutions of federal and provincial level working under the ministries concerned with environment related issues (Morrison et al., 2019; Pillay and Buschke, 2020; Van der Molen, 2018).

Pakistan extends in a longitudinal pattern till south to the Indian Ocean and to the north

till the Himalayas. It is situated in the sub-tropical region and partially in the temperate part of the world. These regions are a habitat of millions of people and presumably a large chunk of these is generally susceptible to the ecological changes. Huge quantities of inhabitants living around coastline sections and the rich deltas of rivers where water ascents and in turn, ensues flooding as the obliterating results of variations in global temperature as the climate shifts. Most of the country is especially vulnerable to climate change as the major part of it is arid to semi-arid in nature. Along with that, the geographical and geo-strategic sensitivity of the region has exposed the country to the repercussions of climate change and the subsequent competition for trans-boundary resources, which could further destabilize the political and social scenario of the nation. This situation demanded a strong legislative and governance framework to cope up with the potential disastrous situations.

The foremost major united environmental enactment, the Pakistan Environmental Protection Ordinance (PEPO), was declared in 1983. It made an extremely significant level strategy-making platform under the chair of the Prime Minister, called the Pakistan Environmental Protection Council. The law also made an Environmental Protection Agency (PEPA) at the government level and four Environmental Protection Agencies (EPAs) at the common level. These foundations while established remained essentially out of commission for over 10 years. The PEPO 1983 was improved after a broad and delayed consultative cycle with all partners and another law, the Pakistan Environmental Protection Act, was declared in December 1997. This law had incorporated a few arrangements to improve the implementation forces of government. It additionally engaged all influenced residents to move toward the courts for any damage. Special tribunal courts at the regional levels were established to deal with such cases.

The Constitution (Eighteenth Amendment) Act 2010 gives provincial governments powers to administer regarding the matter of contamination and environment. At the point when the Pakistan Environmental Protection Act (PEPA) 1997 worked as a federal law, any opposing arrangements in different laws, regardless of whether administrative or common, were invalidated in light of the fact that PEPA 1997 had annulling impact. Yet, this is not true anymore. With natural security enactment working at the common level, all government laws presently supersedes it.

Before the approval of the Eighteenth Amendment, PEPA 1997 represented all tasks and exercises that could possibly cause environmental harm. This included subjects, for example, nuclear power for which just the federal government may administer. This also is not true anymore. The government holds restrictive authority over various subjects that ought to be directed by environmental law, however the ambit of that law will now at this point don't reach out to them (Awan et al., 2020; Khalid and Khaver, 2019). Provincial governments have in front of them the errand of detailing their own environmental laws. However, as the investigation in this study will show, this is no straightforward matter. An incredible number of fundamentally significant issues should be considered before any provincial governance activity can start.

Albeit the provinces are currently responsible for environmental issue, numerous tasks, exercises and cycles stay past their range, nor it clears what Environmental Impact Assessment (EIA) necessities will apply on account of such activities. The Pakistan Environmental Protection Agency (Pak-EPA) is currently reserve just for Islamabad and the special territories, while provincial EPAs have not been appointed powers on the issue on the federal list (Javeed et al., 2020).

As provinces build up their own environmental legislation, it is absolutely critical that they consent to receive standard principles which can consequently be fortified by individual provinces. Likewise, the provincial and local governments should start promptly to arrange an assignment of tasks so that subjects on the federal list don't get away from the net of ecological guideline. For Pakistan's worldwide responsibilities under ecological settlements, in the interim, a planning system is required (Abid et al., 2021; Khan et al., 2018; Rosilawati et al., 2018). Notwithstanding responsibility apprehensions, the extension various kinds of networking in between the stakeholder can, perplexingly, make reconciliation of data, thoughts and viewpoints more troublesome, make unreasonable structural intricacy, and temporarily, seem wasteful.

In the case of Pakistan, the initial environmental governance framework begins from Pakistan Environmental Protection order (PEPO) 1983 in a proper way, under which the Pakistan Environmental Protection Agency (Pak-EPA) was established followed by the National Conservation Strategy (NCS) 1989 also called as "De-facto Environmental Policy of Pakistan" by the experts.

The federation of Pakistan, according to its national constitution, has distributed set of powers at federal and provincial constituencies, which are disseminated between federal government and provincial governments. Among these supremacy's, one of the authority of the federal govt. is to sign, ratify, implement and bring into force the bilateral and international protocols, conventions, agreements and treaties using which the federal govt. has signed, ratified, implemented and brought into force a number of Bilateral agreements and Multilateral Environmental Agreements (MEAs).

In this regard, the year 2010 stands an important year as an amendment (commonly known as eighteenth amendment) was made to the constitution of Islamic Republic of Pakistan (generally known as constitution of 1973) whereby the business of "Ecology and Environment" was transmitted to the provincial units of the federation. The provincial laws of natural resources, mostly lie under the legislative and managerial domain of provinces, were also brought under discussion, according to which these are in need of proper modification in all provinces, to align these to each other as well as to the national policies and MEAs as per secretarial and jurisdictional recommendations of federal government. The empathy and investigation of all existing provincial legislation linked with the subject of environment urges their proper amendments to stand with the national legislature and international environmental treaties ratified by the federal capital. A comprehensive comparison of environmental legislative framework of provinces with the federal government is also a part of the study finding the strengths as well as weaknesses of the provincial ones.

2.4.1 Multilateral Environmental Agreements of Pakistan

MEAs are the key instruments for specific environmental conservation and protection measures through which a global coalition among countries is ensured on matters faced by the international community as a whole. The ultimate goal of these agreements is to ensure sustainable development. (Agrawal and Lemos, 2007; Gerlak et al., 2020; Lockwood et al., 2010). These are agreements between countries that take the form of 'soft law' as a non-legally binding arrangements that each member country has to consider when making a decision about a certain environmental or ecological issue, or a 'hard law' which is a legally binding instrument aimed towards a particular environmental objective (Tiwari and Joshi, 2015). Pakistan, facing a multitude of environ-

mental and ecological concerns, is a signatory of various Multilateral Environmental Agreements. Some notable of them is the Basel Convention, Cartagena Protocol, Convention on Biological Diversity, Kyoto Protocol, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Montreal Protocol, Vienna Convention, Paris Agreement, Stockholm Convention, Ramsar Convention, United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), United Nations Convention on the Law of the Sea (UNCLOS)(Abid et al., 2021). The federal government is in charge of signing these international agreements, which are then incorporated by the federal government with the cooperation of respective provincial governments according to their concerned and relevant territories.

Pakistan has been actively participating in keeping up with the goals and targets of these agreements by ensuring progress in the respective domains. The cross-cutting themes of various MEAs and the overlapping roles provides opportunities for intra-national cooperation of different institutions, but the lack of effective governance framework and cooperation could result in a lacking advancement in terms of these agreements. Provincial governments do not have the right to sign international agreements but once the federal government reaches agreement, provincial governments can integrate them in their environmental mandate to make certain progress from each part of the country. The current governance structure in the country calls for an immediate action to guarantee incorporation of MEAs by every province, along with their effective implementation, progress monitoring and reporting mechanism so that the country can protect and sustain the respective resources while ensuring the global community that Pakistan is considerate about the protection, conservation and preservation efforts for the greater good. This can be made sure by incorporating the strategies and effective governance measures previously discussed.

2.4.2 18th Constitutional Amendment and the Case of Environmental Governance in Pakistan

In Pakistan, Environmental Governance Framework was present before Eighteenth (18th) Amendment in the Constitution (1973) of Pakistan. The policy on environment and laws

in this connection were also present and institutions were established already working for the objectives of conservation, prevention, protection and rehabilitation of natural environment (Butz and Cook, 2016; Khan et al., 2020; Zaheer, 2019). Huge concerns and heavy propagation come out nationally in public with heavy announcements for a specific interval of time and after few days or weeks, all goes to rest and this practice is going on in almost all environmental concerns at all times in a way or the other.

General Muhammad Ayub Khan introduced, rather imposed new constitution to nation on March 01, 1962 (National Assembly of Pakistan) and it became a suspension in 1969. In 2010, the distinguished and historic 18th amendment, with variety of changes carried out successfully along with decentralization of authoritative powers to the provinces in different subjects including environment and its concerned matters. As a result, various complications and implications came at front at federal and provincial levels. Till now, the environmental governance at provincial, sub provincial and local level is not presenting such a pleasant condition even after a very reasonable time period of ten (10) years of the amendment because the reflection of environmental issues at national level in totality present a picture like no environmental governance exists in the country (Shahbaz, 2013).

The mandate for greater provincial autonomy has been a concern since the country came into being, but was repeatedly dismissed by the democratic governments in the past (Faisal, 2017; Faisal and Jafri, 2017; Lahiri-Dutt and Brown, 2017; Rosilawati et al., 2018). With the 18th amendment, the key demands of the provinces were met, and various matters, including the environment and its relevant legislation, monitoring and evaluation came under the jurisdiction of the provinces (Khan, 2019; Zaheer, 2019). Moreover, in 2011, a latest ministry called the disaster management was formed, later re-titled to the Ministry of Climate Change (MOCC) in 2012, emphasizing the increasing issue of climatic variations in the country and around the globe. In the same year, chief justice established Green Benches in all courts. Drafting of sustainable development strategy plan was done, which was aided by the acceptance of the disaster administration policy strategy. In 2015, a climate change division was made in the MOCC, along with the acceptance of a framework policy for it. The subsequent Climate Change Act went under the jurisdiction of the council of climate change, which was chaired by the prime minister (Ministry of Climate Change; Zaheer, 2019).

Since the amendment, provinces have individually legislated on the theme of environment. Province Balochistan added some unique provisions on indigenous fauna and coastal areas as when legislated in 2012 as the Environment Act. The Provinces Khyber Pakhtunkhwa and Sindh also legislated on environment in 2014 but no unique additions or variations were made from the PEPA-1997. Province Punjab, in 2012, ordained PEPA, and determined the responsibilities of counseling, monitoring, funding and implementation of regulations and standards (Group, 2019; Qureshi, 2020). It has enabled the council to interrogate industries and businesses for information on their activities and practices, which was formerly unmanageable and was not supported by the law. Similarly, environmental tribunal and magistrates were appointed to assist with matters regarding the legal aspect of the environment, and were given authority for inspection and collection of samples for examination. This practice empowered the authorities to execute the regulations and keep a check on the potential polluters, and ensuring the effective implementation of provincial, national, and international regulations. Sindh government also founded tribunals in 2015.

In the aforementioned manner, the 18th amendment has shifted the power dynamics and the immense responsibility to the provinces to form regulations and ensure their implementation and monitoring in their jurisdiction (Butz and Cook, 2016; Group, 2019; Ikram et al., 2019; Javeed et al., 2020; Mumtaz and Ali, 2019; Qureshi, 2020). This move could be seen as an effective step towards the efficient environmental governance as the major governing bodies of the country are allowed to regulate and modify their own environmental protocols according to their regional needs (Jamil and Siddiqui, 2020; Wang et al., 2020). Nation-wide, it has been observed that the provincial governments have not assigned responsibilities to the local level administration, which constitutes as incompetency to engage the grass root level management in the environmental governance (Arshad et al., 2013; Ashfaq and Rui, 2018; Khan et al., 2020; Khan and Chang, 2021; Naureen, 2009; Nazir et al., 2010). An overview of all constitutional amendments in the Constitution - 1973 of Islamic Republic of Pakistan has been made available as Annexure-I, from first (1st) Constitutional Amendment (1974) to twenty sixth (26th) Constitutional Amendment - 2019, including eighteenth (18th) Constitutional Amendment in 2010.

2.4.3 Education Policy and Environmental Governance After 18th Amendment in Pakistan

Environmental governance is based on three pillars of policy, legal and institutional frameworks. The policy framework is important if it provides integration of environmental consideration across policies and plans including education and environmental policies.

Pakistan launched its National Environmental Policy (NEP) in 2005. Creation of demand for a pollution free environment through mass awareness and community mobilization is one of the objectives of NEP of Pakistan. The policy introduced integration of environment in the educational curricula at all educational levels as a mean of implementation of policy.

The present study also suggested important recommendations on the basis of in depth literature review and meetings, interviews with educationists, pointing environment based education has to be provided at elementary and secondary level to achieve the goals of sustainable development.

The environment based elementary education is important because students are under-age in primary level and sometimes are not able to understand things very clearly although they learn at primary level. The students at secondary and higher secondary levels thoroughly grip the concepts and memorize it with follow up of up-taking the ideas to do practical work in the field relevant to the discipline. It brings a lot of change in the society.

The elementary level is the most important age group of students. So they should be focused at this stage through lessons, class room learning and through school environment, contents of curriculum, practical's, field trips and tours to the national parks, rivers, oceanic coasts, zoo, gardens, thus inspiring them to be a friend of nature in life.

2.5 Synthesis from Literature Review

The synthesis from this literature review is that effective governance of environment is an imperative for inclusive sustainable development of a country (Gustafsson and Lid-

skog, 2018; Kowarsch and Jabbour, 2017; Morrison et al., 2019; Van der Molen, 2018; Zhang et al., 2019). More often than not, it happens that the existing governing structures are prejudiced towards their own benefit and doesn't permit innovative administrative, infrastructural and technical modifications to embroil. This race for capital benefits results in the vicious exploitation of environmental and human resources, rendering the system unable to recover from with the consequent lack of resources and the broken governance (Anshelm et al., 2018; de Oliveira, 2019; Ernst, 2019; Smits et al., 2017).

Pakistan is a country with variety of bountiful resources which were not managed due to challenges of governance that allowed their abusive exploitation in the past. The geographical and geo-strategic sensitivity of the region has exposed the country to repercussions of climate change and the subsequent competition for trans-boundary resources, which could further destabilize the political and social scenario of the nation (Bhandari and Bhattarai, 2017; Lahiri-Dutt and Brown, 2017; Masud et al., 2018; Shah et al., 2020). The shift of power and authority to the provinces to govern with autonomy and dignity under the 18th constitutional amendment is ideally an efficient governance tactic for better environmental protection. But there is a lack of a constitutional framework linking the federal and provincial governments at one platform. The federal authority is dependent on provinces to legislate and ensure practice, but the inefficient governance practices on the sub-national level results in the underwhelming progress when it comes to environmental protection. Similar is the case with the incorporation and implementation of multilateral environmental agreements and conventions, which Pakistan has ratified. There is a dire need for constitutional amendments (Faisal, 2017; Khan et al., 2020; Nizam et al., 2020).

Many provinces have not yet introduced any specific regulations in the light of global warming and climate change. The need to develop these ecological issues in to the provincial laws, along with ensuring implementation on the local jurisdiction in the various natural and anthropogenic domains is crucial. Furthermore, the input of local governments to ensure proper environmental governance and deal with the local concerns throughout the country has been below par, as the tehsil municipal administrations are left out of the process of decision making and equipped with the essential support to address the local issues (Bank, 2019). Also, the country is still lacking behind in the awareness and capacity building of the existing officials as well as the public in

order to promote effective environmental governance, a practice that has successfully been incorporated by other developing nations by educating and empowering the locals to protect and support the resources, and sustain the communities in doing so (Bodin, 2017; Cornea et al., 2017; Fougère and Bond, 2018; Rosilawati et al., 2018; Sarker et al., 2019; Shahzad et al., 2020).

Apart from that, there still seems to be stigma around the notion of neo-liberalism and the privatization of resources, commodities, and services to take pressure off the government institutions and infrastructures. The literature has discussed some success stories of the privatization, or public-private partnerships for the provision of utilities from which, Pakistan can take notes from and replicate according to its own needs for a better resource governance (Bignall et al., 2016; Ciptet and Roberts, 2017; Dunlap and Sullivan, 2020; Flynn and Hacking, 2019; Job et al., 2017; Kenney-Lazar, 2019). The progress and financial stability achieved from this practice could further aid in refining the institutions and infrastructure governing the environment for an overall sustainable administration.

This comprehensive review of literature shows that the good environmental governance positively impacts the economy, social structure and obviously the environment of a country. The strength of these three things is an imperative for sustainable development and prosperity of a country (Jamil and Siddiqui, 2020; Meadowcroft and Steurer, 2018; Sajeve et al., 2020; Sarker et al., 2019; Wang et al., 2020; Williams et al., 2018). The environmental performance against many indicators in Pakistan has been unsatisfactory in the past years because of lack of effective environmental governance. At present, when every domain and sector is vulnerable to ramifications of environmental devastation, there is a need to develop a sustainable framework that backs good environmental governance in a country. For achieving objectives of sustainable development, there is a need for an accountable and resilient, but flexible environmental governance system at international, national and sub-national levels.

Chapter 3

RESEARCH METHODS

3.1 Context and Scope

The nexus between governance and development is an established fact. The central dogma of governance is the rule of law through compliance and enforcement. Hence, good governance is an imperative for implementation of any development agenda set by a nation. Like economy and society, the environment is also challenged by the crisis of governance in Pakistan, which is termed as major obstacle in achieving objectives of sustainable development. All national and international counterparts are raising issues related to governance. The implementation of policy for the conservation, preservation and rehabilitation efforts under the legislative framework working as the instrument encompasses numerous sectors, including the nexus of economic, social, environmental, healthcare, and legal domains. The legislative procedures are made increasingly complex due to the lack of an effective state policy in Pakistan, which could help in incorporating these divisions. Broadly speaking in context of sustainable development the environmental policies has to be evaluated in conjunction with cross-sectoral policies in social and economic domain.

Good governance is the need of the day as sustainable development and environmental protections seems a dream without it. Environmental governance involves decision making and good environmental governance is the only option and main instrument which can lessen the tension within and between countries and can built confidence

at all administrative levels in the country. Environmental governance is based on four wider cohesive and undividable criteria including: Competence (Efficiency), Effectiveness (Efficacy), Equity (Even-handedness) and Legitimacy (Lawfulness).

Although, after 18th amendment in the Constitution of Pakistan in 2010, climate change related affairs are in the domain of Ministry of Climate Change at federal level and environment related affairs have been devolved to provinces. But still, there are distortions and overlaps because of crosscutting nature and muddle mandates of federal and provincial institutions, which have further escalated the governance crises.

The complex structure of any environmental governance plan makes it tough to gauge its effectiveness. Information of qualitative nature is required to provide backing to the quantitative data-sets to understand the complexity of an environmental governance system. This study was designed to explore the implications for environmental governance after devolution of the subject environment to provinces under 18th amendment in the Constitution of Pakistan, 1973.

3.2 Study Area

Pakistan with 212.2 million people, rank fifth in the world, and second in Muslim World with respect of population. It is a South Asian country, shares borders with Iran, Afghanistan, China and India having a long coastal line of about 1046km at Arabian Sea and Oman Gulf, while sharing maritime border with Oman. The country spreads between 23°-35 to 37°-05'N latitude and 60°-50 to 77°-50'E longitude 30.3753N, having area of 881,913km², density 244.4/km², water 2.86% and Human Development Index (HDI) 0.557, the country is the home of multi ancient civilizations and variety of cultures. (<https://pakistan.gov.pk/>). The Figure 3.1 shows the political map of Pakistan. (Source: <http://www.surveyofpakistan.gov.pk/>)

3.2.1 The Government of Pakistan

The Government of Pakistan (<https://pakistan.gov.pk/>) is of federal in nature that operates its business under the Constitution of Pakistan, 1973. Federal government serves as governing authority of the Islamabad Capital Territory, four autonomous

aries, in the federal capital. These are the uppermost level bureaucrats, who are thought to be the most influential officers in the country. Similarly in the Provincial Capitals, the cabinets and ministries level divisions are functional under the Chief Secretaries of provinces.

Under the umbrella of the Supreme Court at federal level, a “Federal Shariah Court” is functional in the country (<https://www.federalshariatcourt.gov.pk/en/home/>). The number of “High Courts” has been established for all provinces at provincial headquarters including Islamabad High Court (IHC) as high court of federal capital. The districts’ level Civil and Session Courts are functional across the country while Ant-terrorism Courts, Green Courts, Environmental Tribunals are also functioning in the State.

The “Ministry of Climate Change” (<http://mocc.gov.pk/>), previously known as the “Ministry of Environment” is a functional ministry of the state under a minister. Currently there are 34 federal ministries working under the federal ministers assisted by the cabinet secretaries. There are 42 federal divisions including a “Climate Change Division” dealing with environmental matters and climate change issues. A “Standing Committee on Climate Change” (<https://na.gov.pk/en/cmnen.php?comm=ODY=>) is also functional at federal level comprising a chairperson and 20 parliamentarian members to look into the matters of environmental concerns. In this way the environmental governance is going on at federal capital of the country.

1973’s Constitution of Islamic Republic of Pakistan along with all the amendments approved so far is the “Supreme Law” and legal document of the country which elaborates territorial divisions of provinces as below:

3.2.2 Constitutional Status of Provinces and Other Administrative Areas

The status of provinces, according to the 1973 “Constitution of Islamic Republic of Pakistan” (12 April, 1973) is elaborated under “Article 1” of Part-1 “Introductory” states as; “The Republic and its territories”-

1. “Pakistan shall be Federal Republic to be known as the Islamic Republic of Pak-

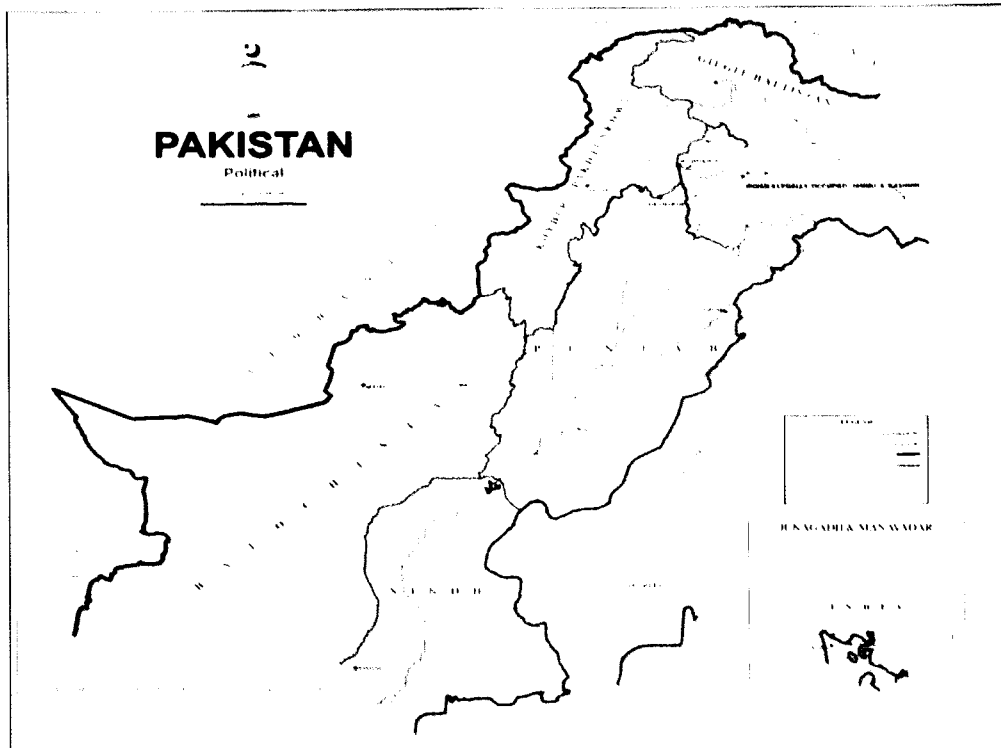


Figure 3.1: Political Map of Pakistan

sub national domains or provinces: Khyber Pakhtunkhwa (KP), Punjab, Sindh, and Balochistan, two self-governed autonomous territories inclusive of Azad Jammu and Kashmir (AJK) and Gilgit-Baltistan (GB) with their own separate legislature.

Prime Minister (PM) (<https://www.pmo.gov.pk/>), Parliament (<https://na.gov.pk/en/index.php>, <https://senate.gov.pk/en/index.php?id=-1&cattitle=Home>) and Supreme Court (<https://www.supremecourt.gov.pk/>) are respectively the major executive, legislative and judicial segments to which the powers are vested under the constitution. Ceremonial head is the President (<https://president.gov.pk/>) and Custodian of the country and the Prime Minister, being the Chief Executive of the executive branch, runs the affairs of the government by selecting his cabinet. A “bicameral legislature” comprising “Senate” and the “National Assembly” also known as “Upper House and Lower House” respectively, exists in the country. The cabinet and ministries level divisions are being run by the Federal Secre-

taries, in the federal capital. These are the uppermost level bureaucrats, who are thought to be the most influential officers in the country. Similarly in the Provincial Capitals, the cabinets and ministries level divisions are functional under the Chief Secretaries of provinces.

Under the umbrella of the Supreme Court at federal level, a “Federal Shariah Court” is functional in the country (<https://www.federalshariatcourt.gov.pk/en/home/>). The number of “High Courts” has been established for all provinces at provincial headquarters including Islamabad High Court (IHC) as high court of federal capital. The districts’ level Civil and Session Courts are functional across the country while Ant-terrorism Courts, Green Courts, Environmental Tribunals are also functioning in the State.

The “Ministry of Climate Change” (<http://mocc.gov.pk/>), previously known as the “Ministry of Environment” is a functional ministry of the state under a minister. Currently there are 34 federal ministries working under the federal ministers assisted by the cabinet secretaries. There are 42 federal divisions including a “Climate Change Division” dealing with environmental matters and climate change issues. A “Standing Committee on Climate Change” (<https://na.gov.pk/en/cmnen.php?comm=ODY=>) is also functional at federal level comprising a chairperson and 20 parliamentarian members to look into the matters of environmental concerns. In this way the environmental governance is going on at federal capital of the country.

1973’s Constitution of Islamic Republic of Pakistan along with all the amendments approved so far is the “Supreme Law” and legal document of the country which elaborates territorial divisions of provinces as below:

3.2.2 Constitutional Status of Provinces and Other Administrative Areas

The status of provinces, according to the 1973 “Constitution of Islamic Republic of Pakistan” (12 April, 1973) is elaborated under “Article 1” of Part-1 “Introductory” states as; “The Republic and its territories”-

1. “Pakistan shall be Federal Republic to be known as the Islamic Republic of Pak-

istan, hereinafter referred to as Pakistan”.

2. Pakistan’s territories comprises of:

- (a) the Provinces of the Balochistan (The words “Baluchistan” substituted by the “Constitution (Eighteenth Amendment)” “Act 10 of 2010”), the Khyber Pakhtunkhwa (Words “North West Frontier” substituted by the Constitution (Eighteenth Amendment) Act 10 of 2010.), the Punjab and Sindh (Words “Sind” substituted by the Constitution (Eighteenth Amendment) “Act 10 of 2010”);
- (b) the “Islamabad Capital Territory”, hereinafter mentioned as the “Federal Capital;”
- (c) the “Federally Administered Tribal Areas”; and
- (d) “such States and territories as are or may be included in Pakistan, whether by accession or otherwise.” (The Constitution of the Islamic Republic of Pakistan, Government of Pakistan retrieved from www.na.gov.pk).

In this context, the state of Azad Jammu and Kashmir (AJK), also commonly known as “Azad Kashmir” is a self-governing state with a legislature of Unicameral Assembly comprising 49 seats and this region is considered as administrative territory, which is administratively functioning under the control of Government of Pakistan. Hence by United Nation and other international organizations, it is also known as Pakistani Administered Kashmir. The status of AJK, conferring to “the Constitution of Islamic Republic of Pakistan” (12 April, 1973), **“such States and territories as are or may be included in Pakistan, whether by accession or otherwise.”** (The Constitution of the Islamic Republic of Pakistan, Government of Pakistan retrieved from; www.na.gov.pk).

The status of Gilgit-Baltistan, according to the “Constitution of Islamic Republic of Pakistan”, under “Article 1” of Part-1 “Introductory” states as; “The Republic and its territories.-

1. Pakistan shall be Federal Republic to be known as the Islamic Republic of Pakistan, hereinafter referred to as Pakistan”. “

2. “The territories of Pakistan shall comprise”:
- (a) “the Provinces of the Balochistan” (The words “Baluchistan” substituted by the “Constitution (Eighteenth Amendment) Act 10 of 2010”), the Khyber Pakhtunkhwa (Words “North West Frontier” substituted by the “Constitution (Eighteenth Amendment) Act 10 of 2010”), the Punjab and Sindh (Words “Sindh” substituted by the “Constitution (Eighteenth Amendment) Act 10 of 2010”);
 - (b) “the Islamabad Capital Territory, hereinafter referred to as the Federal Capital;”
 - (c) the “Federally Administered Tribal Areas”; and
 - (d) **“such States and territories as are or may be included in Pakistan, whether by accession or otherwise”.**

(The Constitution of the Islamic Republic of Pakistan, Government of Pakistan; retrieved from; www.na.gov.pk).

The cabinet of Pakistan, on August 29, 2009 approved “The Gilgit-Baltistan Empowerment and Self-Governance Order, 2009” and the then Prime Minister of Pakistan signed it. This was an order “to provide greater political empowerment and better governance to the people of Gilgit-Baltistan”. The order gave individuals of Gilgit-Baltistan to embrace vital administrative, chief and legal changes for allowing them self-administration to make, alongside others, the Legislative Assembly of Gilgit-Baltistan through electoral process and Gilgit-Baltistan Council (Government of Pakistan and Government of Gilgit-Baltistan retrieved from <https://pakistan.gov.pk/>, <https://gilgitbaltistan.gov.pk/>).

3.2.3 Khyber Pakhtunkhwa

Khyber Pakhtunkhwa (abbreviated as KP), previously with name of North Western Frontier Province (NWFP), brought its new name in 18th Constitutional Amendment in the Constitution of Pakistan - 1973, located in the northwest of the country, shares border with federal capital Islamabad, Balochistan, Punjab, Gilgit-Baltistan, Azad Jammu and Kashmir and Afghanistan and is considered as the 3rd largest province of Pak-

istan in terms of population and economic progress (Nasrullah et al., 2019). The literacy rate of the province is 66% (Hussain and Khan, 2017). The province has a total area of 101,741 km² (39282 sq. mi.), population of 35,525,047 (with inclusive of FATA population), HDI 0.529 (<https://kp.gov.pk/>) with 65 seats in “National Assembly” of the country (<https://na.gov.pk>) and 145 in “Provincial Assembly” (<https://www.pakp.gov.pk/>, <https://kp.gov.pk/>). Peshawar is the capital as well as the largest city of the province and economic center of KP. Figure 3.2 shows the map of the province Khyber Pakhtunkhwa. (Source: <https://freeworldmaps.net/asia/pakistan/khyberpakhtunkhwa/>)

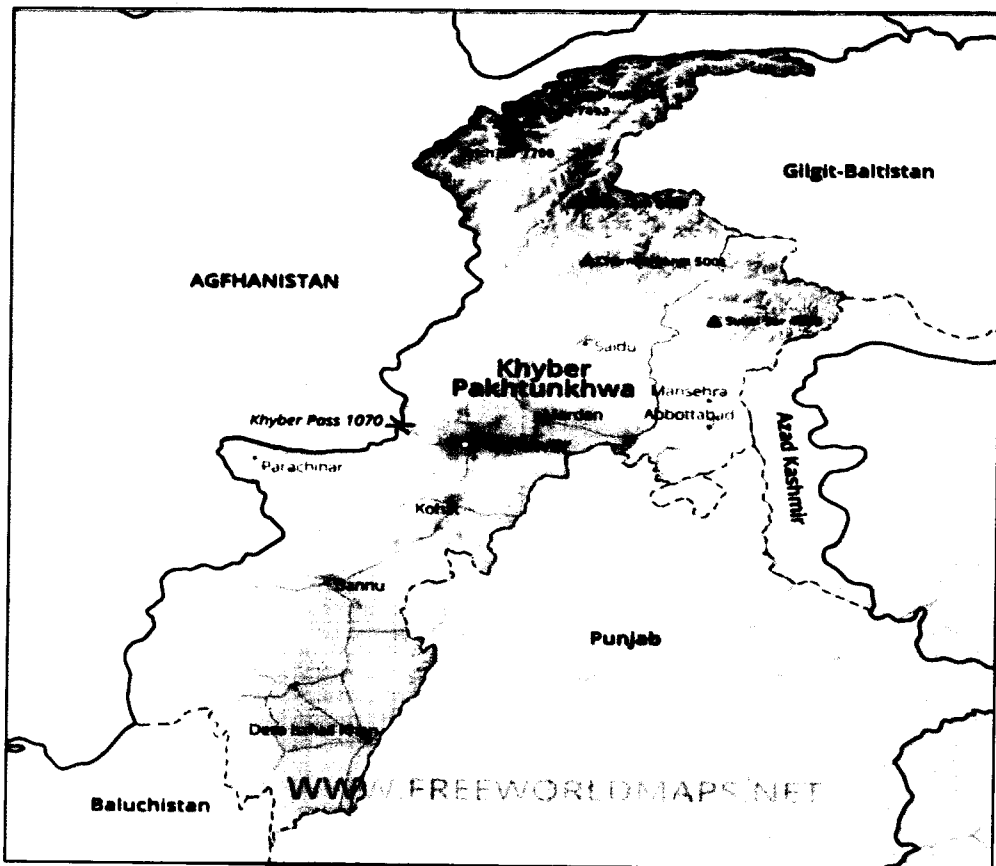


Figure 3.2: Map of Province Khyber Pakhtunkhwa of Pakistan

3.2.3.1 The Provincial Government of Khyber Pakhtunkhwa

The Provincial Government of Khyber Pakhtunkhwa (<http://kp.gov.pk/>) is headed by a Chief Secretary (https://kp.gov.pk/page/welcome_to_khyber/page_type/message) in the provincial secretariat. Different departments made the services available to the citizens under the law. Administratively the province has been divided into 7 divisions (<http://kpboit.gov.pk/digital-mapping-of-kp-districts/>), 36 districts (kpboit.gov.pk/digital-mapping-of-kp-districts/, https://kp.gov.pk/page/kp_towns_places), 105 tehsils (<https://www.lgkp.gov.pk/>), 986 union councils (<https://www.lcakp.org.pk/>) and 2989 village councils (<https://www.lgkp.gov.pk/directorate-general/vcnc/>). Governor of Khyber Pakhtunkhwa (<https://kp.gov.pk/>) is the custodian of the province as representative of the federal government while the Chief Minister (CM) along with his cabinet enjoys the executive authorities and becomes answerable to public as to their representatives in provincial assembly with respect to governmental matters.

3.2.3.2 The Provincial Assembly of Khyber Pakhtunkhwa

The “Provincial Assembly of KP” (<https://www.pakp.gov.pk/>), recognized under “Article 106” of the “Constitution of Pakistan”, is an autonomous unicameral legislative provincial body of province in Pakistan and works for provincial legislation. Previously it was composed of 124 total members including 99 regular seats and 25 reserved seats; 22 for Women and 3 for Non-Muslims reserved seats. After merger of FATA with KP under the 31st Constitutional Amendment Act, 2018 in National Assembly (https://na.gov.pk/uploads/documents/1527169356_307.pdf) and 25th Constitutional Amendment Act, 2018 in KP Assembly (<http://www.pakp.gov.pk/2013/bills/the-constitution-twenty-fifth-amendment-act-2018/>), the number of seats increased to 145 in total with an addition of 16 general seats and 5 reserved seats inclusive of 4 for women and 01 for Non-Muslims.

Currently, 16 Ministers including a Minister on Environment, Forest and Wildlife portfolio (<https://www.pakp.gov.pk/cabinet-composition/>), 3 parliamentary secretaries, one advisor to Chief Minister, and 09 special Assistants to Chief Min-

ister comprise the provincial cabinet under the chair of Chief Minister, the Leader of the House. One standing committee of the provincial assembly is functional on the subject of Environment comprising 14 members including a Chairperson. The official website of KP assembly can be accessed online at link; (<https://www.pakp.gov.pk/>)

3.2.4 Punjab

Punjab, being the largest province with respect to population (110,012, 442) (Pakistan Bureau of Statistics Census Results 2017; <https://www.pbs.gov.pk/content/final-results-census-2017>). Among other provinces, Punjab has HDI of 0.567 as of 2018 (<https://globaldatalab.org/shdi/shdi/>) and located geo-politically at important position, with area of 205344 sq. km. and literacy rate 64.7% (<https://www.thenews.com.pk/print/738566-the-road-to-school>). The figure 3.3 shows the map of province Punjab. (Source: <https://logofmaps.wordpress.com/2015/10/28/maps-of-punjab-pakistan/>)

3.2.4.1 The Provincial Government of the Punjab

The main governmental body of the province is Provincial Assembly (<https://www.pap.gov.pk/>) with a Chief Minister as Leader of the House (<https://cm.punjab.gov.pk/>) and administratively the province is comprised of nine (09) divisions administered by Commissioners, 36 districts under administrative control of Deputy Commissioners, 146 tehsils towns and 7,602 union councils (<https://www.punjab.gov.pk/districts>, https://lgcd.punjab.gov.pk/UCs_in_District_Councils).

3.2.4.2 The Provincial Assembly of the Punjab

The “Provincial Assembly” is the autonomous figure and is the main unicameral legislature of the province, with administrative independence under Article 87 of the Constitution, read with Article 127, to have a separate Secretariat to run the business of the Government, the Governor of the Punjab, in terms of the provisions of the Article 139 (as adapted in 1973), made the “Punjab Government Rules of Business, 1974” according to Sr.No.18 (iii) of which it is having the status of attached department of

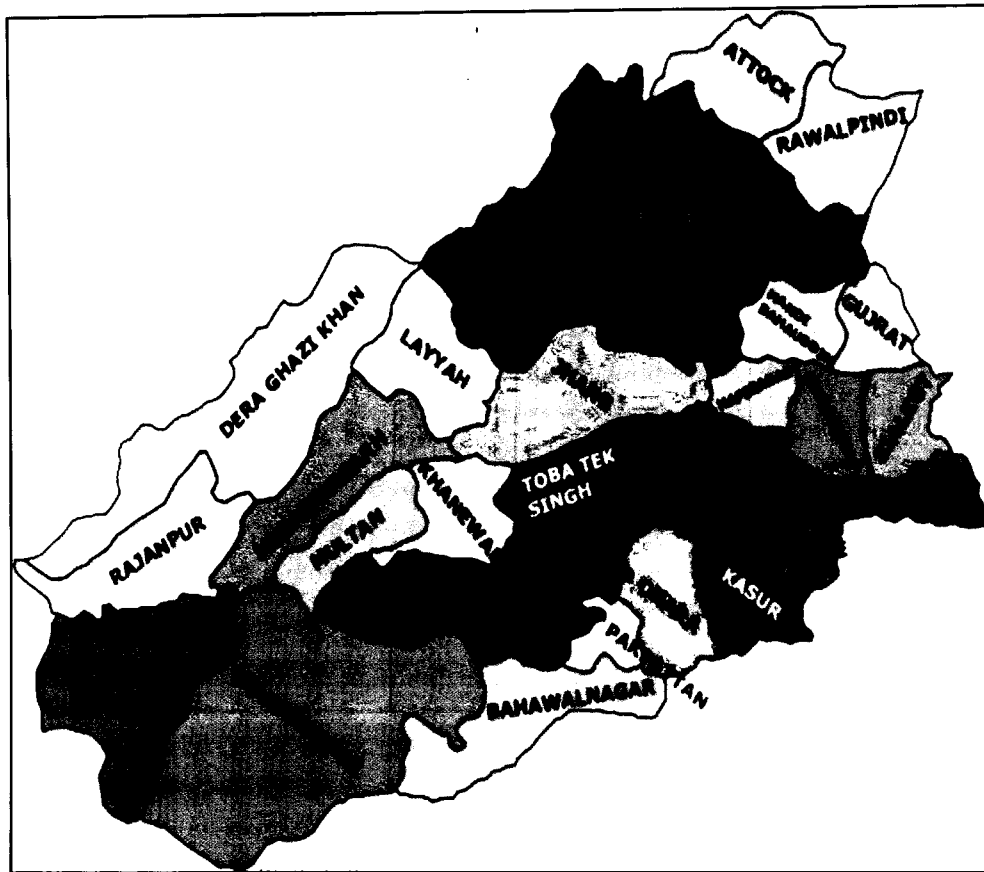


Figure 3.3: Map of Province Punjab of Pakistan

Law. Figure 3.4 shows the Organogram of Secretariat Punjab Assembly. (Source: <https://www.pap.gov.pk/en/about-secretariat/organizational-setup>)

3.2.5 Sindh

Sindh, also known as **Bab-ul-Islam** (The Gateway of Islam) is located in the southern east of Pakistan, being the second largest province in population, the second largest economy of the country, and the third largest province by area. It shares border with province Punjab in the North, Balochistan at west, Gujarat and Rajasthan (The Indian states) are at its east while in its south the Arabian Sea is there. The area of Sindh is 140914 km² (54407sq mi) and population is 47,886,051 (Urban 52.02 and Rural 47.98)

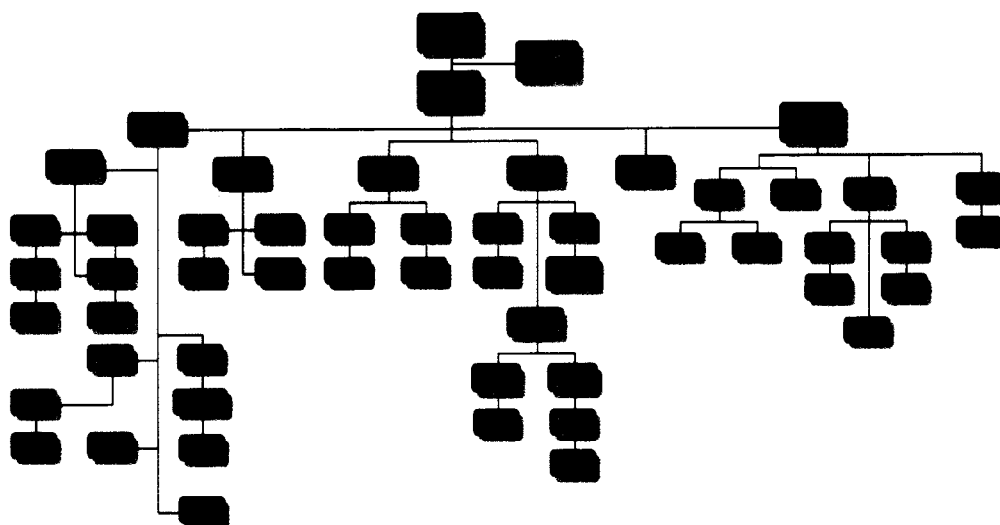


Figure 3.4: Organogram of Secretariat Punjab Assembly

with density of 340km² (880 sq mi) and HDI 0.533.

Two main commercial sea ports including bin Qasim Port and Karachi Port are present in Sindh. The diverse culture dominates the teachings of Sufism with various Sufi shrines in the province. Two UNESCO World Heritage Sites are existing in Sindh; “The Historical Monuments at Makli” and “Archaeological Ruins at Mohenjo-Daro”. The word “Sindhu” of Sanskrit originated the word Sindh, which means a river, with reference to River Indus. The Figure 3.5 shows the map of province Sindh of Pakistan. (Source: <https://www.sindh.gov.pk/images/map.JPG>)

3.2.5.1 The Provincial Government of Sindh

The Provincial Govt. of Sindh (<https://sindh.gov.pk/>) the gateway to all government services of Sindh. The main governmental body of the province comprises a Governor, a Chief Minister, a Chief Secretary, Provincial Assembly and High Court of Sindh. Administratively, the province is divided in seven (07) divisions administered by Commissioners, thirty (30) districts under administrative control of Deputy Commissioners, 138 tehsils towns and 1108 union councils (<http://www.shrc.org.pk/info-districts.php>).

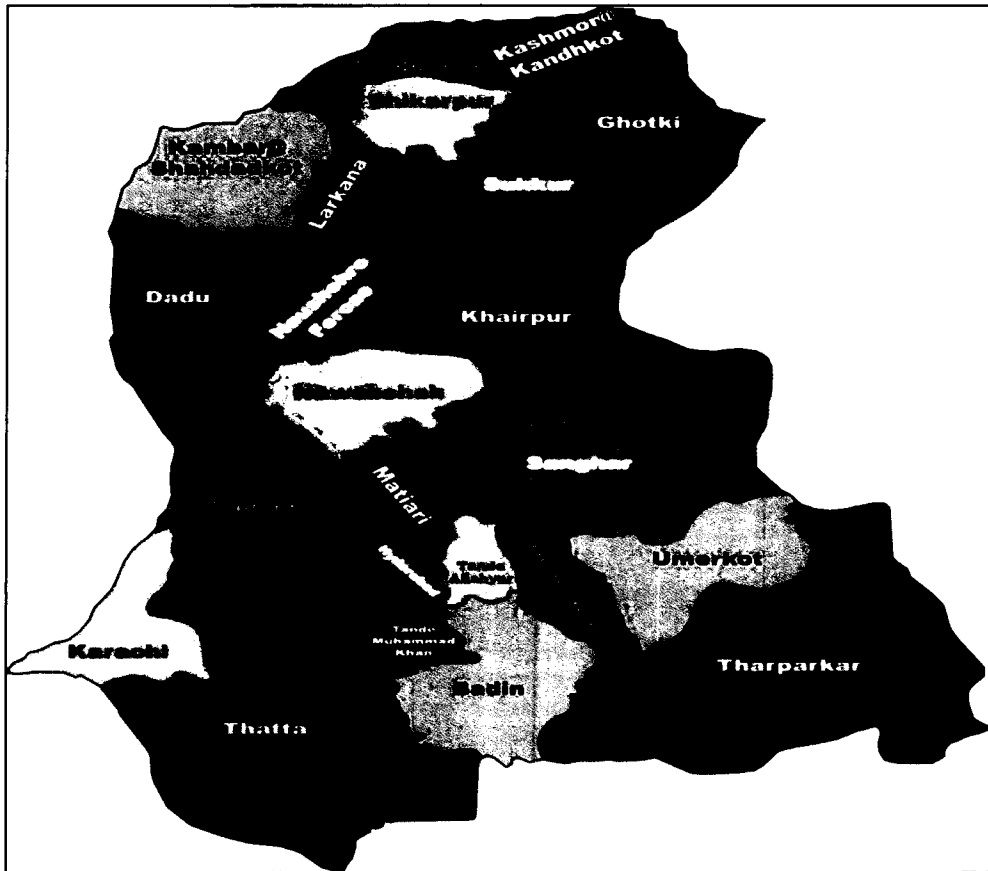


Figure 3.5: Map of Province Sindh of Pakistan

3.2.5.2 The Provincial Assembly of Sindh

A constitutional division of powers has been provided to the provincial governments in the federally nature of constitution (1973) of Pakistan under which the provinces have provincial autonomy. The provinces of Pakistan enjoy this autonomy and Sindh is not an exception. So, this assembly is a unicameral legislature, comprising of a single chamber. The duration of selected members is five (05) years in case, otherwise if dissolved before the time due to any of the reasons. Presently Mr. Agha Siraj Khan Durrani is performing as Speaker and Ms. Rehana Laghari as “Deputy Speaker” of the “Provincial Assembly of Sindh”. Syed Murad Ali Shah, being the “Chief Minister” (<https://cm.sindh.gov.pk/>), the leader of the House while Syed Firdous

Shamim Naqvi is the **Leader of Opposition** (<http://www.pas.gov.pk/>).

Currently seventeen (17) **Provincial Ministers**, three (03) **Advisors to Chief Minister Sindh** and sixteen (16) **Special Assistants to Chief Minister Sindh** are having different portfolios in the cabinet of Sindh headed by “Chief Minister”. The “Sindh Assembly” consists of 168 numbers of total seats out of which general seats are 130 and reserved seats for Women are 29 while 09 seats are reserved for Non-Muslims. One (01) standing Committee on the subject of Environment is also working in the provincial assembly of Sindh. The Provincial Assembly with its official website can be accessed online at link; (“<http://www.pas.gov.pk/index.php/home/en>”)

3.2.6 Balochistan

Balochistan is the western most and the largest province of Pakistan, expanding to area of 347,190 Square Kilometers (Sq. Kms.). Balochistan, Arabian Sea is present in its south, Afghanistan in the northwest and Iran in the west (<http://balochistan.gov.pk/>). Comprising 43.6 % of country part with clustered and the smallest proportion of population (Zia, 2018) of about 12,344,408 as reported in census of 2017, and with low density per Sq. Km. as compared to other provincial units of the sovereign nation state of Pakistan. Figure 3.6 shows the map of province Balochistan. (Source: <https://balochistan.gov.pk/districts/>)

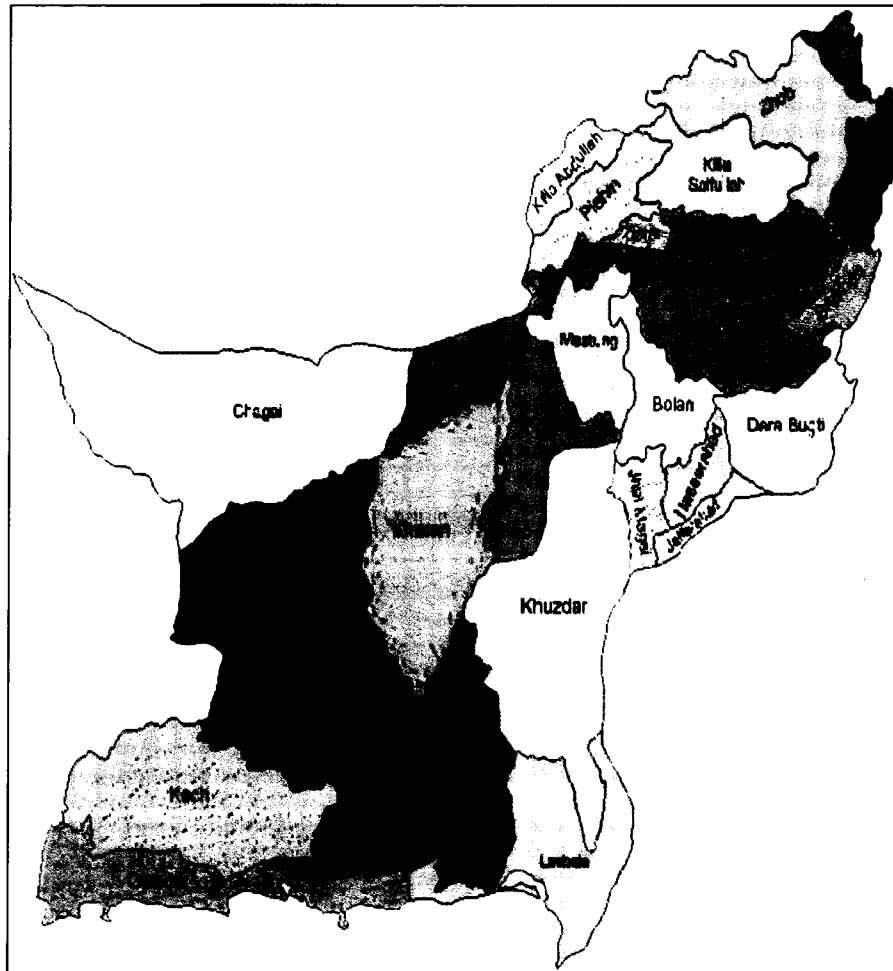


Figure 3.6: Map of Province Balochistan of Pakistan

3.2.6.1 The Provincial Government of Balochistan

Presently the province comprises thirty three (33) districts administrative boundaries and seven (07) divisions (<https://balochistan.gov.pk/explore-balochistan/about-balochistan/>).

3.2.6.2 The Provincial Assembly of Balochistan

The Presidential Order on March 30, 1970 caused the being of the Provincial Assembly of Balochistan (<https://pabalochistan.gov.pk/new/>), as Balochistan was declared as a separate province after the termination of one unit.

With composition of twenty one (21) seats in total, comprising twenty (20) general seats in addition of a single (01) reserved seat for women, the first election of the “Provincial Assembly of Balochistan” took place on December 17, 1970 and first session of newly elected assembly happened on May 02, 1972. Since then, the Provincial Assembly of Balochistan has observed total eleven (11) elections and grown up to recent composition of sixty five (65) memberships including fifty one (51) General Seats, eleven (11) reserved for Women and three (03) seats for Minorities.

After the 18th constitutional amendment of 2010, like all other provincial assemblies, AJK Assembly and GB Assembly, the Balochistan Provincial Assembly has been authorized to make legislation followed by taking proper decisions on the matters of Environment and Ecology including others like Nuclear Energy, Defense, etc. (Fourth Schedule of The Constitution of Pakistan). Moreover, without the required approval of Assembly of Balochistan, the Provincial Government is not authorized to formulate new laws or to announce new taxes.

3.2.7 Azad Jammu and Kashmir

Azad Jammu and Kashmir, the Western Part of larger region of Kashmir holds a self-governing state under the administrative set up of Pakistan. The AJK having literacy rate of 76.8% with its own official flag and national anthem comprises the Western part of larger Kashmir, shares borders with Gilgit-Baltistan in its north, to Punjab Province in its south and to Khyber Pakhtunkhwa in the west. The population of AJK is 4,045,366 (<https://www.pndajk.gov.pk/uploadfiles/downloads/Statistical%20Book%202017%20Final.pdf>) with a density of 300/km² (790/sq mi), with HDI of 0.611 and geographically a total area of 13,297 km² (5134 sq mi) with city of Muzaffarabad as its capital (Figure 3.7). Figure 3.7 shows the map of AJK. (Source: <https://pmajk.gov.pk/ajkmap>)

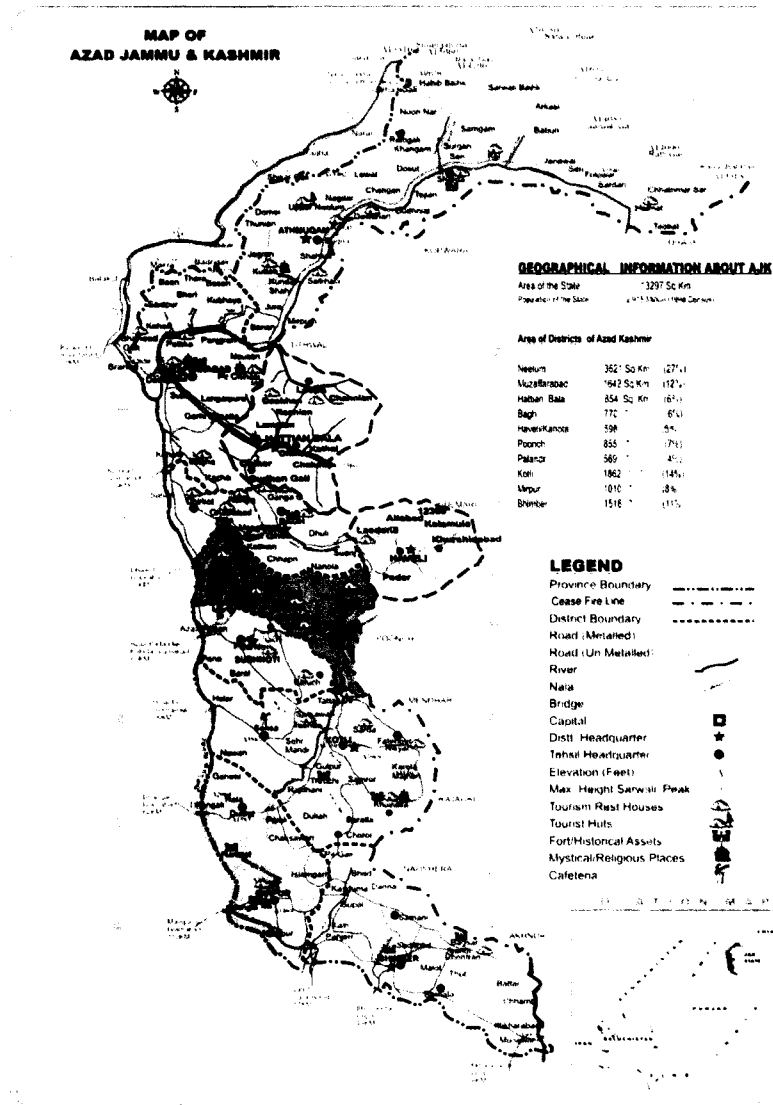


Figure 3.7: Map of Azad Jammu and Kashmir, Pakistan

3.2.7.1 The Government of Azad Jammu and Kashmir

The main governmental body of Azad Jammu and Kashmir (<https://www.ajk.gov.pk/>) is Azad Jammu and Kashmir Assembly (<https://ajkassembly.gok.pk/>). Administratively the area has been divided in three (03) divisions, ten (10)

districts, thirty two (32) tehsils with one eighty three (183) union councils. The details of these divisions are as; Division Muzaffarabad (districts Muzaffarabad, Hattian, Neelam Valley), Mirpur (districts Mirpur, Kotli, Bhimber) and Poonch (districts Poonch, Haveli, Bagh and Sudhanoti). The unicameral AJK Legislative Assembly, with a strength of 49 members, elects both the Prime Minister (supported with a cabinet from members of AJK Legislative Assembly) serves as the Chief Executive of AJK (<https://www.ajkpm.gov.pk/>) and President (the Constitutional Head of the State) (<https://www.presidentajk.gov.pk/>). The AJK owns its own independent “Supreme Court” (<https://ajksupremecourt.gok.pk/>) and a “High Court” (<http://www.ajkhighcourt.gok.pk/>). The “Legislative Assembly” of AJK is the autonomous body, comprising a cabinet of 29 ministers.

3.2.8 Gilgit-Baltistan

Gilgit-Baltistan (GB), has Gilgit city as the capital while Skardu is the largest city, has an area of 72,971 km², population of 1,249,000. It has population density of 17/km², HDI 0.593 and literacy rate of 72%, the highest in Pakistan, (<https://gilgitbaltistan.gov.pk/>). The previously famous as “Federally Administered Northern Areas (FANA)” and emerged as a separate unit in 1970 with the same title, with a consolidation of previous “Gilgit Agency”, “Baltistan” and many smaller “princely states”, including Nagar and Hunza, the northernmost region administered as a secretarial territory by Pakistan and constitute the northern part of the greater “Kashmir region”, presently known as Gilgit-Baltistan. Being located in the north with Azad Jammu and Kashmir to south, the KP area toward the west while Wakhan Corridor of Afghanistan, Xinjiang province of China in its east and upper east and Indian-controlled Union regions Jammu and Kashmir and Ladakh toward the south-east, the Gilgit-Baltistan is the most beautiful part of the country (<https://www.britannica.com/place/Azad-Kashmir>). The Line of Control (with approximate total length of 528km), the de-facto border between India and Pakistan, separates its border from “Indian-administered union territories” of “Jammu and Kashmir”. Limited autonomy was granted to “Gilgit-Baltistan” through “Self Governance Order” in 2009 followed by giving it the status of provisional province after 2020 GB Assembly election. The Figure 3.8 shows the map of Gilgit-Baltistan. (Source:

<http://gilgitbaltistan.gov.pk/Default.aspx>

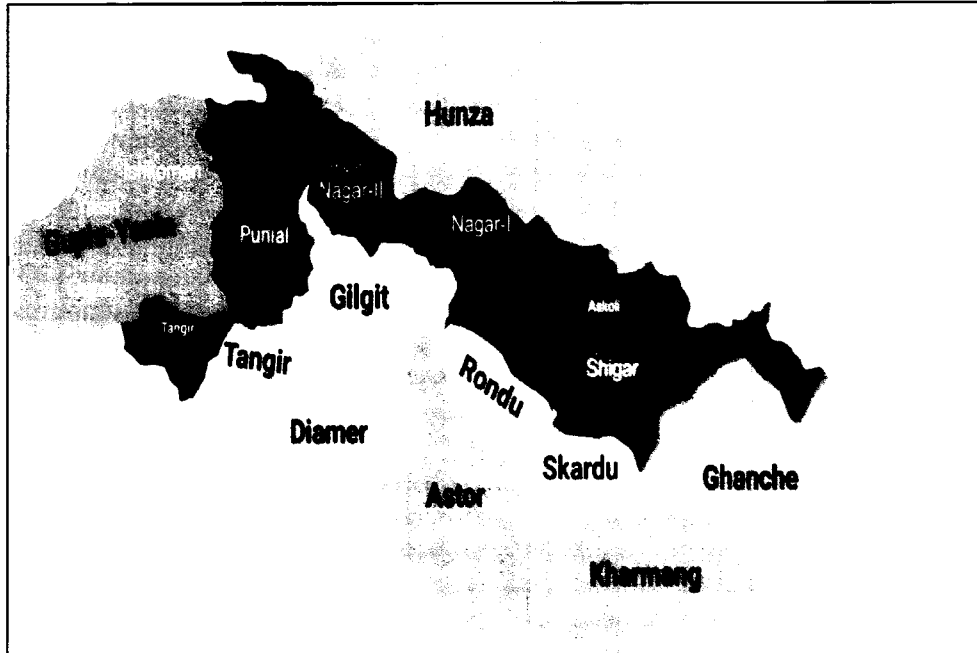


Figure 3.8: Map of Gilgit Baltistan, Pakistan

3.2.8.1 Gilgit Baltistan Government

Gilgit Baltistan (GB) Government is a self-governing autonomous territory, empowered through “Gilgit-Baltistan Empowerment” and “Self-Governance Order of 2009” by the cabinet of Pakistan (<https://gilgitbaltistan.gov.pk/>). The government comprises a cabinet which is selected from Members of GB Assembly. Chief Minister (<http://www.cmgb.gov.pk/>) serves as head of the government and elected by majority of assembly members while Governor is the head of the state/province. The Gilgit-Baltistan Police has liability to enforce the law in GB. Prevention and detection of criminality is the task of police force and it is responsible to maintain the lawful situations through enforcement of the “Constitution of Pakistan”.

Gilgit-Baltistan, administratively consists of 03 divisions and fourteen (14) districts. The divisions include Gilgit (comprising districts Gilgit, Khizer, Hunza, Nagar and

Gupis-Yasin), Baltistan (comprising districts Ghanche, Shigar, Kharmang, Skardu and Roundu) and Diamer (Comprising districts Diamer, Astore, Darel and Tangir).

3.2.8.2 The Legislative Assembly of Gilgit Baltistan

A unicameral legislature of Gilgit-Baltistan Assembly, comprising thirty three (33) members in total including twenty seven (27) male out of which (24) through general election and three (03) on reserved seats for professionals or technocrats) and six (06) female members on women reserved seats. Chief Minister, being Chief Executive and Leader of the House selects cabinet from elected members and both Chief Minister and cabinet run the government system and are responsible for overall governmental issues. Leader of Opposition leads the Opposition Benches in the House. A Speaker and a Deputy Speaker, both are elected among the assembly members. Speaker preserves the decorum of the House along with some other functions and powers while Deputy Speaker takes the position of Speaker in his absence.

3.2.9 Jurisdictional and Territorial Scope

The study was designed to cover the total jurisdictional and regional scope of Pakistan consists of four sub-national administrative divisions (provinces) namely Khyber Pakhtunkhwa province, Punjab province, Sindh province and Balochistan province along with Federal Capital Islamabad, beside two administrative areas i.e., Gilgit Baltistan and Azad Jammu Kashmir region. The total territorial scope is over a span of of 881,913 square kilometres with a populace of 212.2 million.

3.3 Research Approaches, Methods and Procedures

This study employed both qualitative and quantitative approaches and methods to meet requirements of its set objectives. For qualitative output under objective 1, Literature Review and Content Analysis of legal, regulatory and institutional mandates and capacities was carried out. A detailed problem tree analysis (bin Jailani et al., 2014; Iqbal et al., 2020; Norris et al., 2012) was done for setting the criteria and indicators for quantitative analysis under the scope of objective 2. Simple Multi-attributable Rating Technique (SMART) of Multi-criteria Decision Analysis (MCDA) method (Hassan

et al., 2019) was employed to get quantified indices at the level of different constituencies. Based on a structured questionnaire cum matrix, field survey was undertaken for a cross-section data of 380 Key Informant Interviews (KIIs) to evaluate the environmental governance after 18th amendment against set criteria.

Key informants included relevant government officials from Environmental Protection Departments at federal, provincial and district levels, environmentalists, academia, members/representatives of NGOs and ENGOs, policy experts and technical experts.

. Figure 3.9 describes the research design, while following sections provide detail of various steps.

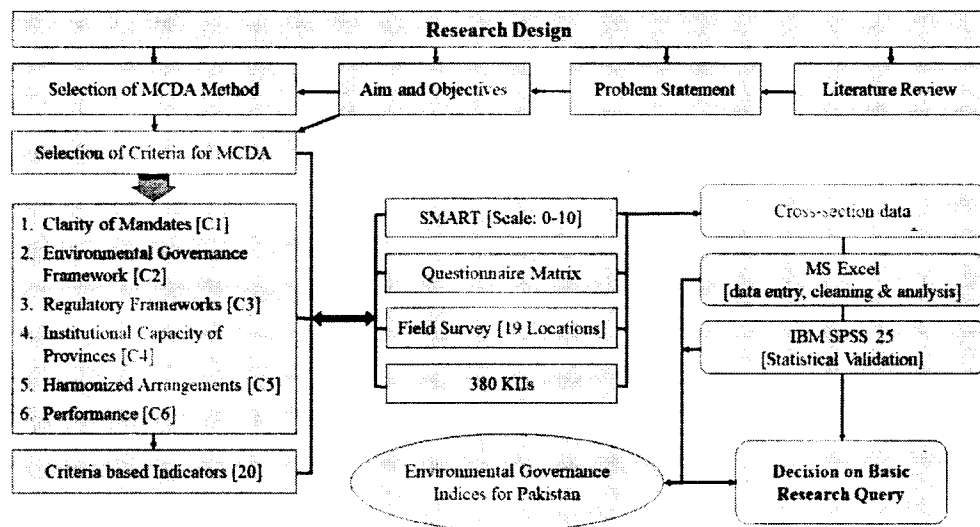


Figure 3.9: Flow Chart of Research Design for the Study

3.3.1 Document Study

At the outset, the existing available peer review literature on environmental governance system in general and with particular context to Pakistan was focused. Government reports pertaining to Millennium Development Goals (MDGs), Sustainable Development Goals, policies, procedures, Short & Medium Term Targets and periodicals at provincial and national levels were thoroughly studied/analysed. Reported literature

covered a wide range of legal and administration related points/markers, from National to Provincial and District levels. Additionally, the writing identified with global ties under multilateral environmental governance to which Pakistan is a signatory. The literature reviewed, provided baseline for criteria and indicator setting, data collection and questionnaire design.

3.3.2 Secondary Data Collection

International Islamic University Islamabad (IIUI) and Higher Education Commission (HEC) online digital libraries were consulted to access peer reviewed publications, while, offices of Federal and Provincial Environmental Protection Agencies (EPAs) as well as planning departments from top to bottom level were approached for the collection of relevant published/unpublished reports as deemed important towards the objective of the study.

3.3.3 Selection of Criteria and Indicators

Based on literature review, key factors which influence the environmental governance framework in a country were tabulated. Based on these factors, following criteria and indicators were set Table 3.1 to analyze the impact of 18th Constitutional Amendment of the Islamic Republic of Pakistan on environmental governance in Pakistan.

Table 3.1: Formulated Criteria and Indicators for the Study

S.No.	Criteria	Indicators
1	Clarity of Mandates: Clarity of institutional mandate of federal and provincial governments is essential to define role and responsibilities in performing functions at local, national and international levels	i) Notified distribution of functions of concerned institutions of federal and provincial governments, ii) Notified status of PEPA, 1997, iii) Notified jurisdiction of PEPA, 1997 after 18th amendment, iv) Obligations of MEAs
Continued on next page		

Table 3.1 – continued from previous page

S.No.	Criteria	Indicators
2	Environmental Governance Framework: Environmental governance frameworks in term of policy, law and institutions at provincial levels is the basic requirement	Development of: i) Environmental Policy, ii) Environmental Act, iii) Environmental Institutions as provided in Act.
3	Regulatory Frameworks: Without rules and regulations law cannot be enforced	Development of: i) Rules and Regulations, ii) Adoption of existing federal rules and regulations
4	Institutional Capacity of Provinces Institutional capacity in all aspects is essential requirement for enforcement of environmental rules and regulations made under the law.	Institutional capacity is adequate: i) Human capacity, ii) Technical capacity, iii) Technological capacity, iv) Financial capacity
5	Harmonized Arrangements: For discharging international obligations on state under MEAs, there must be a harmonized arrangement between federal and provincial institutions.	Development of mechanisms of: i) Data and information sharing, ii) Distribution of tasks between federal and provincial institutions
6	Performance	i) Pollution Control, ii) Climate Action, iii) Urban planning, iv) Sustainable Resource Exploitation, v) Green Growth

3.3.4 Assigning Criteria Score

Simple Multi-attribute Rate Technique (SMART) was processed to rate different criteria (Edwards, 1977). SMART is being recommended and used for assigning criteria, weighing, and normalization for policies.

The key informants belonging from different professional backgrounds including relevant government officials from Environmental Protection Departments at federal, provincial and district levels, environmentalists, academia, members/representatives of NGOs and ENGOs, policy experts and technical experts were asked to rank (0-10) significance score of each criterion for post 18th amendment environmental governance in Pakistan. The respondents were given option to assign minimum zero point to criteria and increasing scores with respect to increased significance, maximum of 10 score points (den Herder et al., 2017; Taylor Jr and Love, 2014; Wang et al., 2009). The average score for each criteria was tabulated.

3.3.5 Primary Data Collection Procedure

For the purpose of primary data collection, an action plan was prepared for field survey. Prior to conduct of field survey, necessary tools were prepared including a structured questionnaire cum MCDA's SMART scoring matrix.

In social sciences and environmental governance discipline, questionnaire based MCDA method is widely practiced and considered most reliable to support decision-making process. The questionnaire was developed by utilizing criteria and indicators and employing MCDA's SMART scale (i.e. 0 to 10), including zero for scoring. Average score for each criteria was used to calculate overall governance index score and ranked in accordance with following ordinal scale.

- Not applicable or No measure yet = Zero (0);
- Very Poor from 0.01 to 1.99;
- Poor from 2.00 to 3.99;
- Considerable from 4.00 to 4.99;
- Fair from 5.00 to 5.99;

- Good from 6.00 to 7.49;
- Very Good from 7.50 to 8.99; and
- Excellent from 9.00 to 10.0

Table 3.3 provides list of 19 districts of four provinces; Punjab, Khyber Pakhtunkhwa, Sindh and Balochistan including AJK, GB and federal capital Islamabad selected for collection of data.

Table 3.2: SMART Scoring Questionnaire cum Matrix.

S.No.	Principle	Criteria	Indicators	Score(0-10)*	Indicator wise Index Score
1	Environmental Governance Framework after 18th Amendment should have Vertical as well as Horizontal Coherence	Clarity of Mandates	There exists notified distribution of functions of concerned institutions of federal and provincial governments		
			Post 18th Amendment status of PEPA, 1997 has been re-notified		
			Post 18th Amendment jurisdiction of PEPA, 1997 has been re-notified		
			Responsibilities for obligations of MEAs is clear among federal, provincial and district departments.		
2	Environmental Governance Framework	Environmental Governance Framework	Federal and provincial ministries have developed their environmental policies after 18th Amendment		
			Federal and provincial departments have formulated their environmental acts.		
Continued on next page					

Table 3.2 – continued from previous page

S.No.	Principle	Criteria	Indicators	Score(0-10)*	Indicator wise Index Score
3			Federal and provincial governments have established environmental institutions as provided in their Acts.		
		Regulatory Frameworks	Rules and Regulations are revised/promulgated at federal and provincial levels after 18th Amendment		
			Where necessary provinces have notified adoption of existing federal rules and regulations.		
4			Institutions have adequate human resource to fulfill their tasks.		
		Institutional Capacity of Provinces	Institutions have adequate technical capacity (experts/scientists) to fulfill their tasks.		
			Institutions have adequate technological capacity (labs, monitoring equipment) to fulfill their tasks.		
			Institutions have adequate financial capacity to fulfill their tasks.		
Continued on next page					

Table 3.2 – continued from previous page

S.No.	Principle	Criteria	Indicators	Score(0-10)*	Indicator wise Index Score
5		Harmonized Arrangements	Mechanisms are available for information and data sharing between various sectoral departments at federal and provincial levels. Harmonized arrangements exist for distribution of tasks between various sectoral as well as federal and provincial institutions		
6		Performance	Performance of federal and provincial institutions in terms of pollution control Performance of federal and provincial institutions in terms of actions taken for climate change mitigation, vulnerability assessment and adaptation strategies Performance of federal and provincial institutions in terms of urban planning		
Continued on next page					

Table 3.2 – continued from previous page

S.No.	Principle	Criteria	Indicators	Score(0-10)*	Indicator wise Index Score
			Performance of federal and provincial institutions to ensure sustainable resource exploitation Performance of federal and provincial institutions in terms of green growth		

Table 3.3 shows the detail of 19 locations from where cross-section data was collected by conducting 380 Key Informant Interviews (KIIs) in Pakistan through a purposive sampling:

Table 3.3: Sampling Locations for the Study

Sr. No.	Location	Governance Tier
1	Islamabad	Federal
2	Lahore	Provincial
3	Multan	District
4	Dera Ghazi Khan	District
5	Mianwali	District
6	Karachi	Provincial
7	Nawabshah	District
8	Larkana	District
9	Kashmore	District
10	Peshawar	Provincial
11	Abbottabad	District
12	Karak	District
13	South Waziristan	District
14	Quetta	Provincial
15	Gwadar	District
16	Lasbella	District
17	Jhal Magsi	District
18	Muzaffarabad	Capital/District
19	Gilgit	Provincial/District

3.3.6 Data Entry, Cleaning and Analysis

Raw data was entered and cleaned in MS Excel (2016) software. Governance indices, graphics along-with data-sets for the application of Kruskal-Wallis (KW), Pearson Correlation (PC) and Principal Component Analysis (PCA) in IBM SPSS 25 were developed in the same software.

3.3.7 Statistical Analysis

Three statistical validation tests i.e. Kruskal-Wallis, Pearson Correlation and Principal Component Analysis (PCA) were run by using IBM SPSS 25. The purpose of Kruskal-

Wallis Hypothesis test was to examine the normality of the sample by looking at diversity of responses by the respondents. Pearson Correlation was done for understanding the association between different variables (criteria) of the study.

Application of Principal Component Analysis (PCA) was considered very unique for avoiding any confusion in the study as there seemed an ambiguity for the dependent and independent variables, although the criteria of performance could be dependent variable. The other influencing factor for the application of PCA was to overcome the challenge of multi col-linearity. For this study, PCA was done for 19 locations covering three different governance tiers in Pakistan. Each constituency was denoted by numbers like Islamabad by 1, Lahore by 2 and so on. Analysis was done with the help of Scree and Bi-plot.

Basically, "PCA" is a process based method for the computation of the principal components for a data-set without discrimination for dependent and independent variables, and utilizing these for alteration on the basis of available data. PCA technique is very old as it was created in 1901 by Karl Pearson, as an "analogue of the principal axis theorem in mechanics" (Bello and Rilwani, 2016; Giannopoulos, 2016; Guo et al., 2016; Liu, 2020; Noronha et al., 2016). It is a reliable technique to a greater extent that is why it is usually practiced for the purpose of reduction of dimensionality in almost all scientific disciplines (Abdi and Williams, 2010). For the maximization of the variance of a projected data-set, 1st principal component equivalently serves as direction. PCA is defined as "an orthogonal linear transformation that transforms the data to a new coordinate system such that the greatest variance by some scalar projection of the data comes to lie on the first coordinate (called the first principal component), the second greatest variance on the second coordinate, and so on".

PCA produces a linear change in data-sets having values of desired variables, which are called coordinates, to measure spaces specifically. This kind of linear change / transformation supports the data-set to be fitted into another system model to observe the main variance on primary coordinate, in a symmetrical manner and to have a reduced level of variance (Ringnér, 2008). So, it enables to change the bunch of x correlated factors over the y tests, and to a bunch of p uncorrelated principle components over same samples.

3.3.7.1 Eigenvalues and Eigenvectors Associated to PCA

Basically, “Eigenvectors” is a direction such as “vertical” or “45 degrees” and its digits for “eigenvalues” describe data-set’s variations. The highest digit in a data-set forms the 1st principal component (Dobriban, 2017; Roweis, 1997). “The number of eigenvalues and eigenvectors that exists is equal to the number of dimensions of the data-set.” (Weingessel and Hornik, 2000).

3.3.7.2 Mathematical Formulae Associate to PCA

In PCA, original data-set of n factors, which are corresponded to different degrees are changed to n quantities of uncorrelated PCs. The PCs are linear transformation of the first factors so that the first and the original variables have equivalent amounts of the differences. Albeit the quantity of PCs and original variables are equivalent, the initial not many PCs clarify most of the difference in the informational index, lessening the dimensionality of the first informational index. The PCs are sequenced from the most noteworthy to the least variation, i.e., the main PC portrays the information’s most elevated change extent. The following most elevated change is clarified constantly PC, etc. The values of PCs can be obtained from Equations

$$PC_1 = a_{11}x_1 + a_{12}x_2 + \cdots + a_{1n}x_n = \sum_{(j=1)}^n a_{1j}x_j \quad (3.1)$$

$$PC_2 = a_{21}x_1 + a_{22}x_2 + \cdots + a_{2n}x_n = \sum_{(j=1)}^n a_{2j}x_j \quad (3.2)$$

”where x_1, x_2, \cdots, x_n are the original variables and a_{jj} are the eigenvectors. The eigenvalues “are the variances of the PCs”. The “covariance or correlation matrix” of a data-set is utilized in deriving coefficients a_{jj} , ‘the eigenvectors’. Following formulae can be used to calculate the eigenvalues of a data-set:

$$|C - \lambda I| = 0 \quad (3.3)$$

“where C is the correlation/covariance matrix, λ is the eigenvalue, and I is the identity matrix”. Finally, following equation can be used to calculate the “PC coefficients or the

weights of the variables in the PCs”:

$$|C - \lambda I|_{a_{jj}} = 0 \quad (3.4)$$

Chapter 4

RESULTS: PART-I: ENVIRONMENTAL GOVERNANCE FRAMEWORK

4.1 General Summary

This chapter (Results: Part-I) has been titled as “Environmental Governance Framework” as it decodes the complete and overall state of environmental governance structure and function of Pakistan appeared after a deep analysis in the context of Eighteenth (18th) Constitutional Amendment in the constitution (known as Constitution of 1973) of the Islamic Republic of Pakistan at national level. The main theme in the study under consideration was to study the impact of Eighteenth (18th) Constitutional Amendment on Environmental Governance Systems in Pakistan, which was a very complex learning because of multi-dimensional discipline and cross cutting thematic melodies of the subject environment as well as the governance. This chapter has further seven parts deals with environmental governance framework of federal capital Islamabad, four provinces of Pakistan and Azad Jammu and Kashmir and Gilgit-Baltistan. Mainly, it provides the results for objective 1 of the study, which were produced with qualitative analysis thus providing the overall overview of environmental governance of the country in post 18th amendment scenario. Average score sheet based on respondents’ scoring data is

attached as Appendix-I.

4.2 Environmental Governance Framework of Pakistan

The results (Part-I) reveals the environmental governance framework of Pakistan after a through study and provides the concrete knowledge about the set objective 1 of the current study. The results are organized separately for federal capital Islamabad, all provinces including Khyber Pakhtunkhwa, Punjab, Sindh and Balochistan and for Azad Jammu and Kashmir and Gilgit-Baltistan.

4.2.1 The Federal Context - Federal Capital Islamabad

In this section, the results about environmental governance framework of federal capital Islamabad after 18th Constitutional Amendment has been explained;

4.2.1.1 Federal Ministry of Climate Change

In April 2012, “Ministry of National Disaster Management” was re-titled as the “Ministry of Climate Change” (MOCC) which was down-scaled to a “Division” in July 2013. Later on, it was again upgraded from Climate Change Division (CCD) to ministry at federation in Pakistan. The ministry now has 178 total employees strength which includes 58 officers and 113 staff members. Figure 4.1 portrays the organizational hierarchy of MoCC.

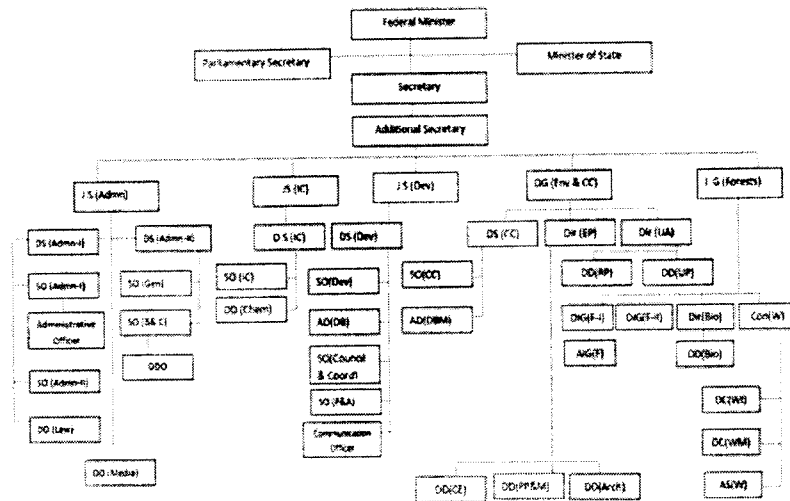


Figure 4.1: Organizational Hierarchy of MOCC

Currently, Ministry of Climate Change is the only ministry dealing with matters related to environmental protection and sustainable development at federal capital with a vision to mainstream climate change in the other economic sectors and to steer Pakistan towards climate resilient development. Formerly, it was named as “Ministry of Climate Change, Local Government (LG), & Rural Development (RD)”; and previously named as “Ministry of Environment” (MoE).

4.2.1.2 Attached Bodies/Department of MOCC

The attached departments of the “Ministry of Climate Change of Pakistan” includes;

- Pakistan Environmental Protection Agency (Pak-EPA)
- Global Change Impacts Studies Centre (GCISC),
- National Disaster Risk Management Fund (NDRMF)
- Zoological Survey of Pakistan (ZSP)
- Islamabad Wildlife Management Board (IWMB)

4.2.1.3 Pakistan Environmental Protection Council (PEPC)

PEPC established in compliance with PEPA, 1997 acted as a supreme decision-making body. Prime Minister Pakistan, is the chairman of the PEPC with all chief ministers of the provinces its members. As elaborated in PEPA, 1997, the role of PEPC is supervisory and it acted as a supreme decision making body before the 18th amendment. However, after 18th amendment provinces have constituted their own Provincial Environmental protection Councils (EPCs), and jurisdictional scope of PEPC remains ill-defined.

4.2.1.4 Pakistan Environmental Protection Agency (Pak-EPA)

Pak-EPA was established under section 5 of PEPA-1997 is an important attached department of MOCC, headed by a Director General (Present Director General, Ms. Farzana Altaf Shah) having authority of enactment of PEPA-1997 along with provision of all sorts of technical assistance to MOCC and comprises four directorates, including; Directorate of Admin/Legal/Enforcement (A/L/E), Directorate of Environmental Impact Assessment (EIA)/Monitoring, Directorate of Laboratories and National Environmental Quality Standards (LAB/NEQS) and Directorate of National Bio-safety Centre (NBC).

The enforcement of PEPA-1997, promulgation and enforcement of rules and regulations, approval of EIA and IEE, monitoring and inspections, issuance of certificates to establish environmental labs in the Islamabad Capital Territory (ICT), preparation, revision and establishment of national environmental quality standards (NEQS) after taking endorsement from PEPC, R&D in the scientific and technological arenas and education and awareness related to environmental issues to achieve the objectives set in PEPA-1997 are some of the major functions of Pak-EPA. Moreover, Pak-EPA is also responsible for dissemination of information providing guidelines to public on environmental related matters as together specify the safety measure to avoid mishaps and disasters which could result in contamination. Inspiring the foundation and functionality of NGOs, community and village based organizations to uplift the objectives of PEPA-1997 are also the functions to be performed by Pak-EPA. In addition to all above, the agency is authorized to hold inquiries and investigations in case of violation of rules and regulations. For the purpose Pak-EPA is authorized to take action at its own or upon

grievance from a person or organization. In short, function of Pak-EPA is to make rules and ensure their enforcement in the jurisdiction of ICT. Before 18th Amendment only Pak-EPA had the power to make the rules and regulations while provincial EPAs were just helping in enforcement in their respective jurisdictions.

Table 4.1: Environmental Policies, Acts, Rules and Regulations Enacted in Federal Capital Islamabad after 18th Amendment

Policies, Acts, Rules and Regulations Promulgated in Federal after 18th Amendment
Policies after 18th Amendment
National Forest Policy, 2017
National Climate Change Policy, 2012
National Sanitation Policy, 2012
National Rangeland Policy, 2010
Policies before 18th Amendment
National Drinking Water Policy, 2009
National Environment Policy (NEP), 2005
“National Resettlement Policy, 2002
Acts after 18th Amendment
Pakistan Climate Change Act, 2017
Acts before 18th Amendment
Pakistan Environmental Protection Act (PEPA), 1997
Rules and Regulations after 18th Amendment
Ban on (Manufacturing, Import, Sale, Purchase and Usage) Polythene bags Regulation, 2019
Pakistan Trade Control of Wild Fauna and Flora Rules, 2018
Handling, Manufacture, Storage, Import of hazardous Waste and hazardous Substances Rules, 2016
Amendment in Non-Degradable Plastic Product Regulations, 2015
Compounding of offenses and Payment of Administrative Penalty Rules, October 2015
Regulation on Prohibiting of Non-Degradable Plastic Bags and Products (Manufacture, Import, Sale and Usage) Regulations, 2013
National Environmental Quality Standards (NEQS) for Ambient Air, 2010
NEQS for Liquid Municipal and Industrial Effluents, 2010
National Environmental Quality Standards for Drinking Water Quality, 2010
National Environmental Quality Standards for Industrial Gaseous Emissions (mg/Nm ³) Air, 2010
Rules and Regulations before 18th Amendment
National Environmental Quality Standards for Motor Vehicle Exhaust and Noise, 2009
Hospital Waste Management Rules, 2005
Pakistan Bio-safety Rules, 2005
Draft Pakistan Environmental Protection Motor Vehicle Regulations 2016 under section 33 of Pakistan Environmental Protection Act, 1997

(Source: <https://environment.gov.pk/>)

4.2.2 Khyber Pakhtunkhwa Environmental Governance Framework

The environmental governance framework of province Khyber Pakhtunkhwa is given as follows;

4.2.2.1 Department of Forestry, Environment and Wildlife

In Khyber Pakhtunkhwa, at the provincial government level, the department is responsible for matter related to environment. The department is assisted by five attached departments as follows:

- Forest Department
- Wildlife department
- KP EPA
- Pakistan Forest Institute
- Forest Development Corporation

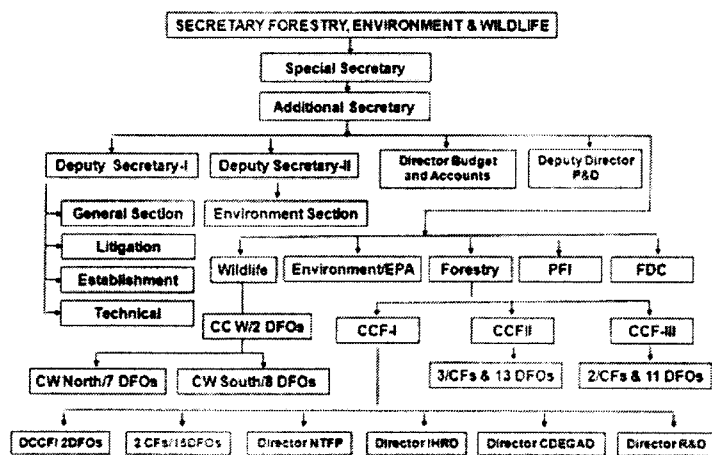


Figure 4.2: Organogram of Department of Forestry, Environment and Wildlife

Source: (<http://few.kp.gov.pk/page/organogram>)

4.2.2.2 Khyber Pakhtunkhwa Environmental Protection Council (KP-EPC)

Khyber Pakhtunkhwa-Environmental Protection Council was created under “Section 3” of Khyber Pakhtunkhwa Environmental Protection Act, 2014 with provincial chief minister as the chairman. The council is the apex decision making body for environmental protection in KPK. Its function is to approve policies, rules, regulations, guidelines and standards formulated by EPA and to oversee the performance and state of the environment of the province.

4.2.2.3 Khyber Pakhtunkhwa Environmental Protection Agency (EPA-KP)

EPA-KP was established in 1989 under the administrative and managerial governing of “Department of Physical Planning and Health, KPK”. Afterward, in 1992 EPA went to “Planning, Environment and Development Department”. And then it was again shifted to newly established “Environment Department”, with which it is now working with a vision to provide pollution free and healthy environment for the public of the province. Moreover, Six (06) certified laboratories registered with EPA-KP.

The Figure 4.3 shows the organogram of EPA-KP. Source: (<http://epa.kp.gov.pk/page/organogram>)

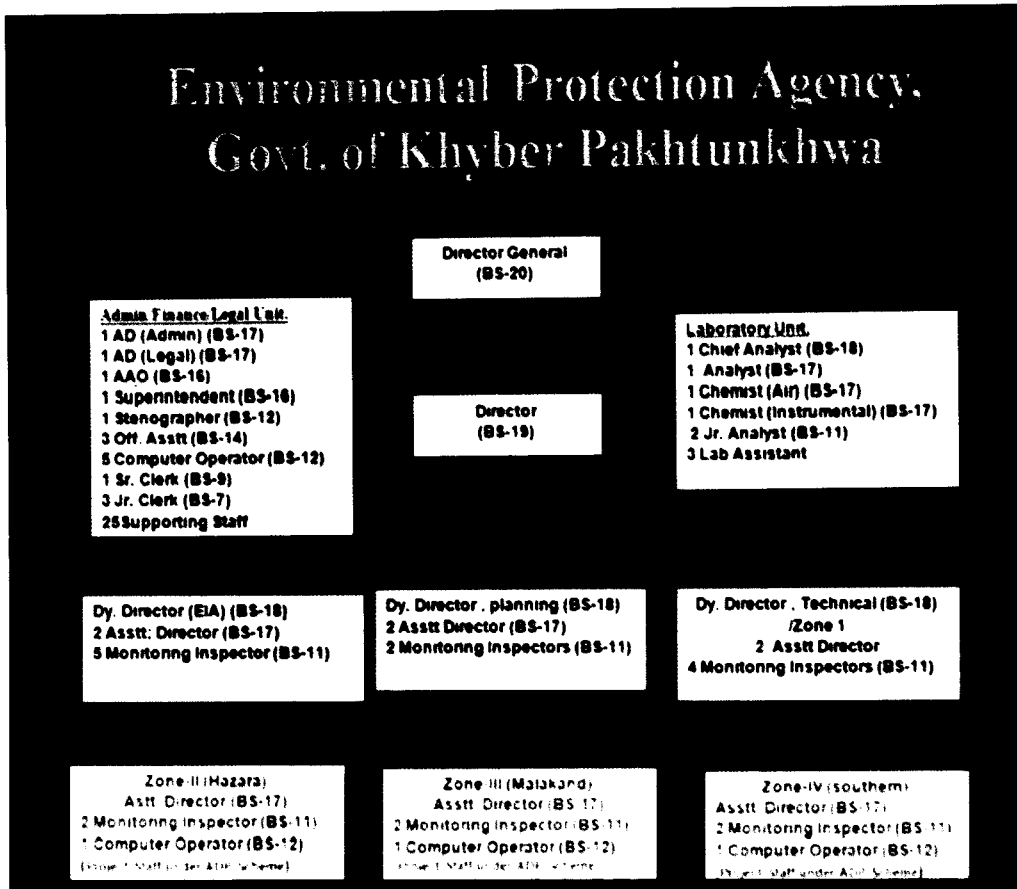


Figure 4.3: Organogram of EPA-KP, Government of KP

Before 18th Amendment, the Pak-EPA was responsible for monitoring and enforcement of the legal framework promulgated by Pak-EPA. After 18th Amendment, KP-EPA can now formulate and enforce its own rules. As a result of 18th Amendment, KP Environmental Protection Act has been promulgated in the province in 2014. Table 4.2 enlists policies, Acts, Rules and Regulations promulgated after 18th Amendment.

4.2.3 Punjab Environmental Governance Framework

The province Punjab comprises the following environmental governance framework;

Table 4.2: Environmental Policies, Acts, Rules and Regulations in Khyber Pakhtunkhwa after 18th Amendment

Policies, Acts, Rules and Regulations Promulgated in Khyber Pakhtunkhwa after 18th Amendment
Policies After 18th Amendment
Wildlife and Biodiversity (Protection, Preservation, Conservation and Management) Act, 2015
Khyber Pakhtunkhwa Rangeland Policy, 2014
Acts
The Khyber Pakhtunkhwa Environmental Protection Act, 2014, (Act No. XXXVIII). “Government of Khyber Pakhtunkhwa”
Rules and Regulations After 18th Amendment
Khyber Pakhtunkhwa Environmental Protection Tribunal Rules, 2016
Environmental Quality Standards, Water, 2010
Environmental Quality Standards, Noise, 2010
Environmental Quality Standards, Air, 2010

4.2.3.1 Ministry of Environment Punjab

Ministry of Environment Protection is headed by a Provincial Minister. Additionally, a Parliamentary Secretary has also been appointed to take care of the matter related to environment. Punjab government has constituted 36 standing committees of the provincial assembly, one of these “Standing Committee on Environment Protection” for “Environment Department” (from 2002-2007, 2008-2013, 2013-2018 and 2018 - to-date) (<https://epd.punjab.gov.pk/>) the latest of which comprising 11 members and one secretary.

4.2.3.2 Environment Protection Department – Punjab

The provincial “Environment Protection Department” (<https://epd.punjab.gov.pk/>) with attached department of “Directorate Environmental Protection Agency, Punjab” created “Environment Protection Agency”, which is responsible for environmental agenda (Punjab Environmental Protection Department, 2012). The existing shape of “Punjab Environment Protection Department” of province Punjab becomes from “Environmental Pollution Control Organization (EPCO)” established in the “Public Health Engineering Department, Punjab” in the year 75’ with a mandate to control, reduce and

eliminate the pollution. Introduction of PEPO in 1983 caused the provision of “Provincial Environmental Protection Agency” the power of which were requested to the federal Government in 1985, to be delegated to the “Housing, Physical and Environmental Planning (HP and EP)”. On 1st of July 1987, the EPA, Punjab was formulated and the employees of EPCO were shifted to EPA, Punjab, managerially controlled by HP and EP Department. On 31st of December, 1996 a distinct managerial unit of EPD was came into existence under the Government of the Punjab which caused the detachment of EPA Punjab from HP and EP and hold its control. The offices of EPD (Figure 4.4), Punjab mainly consists of a “Secretariat”, an “EPA Directorate” and “District (Field) Offices” with an office in each district. The Secretariat mainly comprises a secretary, an additional secretary, and deputy secretaries in admin and technical wings of the department.

4.2.3.3 Environmental Protection Council of Punjab

Punjab Environment Protection Council has been constituted by Mr. Shahbaz Sharif, the then Chief Minister in October, 2017. The council is headed by the Chief Minister and will be supreme decision making body for environment related matters with overarching role to approve, coordinate and supervise the implementation of environmental laws and policy framework. “Punjab Environmental Protection Act, 2012” elaborates powers and functions of Environmental Protection Council of Punjab as the apex decision making body.

4.2.3.4 Environmental Protection Agency of Punjab

The Environmental Protection Agency of Punjab, being a functional attached department of “Environment Protection Department” of “Government of the Punjab” is responsible for implementation of necessities of “Punjab Environment Protection Act, 2012” and all that comes under, issuance of approvals in wake of environment regarding various projects and certification of environmental laboratories in Punjab. It is also authorized to formulate and launch the “Punjab Environmental Quality Standards (PEQS)” after taking support and to enforce PEQS along with resolving the complaints of public received on environmental issues. Preferment of research and development in science and technology for environmental fortification and contributing to the needed

sustainable development along with the campaign of plantation for clean and green Pakistan and promotion of environmental awareness through various seminars, workshops and trainings are also among its functions. The agency has to perform the functions of implementation of international treaties in the jurisdiction of the province and initiation of legislation after identification of needs in different segments of the environment. Moreover, it is responsible to take all necessary measures to guard, preserve, restore and progress for the purpose of pollution control through providing information to public about environmental issues and encouraging non-government, community based village organizations. Figure 4.4 shows the organogram of EPA Punjab. (Source: https://epd.punjab.gov.pk/epa_organogram)

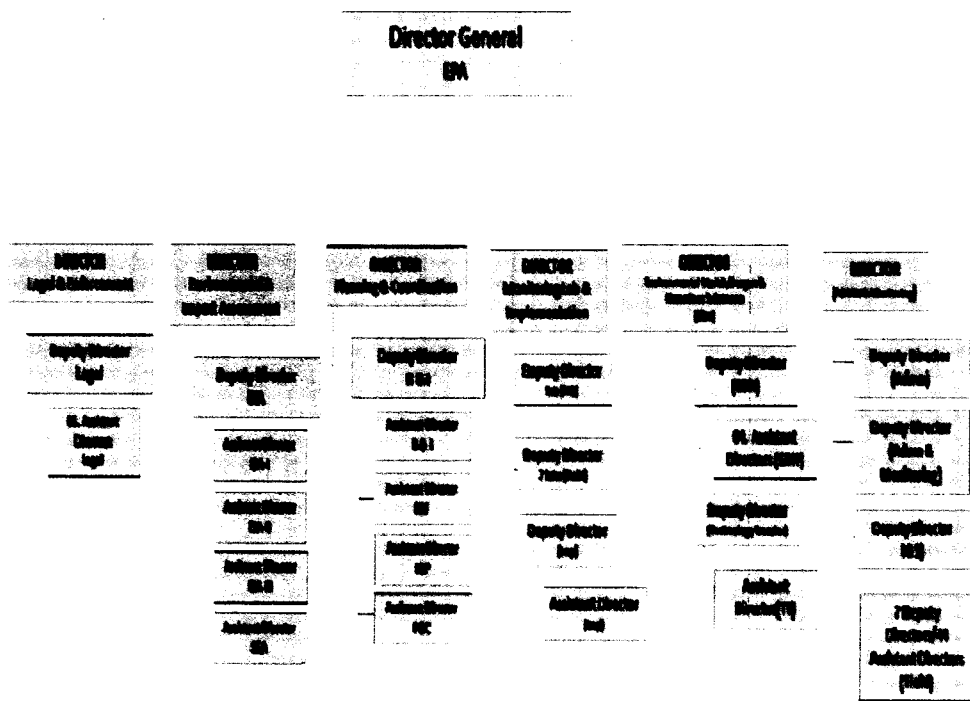


Figure 4.4: Organogram of EPA, Punjab

EPA Directorate headed by a Director General consists of nine (09) different sections, each of which is headed by a Director, the details of which are given in figure 4.4.

After 18th Amendment, new Policies, Acts, Rules and Regulations were developed

which are summarized in Table 4.3.

Table 4.3: Environmental Policies, Acts, Rules and Regulations in Punjab after 18th Amendment

Policies After 18th Amendment
Policy on Controlling Smog, 2017
Policy to deal with Air Pollution Episodes
Punjab Climate Change Policy (Internal Draft)
Punjab Environmental Policy, 2015 (draft)
Acts After 18th Amendment
Punjab Environmental Protection Act, 2012
Punjab Environmental Protection Act, 2012 (Amended in 2017)
Rules and Regulations After 18th Amendment
Punjab Environmental Protection - Delegation of Powers for Environmental Approvals- Rules, 2017
Punjab Environmental Protection (Registration of Environmental Consultants) Regulations, 2017
Punjab Environmental Protection Council (Procedure) Rules, 2016
Punjab Environmental Quality Standards (Liquid, Municipal and Industrial Effluents, 2016 for various parameters into inland waters and into sewage treatment
Punjab Environmental Quality Standards for Drinking Water, 2016
Punjab Environmental Quality Standards for Motor Vehicle Exhaust and Noise, 2016, were approved in 2016 for i) In-use Vehicles, ii) for New Vehicles, iii) for Diesel Vehicles; iv) For passenger cars and light commercial vehicles (g/km), v) For Heavy Duty Diesel and Large Goods Vehicles (g/KWh) with various parameters and maximum permissible limits along with Measuring Method and Applicability
Punjab Environmental Quality Standards for Ambient Air, 2016
Punjab Environmental Quality Standards -Treatment of Liquid and Disposal of Biomedical Waste- 2016, by Incineration, Autoclaving, Microwaving and Deep Burial were published in 2016 with parameters and standards
Punjab Environmental Quality Standards for Industrial Gaseous Emissions, 2016, were published in 2016 with parameter, source of emission and standard

Punjab Bio-safety Rules, 2014
Punjab Hospital Waste Management Rules, 2014
Punjab Environmental Protection Motor Vehicles Rules, 2013
Punjab Environmental Protection Administrative Penalty Rules, 2013
Environmental Tribunal Rules, 2012
Punjab Environmental Protection Base Transceiver Station (BTS) Regulations, 2012
Rules and Regulations(in draft)
Punjab Sustainable Development Fund (Utilization) Rules, 2021
Punjab Sustainable Development Fund (Procedure) Rules, 2021
Punjab Environmental Protection (Administrative Penalty and Compounding of Offenses) Rules, 2020
Punjab Hazardous Substance Rules, 2020
Punjab Batteries (Environmental Management and Handling) Rules, 2020
Punjab Review of IEE and EIA Regulations, 2020
Punjab Clean Air Action Plan (PCAP)
Guidelines for Registration of Environmental Consultants
Regulation of Disclosure of Environmental Information and Citizen Engagement, 2020
Draft Punjab Environmental Protection (Poultry) Regulations, 2013

Source: (https://epd.punjab.gov.pk/resoruce_center)

Significant development has been made with respect to development of post 18th amendment legal framework for environmental protection in Punjab, however adoption of PEPA, 1997 with very little amendments in the title cause ambiguity in jurisdictional and operation scope of the act and role of institutions.

4.2.4 Sindh Environmental Governance Framework

The details of the framework of environmental governance in the province of Sindh are given below;

4.2.4.1 Ministry Dealing with Environment

In Sindh, Ministry of “Law, Environment, Climate Change and Coastal Development” is functional and Mr. Murtaza Wahab is holding the office of “Advisor to Chief Minister Sindh” with portfolio of “Law, Environment, Climate Change and Coastal Development”. One standing committee of the provincial assembly is also functional under the title of “Environment, Climate Change and Coastal Development Department (ECC & CDD)” (<http://www.pas.gov.pk/index.php/committees/home/en/32/170>).

4.2.4.2 Environment, Climate Change and Coastal Development Department – Sindh

The provincial department working in the domain of environment is “Environment Climate Change and Coastal Development Department (ECC & CDD), Government of Sindh” (<https://environment.sindh.gov.pk/>). The Government of Sindh established this subsidiary department on May 17, 2016 and it is comprising “Sindh Environment Protection Agency (SEPA)” (<https://epa.sindh.gov.pk/>), “Sindh Environmental Protection Tribunal (SEPT)” (<https://environment.sindh.gov.pk/environment-protection-tribunal>) and Sindh Coastal Development Authority (SCDA) and Climate Change (<https://environment.sindh.gov.pk/>). Two attached departments including SEPA and SCDA have been established and functional while the third one Climate Change is yet to be established. The department with strength of more than 350 employees working in different sections. The ECC & CDD has an important role and phenomenal responsibility owing to exacerbating micro and macro climatic variability and protection of coastlines. Currently ECC & CDD is involved in various monitoring and execution of various expansion and development project initiated by the provincial government to cope with the environmental pollution and climatic changes along with the innovations in the coastal development. ECC & CDD is headed by the Provincial Minister of Environment or Advisor on Environment

to Chief Minister from cabinet under the Chief Minister of the province, and a Secretariat under the Chief Secretary of the Province, headed by a Secretary (Figure 4.5), (Source: <https://environment.sindh.gov.pk/organogram>)

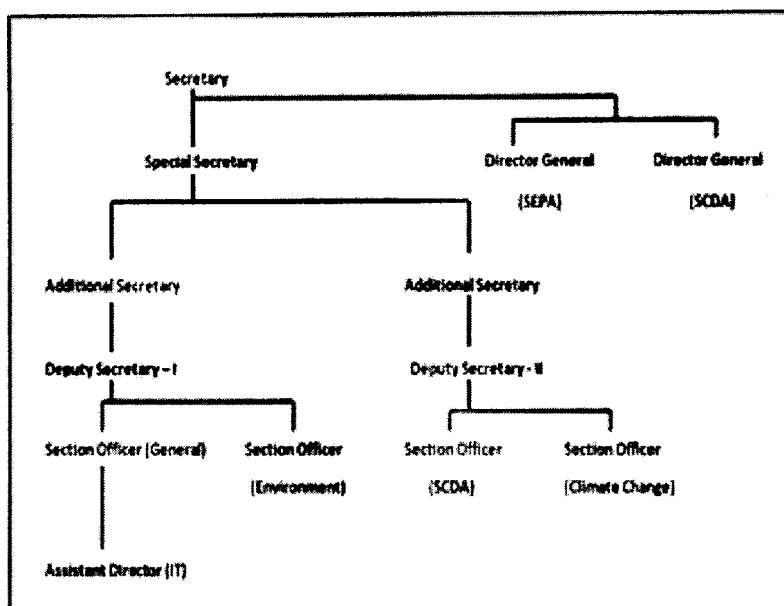


Figure 4.5: Organogram of ECC & CDD, Government of Sindh

4.2.4.3 Sindh Environmental Protection Council (SEPC)

SEPC was constituted and established under section 3 of Sindh Environmental Protection Act (SEPA), 2014. It has specific powers and functions as prescribed under section 4 of this Act.

4.2.4.4 Sindh Environmental Protection Agency (Sindh-EPA)

Sindh-EPA, first established in 1989 as its head office in Karachi. Currently, the EPA is an attached body of “Department of Environment, Climate Change and Coastal Development, Government of Sindh.”

The organogram of existing structure of SEPA has been displayed in Figure 4.6, Source: (<http://epasindh.gov.pk/sepa%20organogram.jpg>).

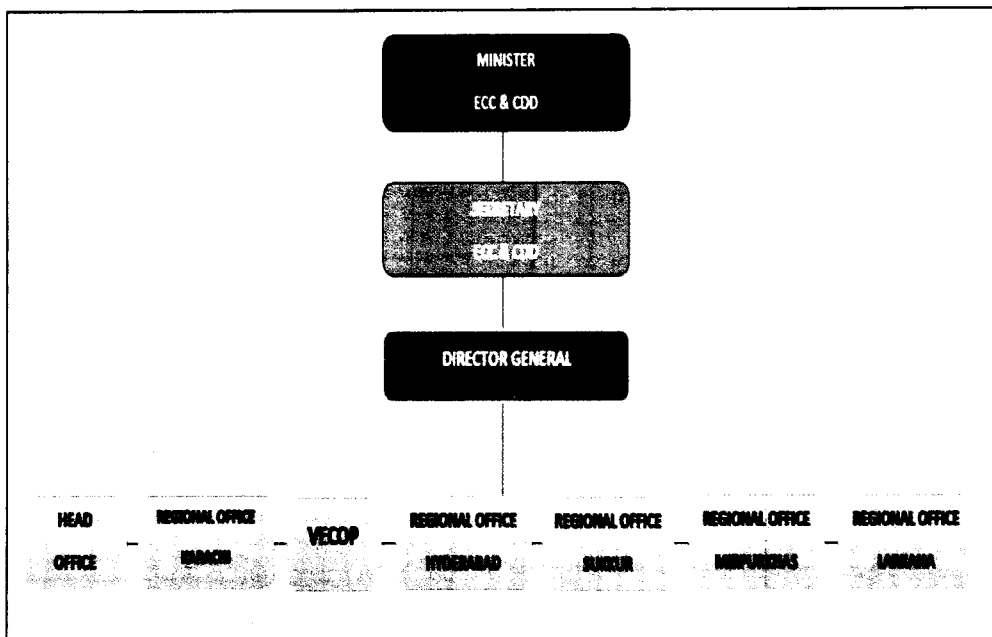


Figure 4.6: Organogram of SEPA

The Sindh Environmental Protection Act, 2014 of Government of Sindh provides the establishment of SEPA, under Part-III, section 5. Section 6 states the functions of the agency while section 7 provides the powers to the agency subject to the provision of the Act, i.e., (Environmental Protection Act, 2014). SEPA is mainly responsible for implementation and enforcement of environmental rules and regulations made under the law to achieve the objectives of “Environmental Protection Act, 2014”.

Table 4.4 Environmental Policies, Acts, Rules and Regulations in Sindh after 18th Amendment

Source: (<https://environment.sindh.gov.pk/departments-wings/302>)

4.2.5 Environmental Governance Framework in Balochistan

The environmental governance framework of province Balochistan comprises the following;

Table 4.4: Environmental Policies, Acts, Rules and Regulations in Sindh after 18th Amendment

Policies, Acts, Rules and Regulations promulgated in Sindh after 18th Amendment
Policies After 18th Amendment
Sindh Climate Change Policy (Draft-2018)
Acts After 18th Amendment
Sindh Environmental Protection Act (SEPA), 2014
Rules and Regulations After 18th Amendment
Sindh Environmental, Industrial, Wastewater, Effluent, Domestic, Sewerage, Industrial Air Emission and Ambient Airs, Noise for Vehicles, Air Emissions for Vehicles, and Drinking Water Quality Standards 2015
Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2014
Environmental Sample Rules, 2014
Hazardous Substances Rules, 2014
Sindh Environmental Protection (Composition of Offences and Payment of Administrative Penalty Rules), 2014.
Sindh Environmental Protection Tribunal Rules, 2014
Sindh Hospital Waste Management Rules, 2014
SEQS Certification of Environmental Laboratory Regulations, 2014
Sindh Prohibition of Non-Degradable Plastic Product (Manufacturing, Sale and Usage) Rules, 2014
Sindh Sustainable Development Fund (Procedure and Utilization) Rules, 2014
SEQS (Self-Monitoring and Reporting by Industry) Rules, 2014

4.2.5.1 Ministry Dealing with Environment

In Balochistan, Provincial Ministry of Livestock, Dairy Development and Environment headed by a provincial minister is dealing with matter pertaining to environment. Under the umbrella of Baluchistan Assembly, a standing committee titled as "Irrigation Energy, Environment and Forests Wildlife comprised of a Chairperson and six (06) members is also functional (<https://pabalochistan.gov.pk/new/irrigation-energy-environment-and-forests-wildlife/>). The committee holds meetings and prepare reports to supervise and review progress on environment related initiatives.

4.2.5.2 Department of Environment, Sports and Youth Affairs

The basic department of the provincial Government of Balochistan which deals with the environmental concerns is “Department of Environment, Sports and Youth Affairs” functions in coordination with other provincial departments and directorates (<https://balochistan.gov.pk/departments/environment-sports-and-youth-affairs/#1560770068560-ad976315-b5ae>).

The establishment of “Department of Environment, Sports and Youth Affairs” under the Government of Balochistan took place in 2004 which recently up keeping the directorates of; “Balochistan Environmental Protection Agency, Balochistan Sports and Youth Affairs”. The role and functions of the department have been defined in the rules of business. Figure 4.7 provides an Organogram of Department of Environment, Sports and Youth Affairs, Balochistan. Source: (<http://balochistan.gov.pk/departments/environment-sports-and-youthaffairs/#1560770282399-0b7b2763->

The Environment Protection Department of provincial Government of Balochistan has a vital role to improve the life of public through taking steps for lessening and eliminating various types of environmental pollution and adverse effects of different effluents discharged from all types of industrial activities and all types of wastes which pose harmful effects to the well-being, security and prosperity of the public. Enforcement of all qualitative and quantitative standards established under the law is also the responsibility of the department.

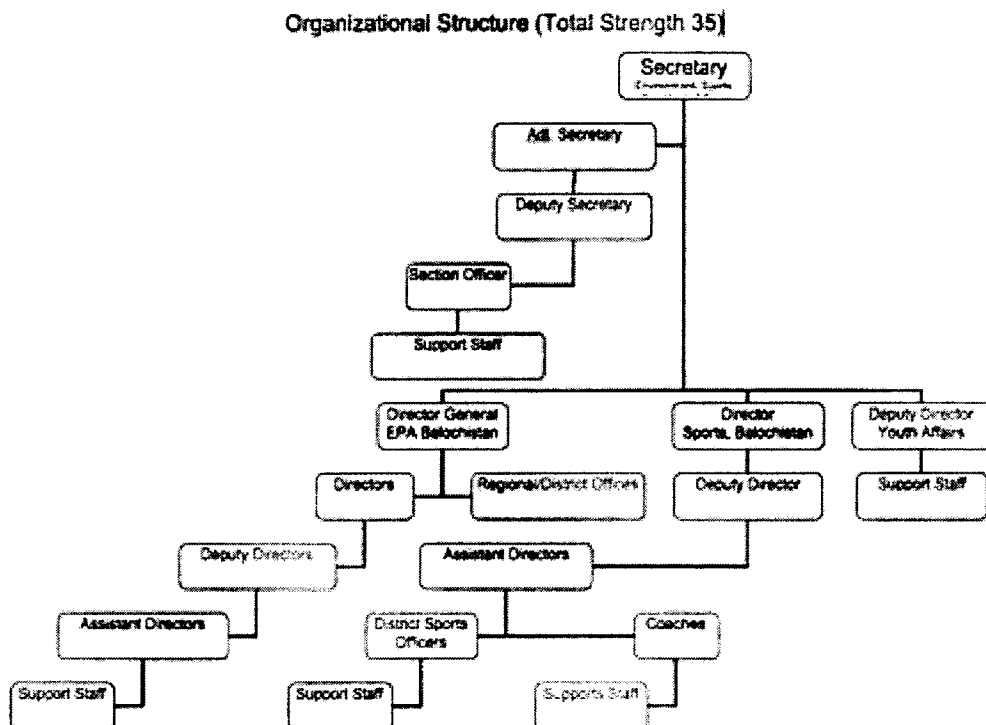


Figure 4.7: Organogram of Department of Environment, Sports and Youth Affairs, Balochistan

4.2.5.3 Balochistan Environmental Protection Council

As specified in the Balochistan Environmental Protection Act, 2012, the “Balochistan Environmental Protection Council”, established by the Provincial Government is led by the “Chief Minister” of the Province or his nominee in this behalf and Provincial Minister of the Environment being its Vice Chairperson. Other Members include Chief Secretary of Balochistan, Secretary Environment (Secretary), Director General Provincial Environmental Protection Agency (EPA), Secretary Finance, Secretary Industries, Secretary Agriculture, Secretary Forest, Secretary “Planning and Development (P&D)” and “Secretary Services and General Administration Department (S&GAD)”. The organogram of Balochistan Environmental Protection Council is shown in Figure 4.8, Source: <https://bepa.gob.pk/epa-council/>

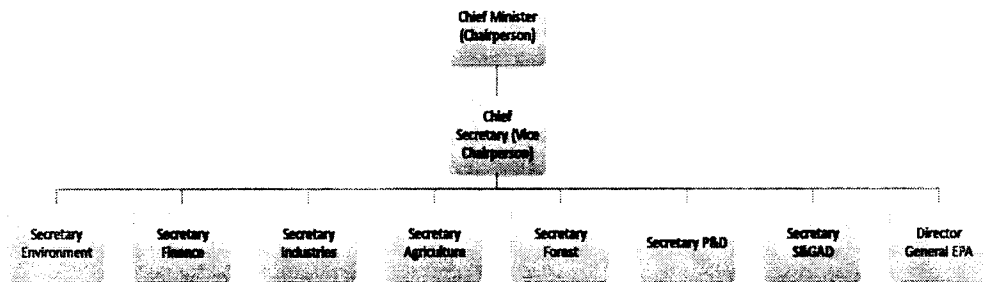


Figure 4.8: Organogram of Balochistan Environmental Protection Council

The council can use such influences and accomplish/discharge such as purposes as prescribed under “section 4” of Balochistan Environmental Protection Act, 2012 which can be summarized as; the coordination and supervision to enforce the provisions of this Act, approval of environmental policies along with ensuring their execution contained by the framework of conservation strategy at national and provincial level as per approval of the Federal and Provincial Government, approval of Provincial “Environmental Quality Standards”, provision of strategies and procedures to protect in general the flora, fauna and ecology and to conserve the various energy sources along with the inclusion of sustainable development principals into developmental strategies including regulations.

The council has been authorized to frame its own rules of processes and procedures and to have assemblies if and when necessary, but subject to hold at least two meetings annually. The council is also lawful to give directions to the Provincial Agency/(Agencies) and/or any other Government Agency/(Agencies) for preparation, submission or implementation of projects for well-being, security and prosperity of the environment together with the sustainable development of resources or for undertaking research in various aspects of environment.

4.2.5.4 Balochistan Environmental Protection Agency (BEPA)

The “Environmental Protection Agency” (<https://bepa.gob.pk/>) of Province Balochistan was shaped on “February 22, 1992” under the executive control of “Department of Urban Planning and Development” (<https://balochistan.gov.pk/departments/planning-and-development/>). Afterwards, the Provincial Department of Environment re-positioned its managerial control which was later on eliminated and the Provincial Department of Environment, Wildlife, Livestock and Tourism Department took the administrative control. After extended discussions and efforts, it has obtained the status of a separate department under the umbrella of Secretary Environment and Sports as notified by the Government of Balochistan.

BEPA is serving as major provincial regulatory and monitoring organization of Balochistan. It is responsible to implement the laws of National and Provincial level and to protect the environmental as well as natural resources of the province. The agency is also aimed at development of various policies to improve the nature and sustainability. The Figure 4.9 shows the Organogram of BEPA, Government of Balochistan. (Source:<http://balochistan.gov.pk/departments/environment-sports-and-youth-\#1561557099681-a017bcd1-d50a>)

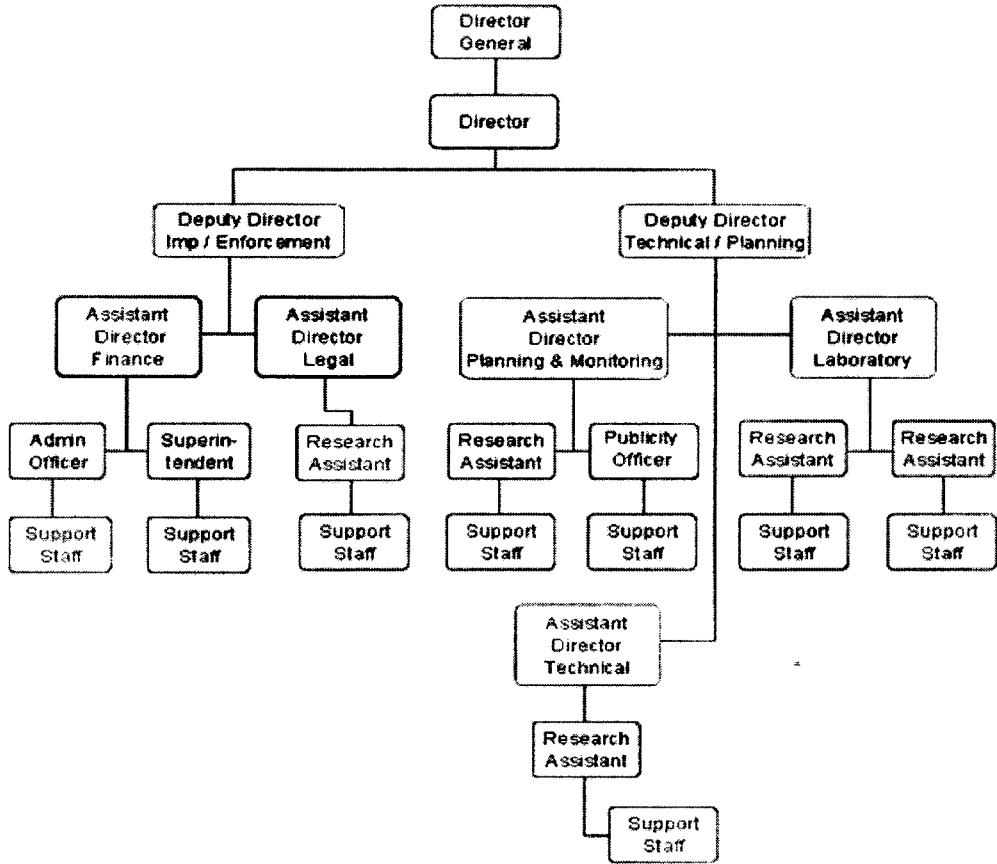


Figure 4.9: Organogram of BEPA, Government of Balochistan

The BEPA is working in collaboration with its partners and with their support performing the activities for the protection of the environment having a solid word with them for the cause. The partners include; Islamic Relief Pakistan (IRF) (<https://islamic-relief.org.pk/>), (<https://www.islamic-relief.org/category/where-we-work/pakistan/>), Pakistan Poverty Alleviation Fund (PPAF) (<http://www.pfaf.org.pk/>) and Civil Society Coalition for Climate Change (CSCCC) (<https://www.cscoc.org.pk/#:~:text=The%20Civil%20Society%20Coalition%20for,national%20levels%20through%20research%2C%20knowledge%2D>)

Table 4.5: Environmental Policies, Acts, Rules and Regulations in Balochistan after 18th Amendment

Environmental Policies, Acts, Rules and Regulations in Balochistan after 18th Amendment
Policies After 18th Amendment
Recruitment Policy 2021 to hire the experts and specialists in the field of environment and managerial skills holding persons, associates and other supportive human resource
Safe Polythene Management Strategy 2021 Phase-I which is limited to Quetta city for a year testing phase and will be extended to the whole province of Balochistan in Phase-II in 2022
Policy and Procedures for the Filing, Review and Approval of Environmental Assessment
Rules and Regulations After 18th Amendment
Balochistan Environmental Protection (Registration of Environmental Consultants) Regulations, 2021
The Balochistan Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules, 2020
The Balochistan Environmental Quality Standards (Certification of Environmental Laboratories) Regulations, 2020
The Balochistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2020
Balochistan Quality Standards for Noise 2020
Balochistan Environmental Protection (Poultry) Regulations 2020
Balochistan Hospital Waste Management Rules 2020
Balochistan Environmental Protection Agency Review of Initial Environmental Examination and Environmental Impact Assessment Regulations, 2020
Balochistan Quality Standards for Noise 2020
Balochistan Hazardous Substances Rules 2020
Balochistan Environmental Tribunal Rules 2020
Balochistan Environmental Quality Standards for Treatment of Liquid and Disposal of Biomedical Waste by Incineration, Autoclaving, Microwaving, and Deep Burial 2020.
Balochistan Environmental Quality Standards For Industrial Gaseous Emission (mg/Nm ³ , Unless Otherwise Defined)
Balochistan Environmental Quality Standards for Drinking Water
Balochistan Environmental Quality Standards for Ambient Air.
Balochistan Environmental Protection (Motor Vehicles) Rules 2020
Balochistan Environmental Protection (BTS) Regulations 2020.
Balochistan Environmental Protection (Administrative Penalty) Rules 2020.
Balochistan Environmental Pollution Charge for Industry (Calculation and Collection) Rules, 2020.
Policy Draft
“Balochistan Environmental CSR Policy” – 2021 (Draft)

The Balochistan Environmental Protection Act is more comprehensive as compared to other administrative units acts as it also covers environmental issues including Alien Species, Balochistan Coastline or Coastal Zones, Clinical Waste, Electronic Waste, Endemic and Indigenous Species, Genetic Resources, Living Modified Organisms, Ship Breaking Industry, Strategic Environmental Assessment (SEA) and Sustainable Management of Water Resources (197).

4.2.6 Environmental Governance Framework in Azad Jammu and Kashmir

The environmental governance framework exists in the government of Azad Jammu and Kashmir, the details of which are given below;

4.2.6.1 Ministry of Environment, Azad Jammu and Kashmir

Ministry of Environment, AJK is the main policy making institution headed by Minister of Environment and coordinated by Secretary (<https://www.ajk.gov.pk/>).

4.2.6.2 Environmental Protection Council of Azad Jammu and Kashmir

“AJK Environmental Protection Council (AJK-EPC)” was established in 2018, with prime minister as the chairman of the council. Function of Environmental Protection Council is coordination and supervision and providing strategic guidelines. AJK Environmental Protection Act, 2000 elaborates powers and functions of the AJK-EPC.

4.2.6.3 Environmental Protection Agency of Azad Jammu and Kashmir

“Azad Jammu and Kashmir Environmental Protection Agency (AJK-EPA)” (<http://www.epaa.jk.gok.pk/>) is functional in the constituency with head office at Muzaffarabad and another office at Mirpur. AJK-EPA was established in 1998, previously in 1994, Environmental Unit was recognized under “Natural Resource Project Management in Planning and Development department” (<https://www.pndajk.gov.pk/>). Later on, in 1996 AJK Environmental Protection Ordinance was promulgated which includes requirements for formation of ecological conservation councils and

EPA. AJK-EPA is a regulatory authority with powers and functions vested through AJK Environmental Protection Act, 2000.

Table 4.6: Environmental Policies, Acts, Rules and Regulations in AJK after 18th Amendment

Environmental Policies, Acts, Rules and Regulations in AJK after 18th Amendment
Policies after 18th Amendment
Climate Change Policy AJK, 2017
Acts after 18th Amendment
Wildlife (Protection, Preservation, Conservation, and Management) Act, 2014 (IV, 2015)
AJK Environmental Protection Act, 2000
Rules and Regulations after 18th Amendment
AJK Prohibition of Non-degradable Plastic Products (Manufacturing, Sale and Usage), 2013
Pollution Charge for Industries (Calculation and Collection) Rules, 2009
State Sustainable Fund Board Rules, 2009
Bio-safety Rules, 2009
Environmental Sample Rules, 2009
State Environmental Quality Standards (Certification of Environmental Laboratories) Regulations, 2009
State Environmental Quality Standards (Self-Monitoring and Reporting by Industry) Rules, 2009
AJK Environmental Protection Agency Review of Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) Regulations, 2009

Source: (<http://www.epaajk.gov.pk/ajkepaacts.php>)

4.2.7 Gilgit Baltistan Environmental Governance Framework

The details of Environmental Governance Framework of Gilgit-Baltistan (GB) are as follows;

4.2.7.1 Forest, Wildlife and Environment Department Gilgit Baltistan

In GB, the “Department of Forest, Wildlife and Environment” (<https://fwegb.gov.pk/>) is relevant cabinet department that deals with issues related to environ-

ment. The department is headed by a senior minister of the cabinet of GB. The department works with assistance of two attached department namely “Conservator of Forest” headed by Conservator and “Directorate of Khunjarab National Park” headed by Director.

4.2.7.2 Gilgit Baltistan Environmental Protection Council (GB-EPC)

GB-EPC as established under section 3 of “Gilgit-Baltistan Environmental Protection Act, 2015” comprising Chief Minister as chairman, the Minister, in-charge of the Environment Department as Vice-Chairperson, Chief Secretary (Ex-officio Member), the Secretaries of “Planning and Development Department”, “Forest, Wildlife and Environment Department”, “Agriculture, Fisheries and Livestock Department”, “Water and Power Department”, “Works Department”, “Local Government and Rural Development Department”, “Industries and Mineral Development Department” (Ex-office Members), President, Gilgit-Baltistan Chamber of Commerce and Industry OR One Representative of NGO (Non Official Members) and Director Environment Protection Agency (Ex-officio Member/Secretary) of Gilgit-Baltistan.

4.2.7.3 Gilgit Baltistan Environmental Protection Agency (GB-EPA)

GB-EPA established in “section 5” of “Gilgit-Baltistan Environmental Protection Act, 2015” is headed by a Director. Section 6 of the act states the functions of the agency while section 7 explains the powers of the Agency. The GB-EPA consists of different sections including Legal and Enforcement Section, Research and Development Section, Administration and Laboratory Section.

Table 4.7: Environmental Policies, Acts, Rules and Regulations in Gilgit Baltistan after 18th Amendment

Environmental Policies, Acts, Rules and Regulations in Gilgit Baltistan after 18th Amendment
Policies, Acts, Rules and Regulations promulgated in Gilgit Baltistan after 18th Amendment
Policies after 18th Amendment
GB-EPA Climate Change policy and Action Plan, 2017
Acts after 18th Amendment
Gilgit Baltistan Environmental Protection Act, 2014
Rules and Regulations after 18th Amendment
Establishment of Data Acquisition Stations (Automatic Weather Stations, Environmental Monitoring Stations, Water Gauging Stations and Other) Rules, 2018
Gilgit-Baltistan Base Transceiver Station (BTS) Regulations, 2018
Gilgit-Baltistan Industrial Regulation, 2018
Gilgit-Baltistan Stone Crushing Units Regulations, 2018
Gilgit-Baltistan (Empowerment and Self-Governance) Order, 2009
Under the Schedule-I [See rule-2(a), (i) and rule 3(1)], Departments and Autonomous Bodies includes at Sr. 7. Forest, Wildlife and Environment Department with attached departments of “Conservator of Forest” (headed by Conservator) and Directorate of Khunjarab National Park (headed by Director) and under Schedule-II, “Distribution of Business Among Departments” includes at Sr. 13 to 17 as; “13. Administration of laws relating to environmental protection. 14. Preparation of environmental policy. 15. Coordinate environmental policies and programme nationally. 16. Provide awareness and education to the public on environmental issues, 17. Identify the need for legislation for environmental related problems.
Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000
Environmental Quality Standards for Ambient Air
Environmental Quality Standards for Liquid Municipal and Industrial Effluents
Review of IEE/EIA Regulations, 2000

Source: (<http://www.gbepa.gog.pk/gbepa-ccs/>)

4.3 Discussion: Post 18th Amendment Contextual Analysis of Environmental Governance Framework in Pakistan

Environmental governance is a sub-set of the broader governance literature, but have some important features. A superior importance on environment protection and sustainable development is a widespread classifying theme and takes the conversation further than fundamental concepts of sectoral governance. For example, hybrid environmental governance arrangements reflect openness to using market based institutions (markets, rights, norms) and incentives (economic, social) in novel ways to address environmental problems (Najam, 2005). That openness may stem from recognition of the limited capacity of government agencies that are acting in isolation from each other to deal with “wicked” environmental problems (Howes and Wyrwoll, 2012; Shah, 1999). Besides, pressure from citizens for a greater role in decision making, and expected benefits (despite transaction costs) when involving more perspectives and different kinds of knowledge are also the key pinning areas to make environmental governance more complicated. Environmental governance scholars need insights from non-equilibrium ecology and complex adaptive systems to move governance concerns beyond simple notions of accountability and authority, towards a focus on objectives such as maximum sustainable yield (Howes and Wyrwoll, 2012; Shah, 1999).

Implementing new conducts of governing will necessitate a significant endeavor with sustained and continued assurance on the part of all participants. However, the world’s past experiences reveal that areas with poor institutional arrangements and clearly unsolved problems are more prone to instability. Abrupt shifts in the trajectory of supremacy are likely to occur in these cases.

Pakistan is located in a region with high sensitivity to environmental and climatic disasters, which are exacerbated by uncontrolled environmental pollution including land degradation, deforestation, air pollution, water pollution and improper waste disposal practices (202; Khan and Irfan, 2018). Adoption of laws, regulations and guidelines helps governments to control or at least slow down the adverse environment impacts (Hassan et al., 2021; Khayam and Ahmad, 2020). However, this depends on the compre-

hensiveness and effective policy, regulatory and institutional framework to address these issues. An effective environmental protection system in a country needs enforcement of a uniform policy and legislative regime across the country, besides comprehensiveness of the legislation to cover the all dimensions of issues faced by the country (Pastakia, 2012). In many countries, international laws and principles have been adopted in temptation to tap financial benefits associated with these agreements and international pressures, but either never or weakly translated into national and sub-national regulatory frameworks. As a result enforcement, implementation and compliance remains weak, owing to lack of coordination and institutional capacities (Ahsan and Khawaja, 2013).

Due to cross-cutting nature of environmental issues, environmental governance frameworks require horizontal as well as vertical coordination in terms of activities and processes (Khan and Irfan, 2018; Pastakia, 2012; Qazi et al., 2017).

Environmental governance framework in Pakistan remained a federal chapter since 1975 till 2010 (Ahsan and Khawaja, 2013; Khayam and Ahmad, 2020; Pastakia, 2012; Zaheer, 2019). As discussed earlier, 1973 Constitution of Pakistan delegate powers to federal as well as provinces to make laws on the environment till the year 2010, “environment and ecology” being at the concurrent legislature list. However, during this time period policies, act and regulations were made at the federal levels and the provincial authorities only played their role in enforcement of laws made at the federal level. After 2010, through 18th Amendment in the Constitution of Pakistan, the concurrent legislative list was devolved and powers were delegated to make environmental laws for their jurisdictional scope (Ahsan and Khawaja, 2013; Pastakia, 2012).

In response to 18th Amendment, Punjab adopted the PEPA 1997 with minor changes in the form of Punjab Environmental Protection (Amendment) Act, 2012 while Balochistan passed the Balochistan Environmental Protection Act, 2012, and later Sindh and KPK developed their acts. After 2010, till the promulgation of laws in respective provinces and other administrative areas, PEPA, 1997 and rule/regulation made their under continued to serve the purpose. Where the devolution of power has provided opportunity to provinces to formulate laws in accordance to their needs (Khayam and Ahmad, 2020), synchronization of these laws to achieve the national goals (Waheed et al., 2021), maintaining institutional capacities (Tapio Reinikainen, 2018) and disbursement

of funds remain challenging for developing countries like Pakistan.

Findings of the study portrayed that 18th amendment in the 1973 Constitution of Pakistan granted legislative power to provinces on the subject of environment. After 18th Amendment in 2010, provinces started their work on formulation of legal framework for their jurisdiction. All four provinces including GB and AJK has developed their acts and are in the process of developing respective regulatory framework as listed in Table 4.1 to Table 4.7. The findings construe that 18th amendment provided an opportunity to provinces to integrate emerging environmental issues as part of their legal framework. Consequently, BEPA, 2014 addresses issues like coastal areas, e-waste and SEA, inter-provincial coordination, hazardous and hospital waste, Sindh included SEA, environmental monitoring and auditing, and public participation, while KPK also inculcated theme of SEA, import of hazardous waste in KP Environmental Protection Act, 2014. GB Environmental Protection Act, 2015 is the youngest one but effectively addresses the areas like SEA, import of hazardous waste, environmental monitoring and auditing. However only Punjab province adopted PEPA 1997, with little modifications, while AJK Environmental Protection Act, 2000 and PEPA, 1997 were not revised in accordance with 18th Amendment.

In this context it is important to discuss here that before 18th amendment, the PEPA, 1997 was the only act and operated as federal law. Being federal law, PEPA, 1997 had an overriding effect on any other provincial or federal acts. Hence, any contradictory provision in any other law, whether provincial or federal were nullified. But after 18th amendment, the scenario has been changed now. Federal government has not repealed it yet. While provincial legislations for environmental protection made by province, all federal laws can override these legislations (Pastakia, 2012).

Another problem arises due to jurisdictional conflicts by the federal authority (Borchers, 2001). In the process of devolution, federal authority retained some areas in legislative jurisdiction of the federal government. During interviews with key informants following areas were identified, where jurisdiction conflicts between federal and provinces arises. These are areas that are in federal legislative list but provinces have made these areas as part of their legislation or where jurisdiction is still not clear:

- import of hazardous waste included in provincial acts, but in import is federal

subject;

- control of pollution at coastal zones, maritime areas which is basically in jurisdiction of federal area although located in provinces;
- control of hazardous substances that are in federal control for example radioactive materials and wastes;
- environmental impact assessment of projects that are inter-provincial in nature or controlled by federal departments;
- uniformity in environmental quality standards between federal and provinces and among provinces;
- implementation and disbursement of funds related to international obligation of the Pakistan in provincial territorial borders;
- issues related to intellectual property rights, especially in case of genetically modified organisms; trademarks etc;
- national surveys, monitoring and reporting requirements against provincial matters;
- lack of associated fiscal reforms for devolved matters, National Finance Commission (NFC) though established in 2010, but it failed to resolve conflicts in disbursement of funds among the partners

Similar nature of issues are also discussed by other researchers (Khayam and Ahmad, 2020; Qazi et al., 2017; Tapio Reinikainen, 2018; Zaheer, 2019). However, the researcher (Tapio Reinikainen, 2018) construes that devolution of power will result in better public participation. This is also evident from the inclusion of public participation concept in provincial environmental protection acts of the Sindh and KP Governments.

Another issue arises due to slow progress of provinces on environmental policy making. None of the provinces yet developed environmental policy. Policy act as a guiding document for governments to provide future direction for development (Kessler et al., 2011). Lack of policies result in decision based on segregated fashion and consequent incoherence in governance framework (Spiller and Tommasi, 2003).

4.4 Conclusion: Post 18th Amendment Contextual Analysis of Environmental Governance Framework in Pakistan

Twelve years have passed since the 18th Amendment was enacted in the Constitution of the Pakistan in 2010 (Abbas et al., 2022; Jamal, 2021; Majeed and Akhtar, 2021). Though provinces have developed their own environmental protection acts and regulations (Ali et al., 2021), the pace of development is not same across provinces. Eighteenth amendment did not provide timelines and cutoff dates for the transition and the promulgation of provincial legal frameworks and left this to the initiative of each provincial assembly individually. Therefore, significant developments were recorded in cases of Punjab and Balochistan compared with other provinces, Gilgit-Baltistan, obtaining the status of the new entity, is striving hard to keep up the pace. The findings also revealed that while provinces have showed significant development in developing their legal and institutional framework, PEPA 1997 is still not amended accordingly resulting in conflicts and duplication in legislation at federal and provincial levels.

Eighteenth Amendment provided the opportunity to devise laws according to the need of the province to address their respective issues, For example, Balochistan Environmental Protection Act identified coastal zone management and ship breaking as environmental problems in their jurisdiction. Similarly, Punjab province identified smog as problem and approved a policy on controlling smog in 2017. The amendment also provided an opportunity to address emerging issues like e-waste and mercury. However, only Baluchistan Environmental Protection Act comprehensively covered these areas, while the Punjab missed this opportunity by adopting the PEPA, 1997 with minor changes. Though the Amendment provides some opportunities to provinces to address the environmental issues yet they are facing, the regime is not uniform across the country.

In depth analysis of the laws developed after the amendment and subsequent literature published suggest that transition of powers towards provinces is not smooth. Federal Government has retained power on subjects like “climate change” and “multilateral environmental agreements” which may have direct impact in areas located in provincial

jurisdictions. There is also ambiguity rather conflict in jurisdiction of matters in following cases like EIA of projects that are in the federal legislative list, hazardous waste import, maritime pollution, hazardous substances controlled under MEAs or through the federal list, NEQS for establishments that are controlled through federal governments like airports, implementation and reporting of MEAs (Pastakia, 2012).

In some other cases, developments on procedures and mechanisms is either non-existent or in embryonic stages. For example, coordination for development of uniform standards for air, water and noise, planning for climate change mitigation and adaptation strategies, access to donor funding, fiscal reforms, access to indigenous resources, intellectual property rights and trademarks.

Besides, the amendment is also still facing vertical and horizontal non coherence. PEPA 1997 had over riding effects that nullify the inconsistency between the sectoral laws resulting in horizontal coherence. After 18th Amendment, inconsistencies have become pronounced due to unclear mandates for example in case of pollution, oil spills, or waste from shipping, accidents on ports and coastlines, oil and gas exploration activities, mining, and nuclear energy.

Chapter 5

RESULTS: PART-II: ENVIRONMENTAL GOVERNANCE INDEX

The current section Part-II of Results is titled as Chapter-5 and it provides environmental governance indices based on quantitative analysis for objective 2 and 3 of the study. Environmental governance indices are categorized into two different parts according to constituencies selected for the study which includes federal capital Islamabad, four provinces (Khyber Pakhtunkhwa, Punjab, Sindh and Balochistan), Azad Jammu and Kashmir and Gilgit-Baltistan. All provincial headquarters are taken representatives of their respective Provinces while indices for selected districts of each province has been given separately.

5.1 Environmental Governance Index: An Overview of Pakistan

The index of the general environmental governance for environmental measures and retort mechanism in the country at all levels including federation, provinces, AJK, GB and districts along with overall average has been shown in Table 5.1.

Figure 5.1 shows criteria wise Index of Environmental Governance on a grouped (Clustered) Bar Chart and includes federal, provincial (of four provinces), AJK, GB, along with provincial average and overall average Index, while Figure 5.2 reveals an index of overall governance based on criteria and constituency including federal capital, provinces and provincial districts, AJK and districts, GB and districts along with provinces average, districts average and an overall average view.

Figure 5.3 discloses a radar intended for the distances contrary to environmental governance index of Pakistan. Figure 5.4 provides illustrations of overall index for environmental measures and mechanism of response at levels of federal capital and provincial units. The overall environmental governance index of district level has been displayed in Figure 5.5.

As shown in Table 5.1, the index of the general environmental governance for environmental measures and retort mechanism in the country including the levels of federation, province and districts along with overall average, displays the highest score of 8.60, 5.85, 5.85 and 6.77 (out of 10) for C-3 criteria in federal capital, provinces, districts and average respectively while among all the criteria index, the lowest Index score of 3.02, 1.78, 1.61 and 2.13 goes to criteria C-6, respectively for federal capital, provinces, districts and overall average.

Table 5.1: Environmental Governance Index of Pakistan

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Federal	3.68	7.68	8.6	3.11	5.06	3.02	5.19
Provinces	2.52	5.7	5.85	3.82	4.39	1.78	4.01
Districts	2.17	5.17	5.85	2.7	2.69	1.61	3.36
Mean	2.79	6.18	6.77	3.21	4.05	2.13	4.19

[Index Scale: Not Applicable or Not Measure yet= Zero(0), Very Poor= From 0.01 - 1.99, Poor= From 2.00 - 3.99, Considerable= 4.00 - 4.99, Fair= From 5.00 - 5.99, Good= From 6.00 - 7.49, Very Good= From 7.50 - 9.00, & Excellent= From 9.00 - 10.0]

The federal capital stands at top among all constituencies, in all criteria (from C-1 to C-6) excluding the one C-4. The index score goes as 3.68 for C-1, 7.68 for C-2, 8.60 for C-3, 5.06 for C-5 and 3.02 for C-6 respectively in conjunction with top score of 5.19

in overall average while provinces stands at top score of 3.82 for C-4. Overall results represent C-1 index score of 3.68 (the highest for C-1; Federal), 2.52 and 2.17 (the lowest for C-1; Districts) with an average score of 2.79; C-2 index score of 7.68 (the highest for C-2; Federal), 5.70 and 5.17 (the lowest for C-2; Districts) with a middling score of 6.18; C-3 index score of 8.60 (the highest for C-3; Federal), 5.85 and 5.85 (both equal and the lowest for C-3; provinces and Districts) with score at average of 6.77; C-4 index score of 3.11, 3.82 (the highest for C-4; Provinces) and 2.70 (the lowest for C-4; Districts) standing with average score of 3.21; C-5 index score of 5.06 (the highest for C-5; Federal), 4.39 and 2.69 (the lowest for C-5; Districts) with a score at average of 4.05; C-6 index score of 3.02 (the highest for C-6; Federal), 1.78 and 1.61 (the lowest for C-6; Districts) with an average score 2.13 at all constituencies including federal capital city of Islamabad, provinces and districts of each province respectively while it shows the constituency wise average scores 5.19 (the highest for average), 4.01 and 3.36 in the same way as mentioned earlier at federal level, provincial level and districts levels correspondingly. The overall average index score stands at 4.19 for existing environmental governance situation in Pakistan.

5.2 Statistical Validation of Results

Concerning the statistical validation, Table 5.2 delivers a summary of constituency based KW Test while Table 5.3 brings a summary of gender based KW hypothesis Test for overall sample of environmental governance whereas for both sets, asymptotic significance(s) have been put on show using their corresponding significance level of 0.05 beside N=380 wherever constituency based and gender based null hypothesis has been rejected aimed at all concerned criteria exclusive of only gender based C-4 which stands retained.

Null hypothesis stays retained vis-à-vis the observations and opinions of the respondents meant for the adequate institutional capacity at provincial level which because of poor capacity subsists and stated reportedly on alike pattern mainly in almost all selected districts of province Balochistan and in fewer further districts of other provinces' like South Waziristan and Karak in province Khyber Pakhtunkhwa. Even so, the overall test result substantially validates the observations of the respondents and gives a picture

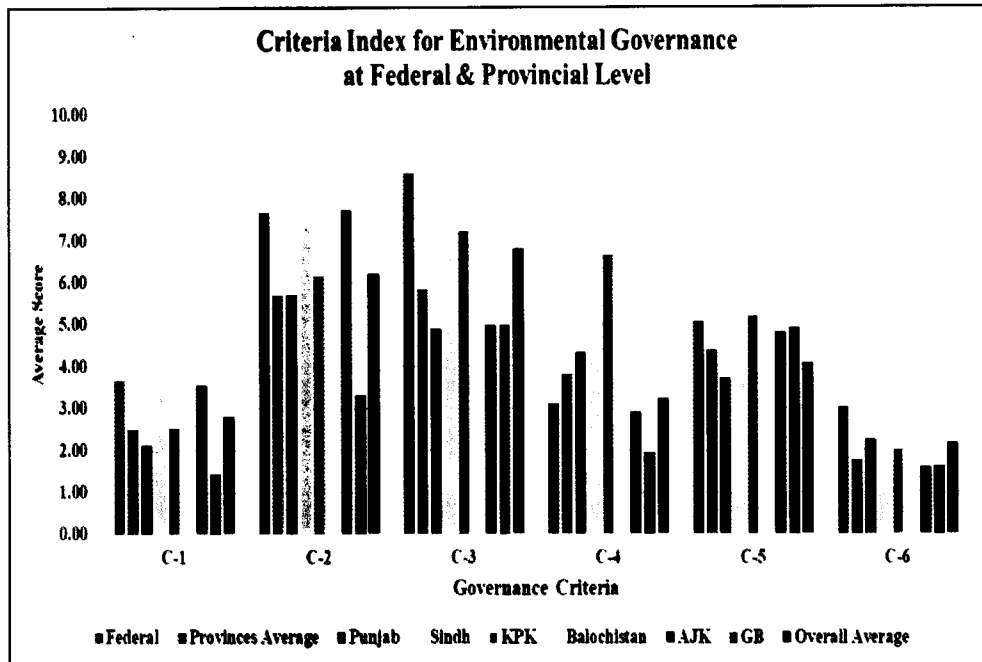


Figure 5.1: Criteria based Index of Environmental Governance in Pakistan

of diverse responses from majority of responding individuals all levels including federal, provincial and district levels.

Table 5.12 in conjunction with Figure 5.6 are showing the Pearson correlations with significance lying at 0.01 level (1-tailed) which point toward a resilient correlation amongst a number of criteria of environmental governance although C-4 stands at inferior value of 0.191 with criteria C-6.

In addition to KW Hypothesis and Pearson Correlation tests for the analysis and validation of results of this study, a dimension reduction Principal component analysis (PCA) was also done using 19 constituencies of Pakistan, to overcome the ambiguity about dependent and independent variables in the overall cross-section data-set. Each constituency is denoted by numbers like Islamabad by 1, Lahore by 2 and so on. These numbers or constituencies can also be seen in the biplot Figure 5.8.

The second main reason for applying PCA is to remove the multi-collinearity (the in-

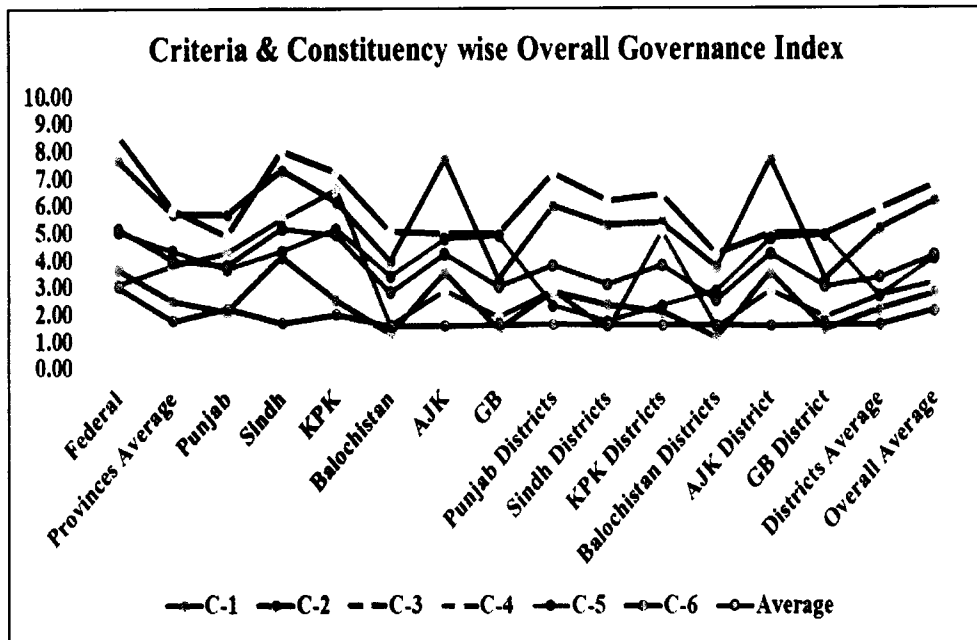


Figure 5.2: Criteria wise and Constituency wise Overall Environmental Governance Index

dependent variables are correlated to each other's). The multi-collinearity is removed using the PCA. The PCA which basically is the dimension reduction technique is used in the current study to reduce the 380 respondent data into just 2 PCs. These Two PCs still contains most of the information (76%) of the data. The basic reason behind reducing the 380 observations to two PCs is that, it's easy to visualize and analyze smaller data (PCs). In short the PCA helps to reduce the number of variables of a data-set, while preserving essential information for analysis.

Table 5.5 shows summary of overall statistics of principal components while Table 5.6 shows all the six PCs associated with 6 variables (C1-C6).

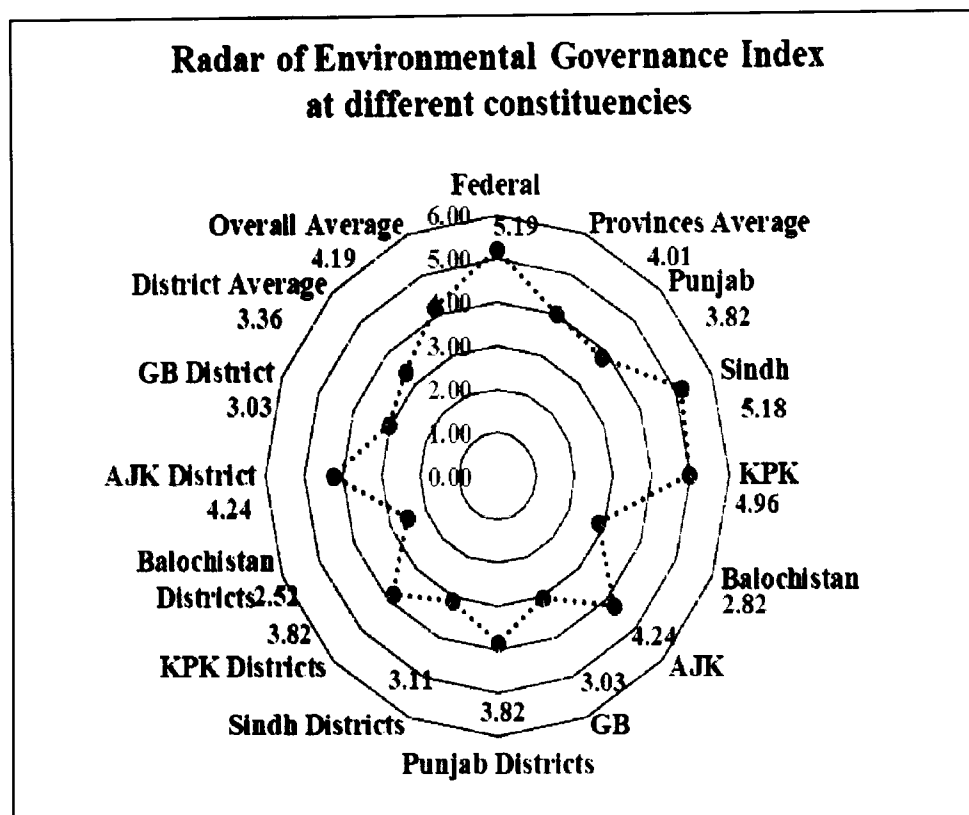


Figure 5.3: Radar of Environmental Governance Index at Different Constituencies

Table 5.2: Summary of KW Test Results based on Governance's tiers

Summary of K.W. Hypothesis Test			
#	Environmental Governance Criteria	Decisions	Output Sigs
1	Clarity of Mandates (C-1)	Ho rejected	.000
2	Environmental Governance Framework (C-2)	Ho rejected	.000
3	Regulatory Frameworks (C-3)	Ho rejected	.000
4	Adequate Institutional Capacity of Provinces (C-4)	Ho rejected	.000
5	Harmonized Arrangements (C-5)	Ho rejected	.000
6	Performance (C-6)	Ho rejected	.000

Null hypothesis (Ho)= Responses are same across all constituencies from federal to local levels
 Alternate Hypothesis (HA) = Responses are not same and have diversity
 Asymptotic significance level run in SPSS was 0.05. N = 380

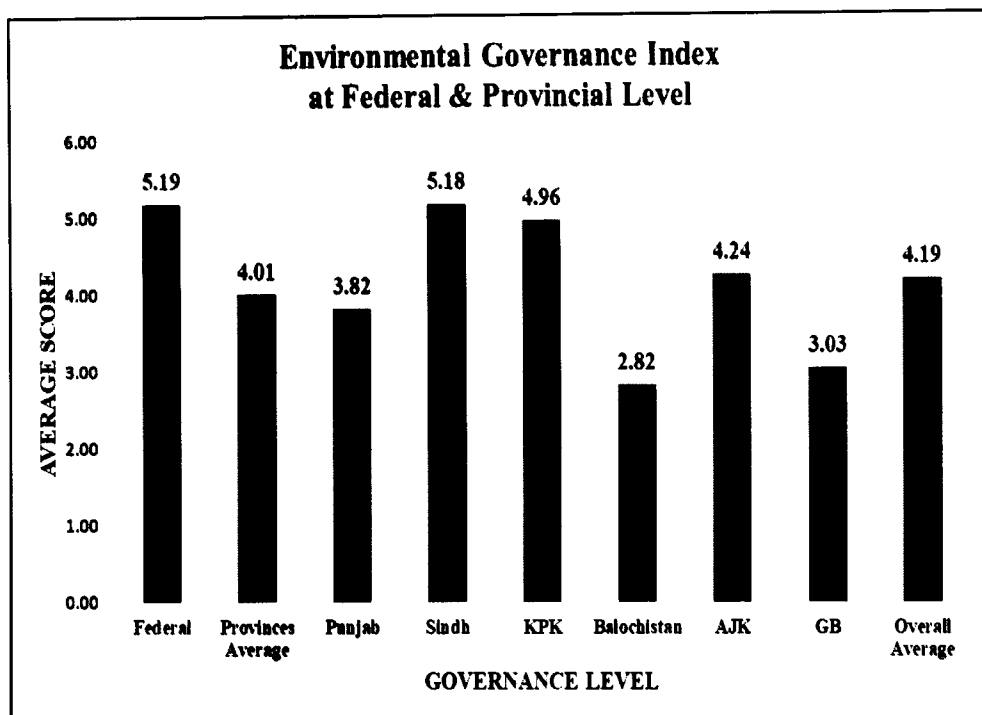


Figure 5.4: Constituency wise Environmental Governance Index; Federal & Provincial Levels

Table 5.3: Summary of KW Test Results based on Respondents' Gender

Summary of K.W. Hypothesis Test			
#	Environmental Governance Criteria	Decisions	Output Signs
1	Clarity of Mandates (C-1)	Ho rejected	.000
2	Environmental Governance Framework (C-2)	Ho rejected	.000
3	Regulatory Frameworks (C-3)	Ho rejected	.000
4	Adequate Institutional Capacity of Provinces (C-4)	Ho rejected	.000
5	Harmonized Arrangements (C-5)	Ho rejected	.000
6	Performance (C-6)	Ho rejected	.000

Null hypothesis (Ho)= Responses are same across all constituencies from federal to local levels
 Alternate Hypothesis (HA) = Responses are not same and have diversity
 Asymptotic significance level run in SPSS was 0.05. N = 380

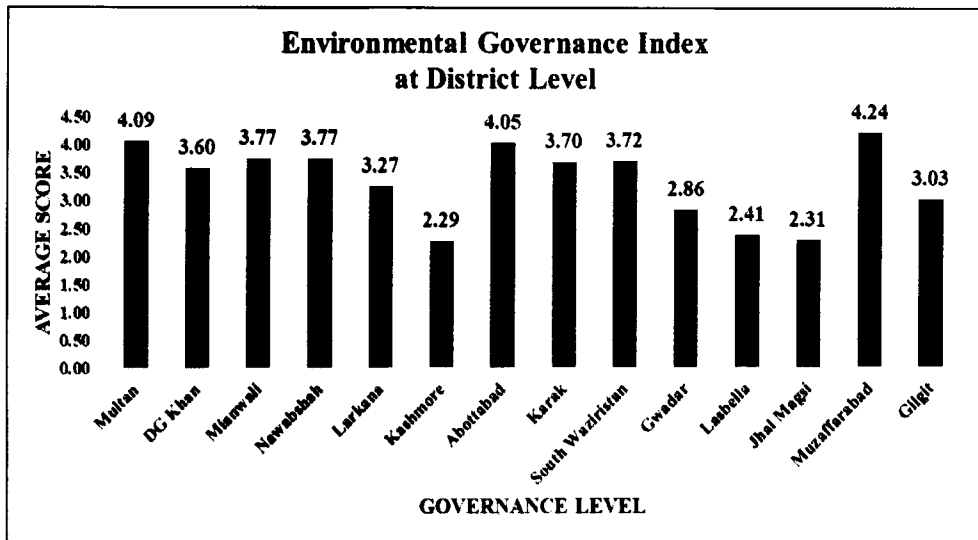


Figure 5.5: Environmental Governance Index of Pakistan: District Level

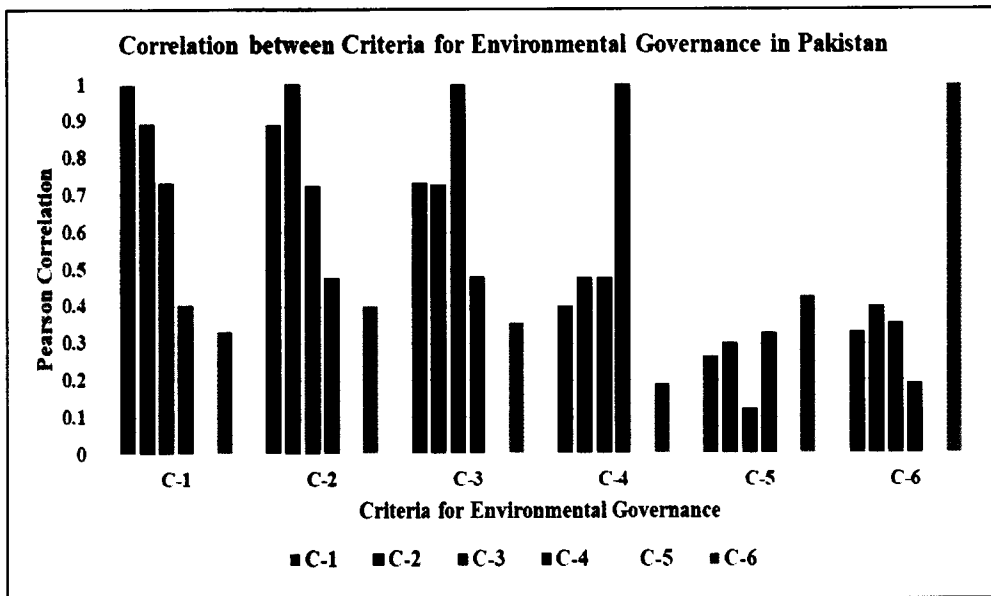


Figure 5.6: Pearson Correlations for Environmental Governance in Pakistan

Table 5.4: Pearson Correlations (Criteria wise) for Environmental Governance

CORRELATION	C1		C2		C3		C4		C5		C6				
	PC	Signif (1-tailed)	N	PC	Signif (1-tailed)	N	PC	Signif (1-tailed)	N	PC	Signif (1-tailed)	N			
C1	1		380	.892**	.000	380	.733**	.000	380	.403**	.000	380	.333**	.000	380
C2	.892**	.000	380	1		380	.726**	.000	380	.476**	.000	380	.298**	.000	380
C3	.733**	.000	380	.726**	.000	380	1		380	.479**	.000	380	.123**	.008	380
C4	.403**	.000	380	.476**	.000	380	.479**	.000	380	1		380	.327**	.000	380
C5	.264**	.000	380	.298**	.000	380	.123**	.008	380	.327**	.000	380	1		380
C6	.333**	.000	380	.333**	.000	380	.356**	.000	380	.427**	.000	380	.427**	.000	380

P. C. = Pearson Correlation, Signif. = Significance, N. = Number of Samples

Table 5.5: Summary of Statistics of Principal Components (PCs)

Importance of Components	PC1	PC2	PC3	PC4	PC5	PC6
Standard deviation	1.8392	1.0828	0.8641	0.65272	0.47729	0.21017
Proportion of Variance	0.5638	0.1954	0.1245	0.07101	0.03797	0.00736
Cumulative Proportion	0.5638	0.7592	0.8837	0.95467	0.99264	1

As we get “6 principal components (PC1-6)”, each of these (PC) clarifies “percentage of the variability in the data”. Thus, PC1 clarifies 56.4% of overall variability, which means that more than 50% of the findings can be collected in just that one Principal Component (PC1). PC2 describes 19.5% of the difference. Thus, by knowing the position of a sample in relation to just PC1 and PC2, a very accurate estimation on where it relates to other samples can be predicted Table 5.6.

The scree plot Figure 5.7 of PCA plots the eigenvalues on y-axis and the number of PCs on x-axis. The point where the slope of the curve levels off (the “elbow”) indicates the number of PCs generated by the analysis. In the current analysis, cut-off of an eigenvalue ≥ 1 denotes two PCs.

As from the scree plot in Figure 5.7, it was seen that the Eigen value of first two PCs have a greater than 1. So, we selected the first two PCs. Selecting the first two PCs are also validated and confirmed from the results shown in Table 4.5, as the first two PCs explain 75.9% of the variance. In extreme case, we can take the first 3 PCs, which carry 88.37% variation of the data set. Table 5.6 shows all the six PCs associated with 6 variables (C1-C6).

Table 5.6: All the Six PCs associated with 6 criteria (variables)

Variable	PC1	PC2	PC3	PC4	PC5	PC6
C1	-0.49531	0.208539	-0.2275	0.353492	0.140062	0.717531
C2	-0.50222	0.161747	-0.19579	0.248191	0.428718	-0.66172
C3	-0.45846	0.316902	-0.08027	-0.27455	-0.76501	-0.14944
C4	-0.36117	0.089642	0.794488	-0.37275	0.28351	0.104828
C5	-0.27032	-0.68344	0.314263	0.503086	-0.32025	-0.07367
C6	-0.29789	-0.59565	-0.41653	-0.58824	0.168562	0.092311

Biplot Figure 5.8 comprises o line, numbers and dots. Lines are utilized to mirror the

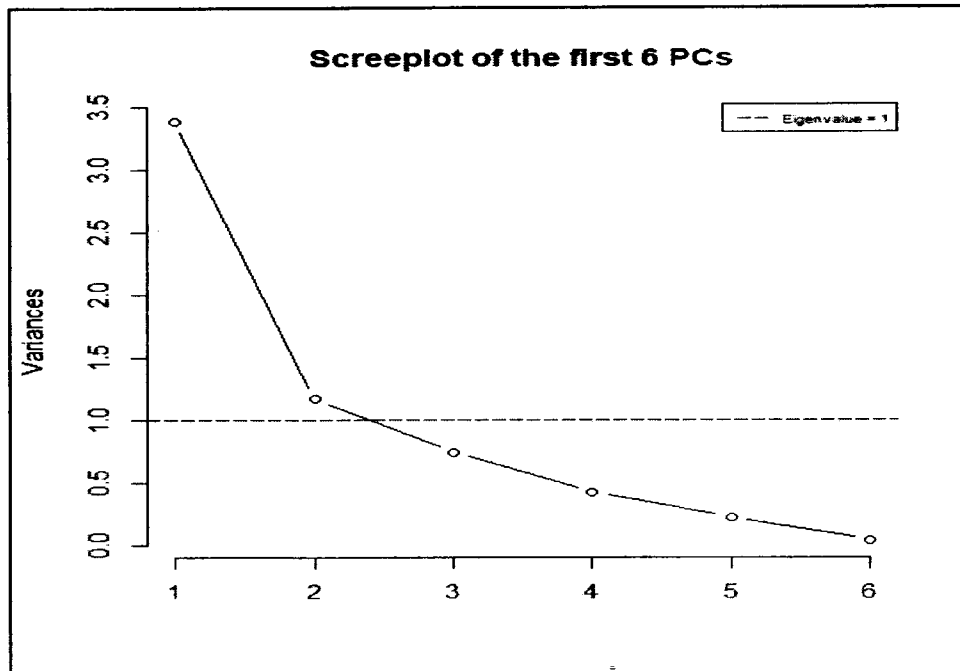


Figure 5.7: Scree plot for Selecting the Desired PCs.

factors of the data-set, and specks or numbers are utilized to show the perceptions. The observations of this data-set are the constituency like Islamabad, Lahore etc. and the variables C1-C6.

The variance in variables is depicted by the length of lines in a Biplot. In Figure 5.8, C4 has the smallest line so its variance is the least while C5 boasts top level of variability in the biplot.

The cosine of the point between the lines, approximates the relationship between the representing variables. The nearer the point to 90, or 270 degrees, the more modest will be the connection, that implies a point of 0 or 180 degrees mirrors a relationship of 1 or -1, separately. The biplot in Figure 5.8 shows a solid connection between the C1-C4, and a frail connection somewhere in the range of C5 and C6. While, the relationship between the C1-C4 variables is negative.

Thus, biplots help in displaying numerous features that are valuable for statistical mod-

eling. The clusters are portrayed in the form of axes in arrow form initiating from the midpoint. The numbers (1-19) show the 19 different constituency. For example, the Islamabad is represented by 1, Lahore by 2, Gilgit by 19 and so on.

Here, you see that the constituency 14 (Quetta), 15 (Gwadar), 16 (Lasbela) 17 (Jhal Magsi), and 19 (Gilgit) all contribute to PC1, with upper readings in the variables relocating the samples to the right.

Additionally, the similar constituency according to its response can also be seen from Figure 5.87. The 14 (Quetta), 15 (Gwadar), 16 (Lasbela) 17 (Jhal Magsi), and 19 (Gilgit) constitute a similar cluster. Similarly, the 1 (Islamabad), 2 (Lahore), 10 (Peshawar), and 18 (Jhal Magsi) is in similar cluster.

5.3 Province wise Breakdown of Environmental Governance Indices in Pakistan

The province wise environmental governance indices are explained in this section. These also includes the federal capital Islamabad, AJK and GB as administrative units.

5.3.1 Environmental Governance Index of Province Punjab

The environmental governance index of province Punjab of Pakistan has been provided in the section. It includes the district Lahore as representative of provincial headquarter and three other districts including Multan, Dera Ghazi Khan and Mianwali.

Table 5.7 shows the district wise breakdown of Environmental Governance Index for the Province Punjab.

For Clarity of Mandates (C1), the provincial headquarter Lahore as representative of the province Punjab meets the score of 2.13 (poor), Multan 3.21 (poor), Dera Ghazi Khan 2.74 (poor), and Mianwali 2.61 (poor) with an average/mean score of 2.67 (poor). Hence as per result patterns, the C1 stands over all at poor scale level of environmental governance index.

For Environmental Governance Framework (C2), Lahore finds score of 5.69 (Fair),

Table 5.7: Environmental Governance Index of Province Punjab

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Provincial Head-quarter (Lahore)	2.13	5.69	4.89	4.31	3.71	2.23	3.82
Multan	3.21	6.32	7.77	3.62	1.98	1.62	4.09
DG Khan	2.74	5.78	7.03	2.38	2.04	1.64	3.60
Mianwali	2.61	5.89	6.73	2.73	3.02	1.66	3.77
Mean	2.67	5.92	6.60	3.26	2.69	1.79	3.82

Multan 6.32 (Good), Dera Ghazi Khan 5.78 (Fair) and Mianwali 5.89 (Fair), with a mean of 5.92 (Fair).

For Regulatory Framework, Lahore 4.89 (Considerable), Multan 7.77 (Very good), Dera Ghazi Khan 7.03 (Good), and Mianwali 6.73 (Good), and mean of 6.60 (Good). It is the overall highest score for a criteria among the districts of Punjab.

For Adequate Institutional Capacity C4, Lahore acquires score of 4.31 (Considerable), Multan 3.62 (Poor), Dera Ghazi Khan 2.38 (Poor), and Mianwali 2.73 (Poor) and mean of 3.26 (Poor). Thus overall pattern about Adequate Institutional Capacity dominates among the districts is poor at scale.

About the Harmonized Arrangements (C4), the districts bears the scores as; Lahore 3.71 (Poor), Multan 1.98 (Very Poor), Dera Ghazi Khan 2.04 (Poor) and Mianwali 3.02 (Poor) with a mean of 2.69 (Poor) which disclose the poor state of harmonized arrangements among districts.

For Criteria of Performance (C6) Lahore marks score of 2.23 (Poor), Multan 1.62 (Very Poor), Dera Ghazi Khan 1.64 (Very Poor), and Mianwali 1.66 (Very Poor), with a mean of 1.79 (Very Poor). These are the lowest score for any criteria among the districts of Punjab.

Considering all criteria (C1 to C6), the mean for Lahore is 3.82 (Poor), Multan 4.09 (Considerable), Dera Ghazi Khan 3.60 (Poor), Mianwali 3.77 (Poor) and mean of all means is 3.82 (Poor). It depicts that districts are overall in the poor environmental governance state.

5.3.2 Environmental Governance Index of Province Sindh

In this section, the environmental governance index of province Sindh of Pakistan has been provided with Karachi as provincial headquarter including Nawabshah, Larkana and Kashmore as selected districts for the study from the province. Table 5.8 shows Environmental Governance Index of Province Sindh. In province Sindh for C1, Karachi scores 4.14 (Considerable), Nawabshah 2.69 (Poor), Larkana 2.60 (Poor) Kashmore 1.77 (Very Poor) and mean 2.80 (Poor). The overall situation in districts of Sindh is poor about clarity of mandates.

In province Sindh for C2, Karachi scores 7.33 (Good), Nawabshah 5.79 (Fair), Larkana 6.29 (Good), Kashmore 3.83 (Poor) and mean 5.81 (Fair). The overall governance of the environment is although fair to good state but district Kashmore is lacking appropriate arrangements. For C3 Karachi attains 7.99 (Very Good), Nawabshah 6.79 (Good), Larkana 7.03 (Good), 4.71, Kashmore 6.63 (Good). The overall status of environmental governance with respect to C2 is good in districts of Sindh.

The C4 finds score from the governance index includes; Karachi 5.55 (Fair), 2.72 (Poor) 0.74 (Very Poor), 0.89 (Very Poor), and mean 2.47 (Poor). The adequate capacity of the institutions is at very poor state in the districts of Sindh although fair in Karachi.

Table 5.8: Environmental Governance Index of Province Sindh

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Provincial Head-quarter (Karachi)	4.14	7.37	7.99	5.55	4.36	1.69	5.18
Nawabshah	2.69	5.79	6.79	2.72	2.97	1.64	3.77
Larkana	2.60	6.29	7.03	0.74	1.33	1.62	3.27
Kashmore	1.77	3.83	4.71	0.89	0.95	1.60	2.29
Mean	2.80	5.81	6.63	2.47	2.40	1.64	2.63

The score of C5 for Karachi stands at 4.36 (Considerable), Nawabshah 2.97 (Poor), Larkana 1.33 (Very Poor) Kashmore 0.95 (Very Poor) and mean 2.40 (Poor). It clearly discloses that the harmonized arrangements among districts. C6 attains score of index as follow; Karachi 1.69 (Very Poor), Nawabshah 1.64 (Very Poor), Larkana 1.62 (Very Poor), Kashmore 1.60 (Very Poor) and mean 1.64 (Very Poor). Hence it depicts a very poor condition about performance which is the lowermost score in the province for any criteria.

While considering all criteria city wise, mean of 5.18 (Fair) for Karachi, 3.77 (Poor) for Nawabshah, 3.27 (Poor) for Larkana, 2.29 (Poor) for Kashmore, and mean of all criteria wise means is 3.63 (Poor).

5.3.3 Environmental Governance Index of Province Balochistan

The environmental governance index of province Balochistan of Pakistan has been provided in this section. Quetta, being the provincial headquarter has been taken as a provincial representative while three other districts selected for the study include Gwadar, Lasbela and Jhal Magsi.

The district wise environmental governance index of Balochistan has been displayed in Table 5.9.

Among the districts of Balochistan, district wise score for C1 is as follows; Quetta 1.15 (Very Poor), Gwadar 1.25 (Very Poor), Lasbela 1.04 (Very Poor), Jhal Magsi 1.17 (Very Poor), along with mean 1.15 (Very Poor). Overall a very poor to poor state of environmental governance in all districts of Balochistan for C1.

Table 5.9: Environmental Governance Index of Province Balochistan

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Provincial Head-quarter (Quetta)	1.15	3.77	4.21	1.54	2.87	1.60	2.52
Gwadar	1.25	4.06	5.04	1.64	3.58	1.58	2.86
Lasbela	1.04	3.84	4.04	1.39	2.52	1.61	2.41
Jhal Magsi	1.17	3.40	3.54	1.59	2.52	1.62	2.31
Mean	1.15	3.77	4.21	1.54	2.87	1.60	2.52

The district wise score for C2 includes; Quetta 3.77 (poor), Gwadar 4.06 (Considerable), Lasbela 3.84 (Poor), Jhal Magsi 3.40 (Poor), and mean 3.77 (Poor). The overall environmental governance index is poor.

Score of criteria C3 for districts of Balochistan consists of; Quetta 4.21 (Considerable), Gwadar 5.04 (Fair) Lasbela 4.04 (Considerable), Jhal Magsi 3.54 (Poor) and mean 4.21 (Considerable). The overall district wise score for criteria C3 shows the considerable status of environmental governance.

In the districts of Balochistan, C4 acquires a score as of; Quetta 1.54 (Very Poor), Gwadar 1.64 (Very Poor) Lasbela 1.39 (Very Poor), Jhal Magsi 1.59 (Very Poor), and mean as 1.54 (Very Poor). The overall environmental governance business for C4 among the districts of Balochistan is very poor.

Score attained by C5 among the district wise breakdown in Balochistan includes; Quetta 2.87 (Poor), Nawabshah 3.58 (Poor), Lasbela 2.52 (Poor), and Jhal Magsi 2.52 (Poor) while for C5 mean is 2.87 (Poor).

C6 indicates the performance and district wise score for C6 in Balochistan comprises as; Quetta 1.60 (Very Poor), 1.58 (Very Poor), 1.61 (Very Poor), 1.62 (Very Poor), and mean 1.60 (Very Poor). It shows the overall performance in environmental governance in districts is very poor.

The mean of all means including district wise for each criteria and criteria wise for each district among districts of Balochistan is 2.52 (Poor).

5.3.4 Environmental Governance Index of Province Khyber Pakhtunkhwa

The environmental governance index of province KP has been narrated in this section which includes Peshawar as provincial headquarter and representative of the province while three other districts include Abbottabad, Karak and South Waziristan. The district wise environmental governance index of province KP has been presented in Table 5.10.

The district wise score for C1 is; Peshawar 2.55 (Poor), Abbottabad 2.11 (Poor), Karak 1.97 (Very Poor), South Waziristan 2.26 (Poor), and mean 2.22 (Poor).

For C2, Score of Peshawar 6.17 (Good), Abbottabad 5.81 (Fair), Karak 5.21 (Fair), South Waziristan 5.17 (Fair), and mean 5.59 (Fair).

C3 gets the score of 4.21 for Peshawar (Considerable), 5.04 for Abbottabad (Fair), 4.04 for Karak (Considerable), and 3.54 for South Waziristan (Poor), while 4.21 (Considerable) is the mean score for C3.

Among the districts of KP, the district wise score of C4 is; Peshawar 6.64 (Good), Abbottabad 5.77 (Fair), Karak 4.77 (Considerable), South Waziristan 4.73 (Considerable)

Table 5.10: Environmental Governance Index of Province KP

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Provincial Head-quarter (Peshawar)	2.55	6.17	7.21	6.64	5.19	2.00	4.96
Abbottabad	2.11	5.81	6.71	5.77	2.28	1.61	4.05
Karak	1.97	5.21	6.28	4.77	2.40	1.60	3.70
South Waziristan	2.26	5.17	6.26	4.73	2.33	1.56	3.72
Mean	2.22	5.59	6.62	5.48	3.05	1.69	4.11

and mean 5.48 (Fair).

C5 achieves Peshawar 5.19 (Fair), Abbottabad 2.28 (Poor), Karak 2.40 (Poor), South Waziristan 2.33 (Poor), and means 3.05 (Poor). The overall condition in all districts for C5 is poor.

For C6 the district wise score in KP districts stands at; Peshawar 2.00 (Poor), Abbottabad 1.61 (Very Poor), Karak 1.60 (Very Poor), South Waziristan 1.56 (Very Poor), and mean 1.69 (Very Poor).

The criteria wise means for each districts has been give and discussed already, however, criteria wise mean for each district is Peshawar 4.96 (Considerable), Abbottabad 4.05 (Considerable), Karak 3.70 (Poor) and South Waziristan 3.72 (Poor), while mean of all means is 4.11 (Considerable).

5.3.5 Environmental Governance Index of Azad Jammu and Kashmir

For AJK, district Muzaffarabad was taken as symbolic of the constituency. The district score for each criteria comprises; C1 = 3.55 (Poor), C2 = 7.72 (Very Good), C3 = 4.97 (Considerable), C4 = 2.87 (Poor), C5 = 4.79 (Considerable) and C6 is 1.57 (Very Poor), while mean is 4.24 (Considerable). Results are shown in Table 5.11.

5.3.6 Environmental Governance Index of Gilgit-Baltistan

For Gilgit-Baltistan, district Gilgit was taken as representative of the constituency. The district score for each criteria comprises; C1 = 1.45 (Very Poor), C2 = 3.32 (Poor), C3

Table 5.11: Environmental Governance Index of Province AJK

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Headquarter of AJK (Muzaf-farabad)	3.55	7.72	4.97	2.87	4.79	1.57	4.24

= 4.98 (Considerable), C4 = 1.94 (Very Poor), C5 = 4.90 (Considerable) and C6 is 1.62 (Very Poor), while mean is 3.03 (Poor). Results are shown in Table 5.12.

Table 5.12: Environmental Governance Index of Province GB

Governance Tier	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance	Mean
Headquarter of GB (Gilgit)	1.45	3.32	4.98	1.94	4.90	1.62	3.03

World's attention is focused towards environmental concerns due to exacerbation in problems in past few decades. Among other prominent reasons are increasing population, urbanization, industrialization and changing life styles. These factors synergistically contributed in various types and magnitude of pollution. Consequently, we are now living in an era where devastating climatic changes and environmental deterioration are inclusive of all progressive developments across the biosphere. Among various plausible solutions presented to overcome these problems and sustained economic growth, governance framework provide foundation for adoption and implementation (202). Governance that deals with resource conservation dilemma is consistently challenged and ultimately ends up in trade-offs.

Governance, therefore, has become an important and key instrument to implement and adopt changes through decision making. The modes of governing are acutely deep-rooted in the majority of settings in different shapes. For example, in conventional governance framework, government led ideas and approaches for making decisions, but such systems have not, and perhaps cannot, create the sustainable outcome. Therefore, in many settings participatory governance framework was preferred because of the complication and multi-scale actuality of most protection, management and conservation problems. In participatory governance framework, no one actor will be capable

of resolving problems individually. Hybrid shapes of governance rising in retort may assure but they too must be watchfully considered in provisions of the conservation outcomes they may produce (Munk Ravnborg et al., 2013; Najam, 2005).

Existing examples are therefore further adaptive and mutual forms of governance have been replaced with more customary, state-centric, and hierarchical approaches. Environmental governance is a sub-set of the broader governance literature, but have some important features. A superior importance on environment protection and sustainable development is a widespread classifying theme and takes the conversation further than fundamental concepts of sectoral governance. For example, hybrid environmental governance arrangements reflect openness to using market based institutions (markets, rights, norms) and incentives (economic, social) in novel ways to address environmental problems (Najam, 2005). That openness may stem from recognition of the limited capacity of government agencies that are acting in isolation from each other to deal with "wicked" environmental problems (Howes and Wyrwoll, 2012).

Besides, pressure from citizens for a greater role in decision making, and expected benefits (despite transaction costs) when involving more perspectives and different kinds of knowledge are also the key pinning areas to make environmental governance more complicated. Environmental governance scholars need insights from non-equilibrium ecology and complex adaptive systems to move governance concerns beyond simple notions of accountability and authority, towards a focus on objectives such as maximum sustainable yield (Howes and Wyrwoll, 2012; Shah, 1999).

Implementing new conducts of governing will necessitate a significant endeavor with sustained and continued assurance on the part of all participants. However, the world's past experiences reveal that areas with poor institutional arrangements and clearly unsolved problems are more prone to instability. Abrupt shifts in the trajectory of supremacy are likely to occur in these cases.

Pakistan is located in a region with high sensitivity to environmental and climatic disasters, which are exacerbated by uncontrolled environmental pollution including land degradation, deforestation, air pollution, water pollution and improper waste disposal practices (202; Khan and Irfan, 2018). Adoption of laws, regulations and guidelines helps governments to control or at least slow down the adverse environment impacts

(Hassan et al., 2021; Khayam and Ahmad, 2020).

However, this depends on the comprehensiveness and effective policy, regulatory and institutional framework to address these issues. An effective environmental protection system in a country needs enforcement of a uniform policy and legislative regime across the country, besides comprehensiveness of the legislation to cover the all dimensions of issues faced by the country (Pastakia, 2012). In many countries, international laws and principles have been adopted in temptation to tap financial benefits associated with these agreements and international pressures, but either never or weakly translated into national and sub-national regulatory frameworks. As a result enforcement, implementation and compliance remains weak, owing to lack of coordination and institutional capacities (Ahsan and Khawaja, 2013). Due to cross-cutting nature of environmental issues, environmental governance frameworks require horizontal as well as vertical coordination in terms of activities and processes (202; Pastakia, 2012; Qazi et al., 2017). Environmental governance framework in Pakistan remained a federal chapter since 1975 till 2010 (Ahsan and Khawaja, 2013; Khayam and Ahmad, 2020; Pastakia, 2012; Zaheer, 2019).

As discussed earlier, 1973 Constitution of Pakistan delegate powers to federal as well as provinces to make laws on the environment till the year 2010, “environment and ecology” being at the concurrent legislature list. However, during this time period policies, act and regulations were made at the federal levels and the provincial authorities only played their role in enforcement of laws made at the federal level. After 2010, through 18th Amendment in the Constitution of Pakistan, the concurrent legislative list was devolved and powers were delegated to make environmental laws for their jurisdictional scope (Ahsan and Khawaja, 2013; Pastakia, 2012).

In response to 18th Amendment, Punjab adopted the PEPA 1997 with minor changes in the form of Punjab Environmental Protection (Amendment) Act, 2012 while Balochistan passed the Balochistan Environmental Protection Act, 2012, and later Sindh and KPK developed their acts. After 2010, till the promulgation of laws in respective provinces and other administrative areas, PEPA, 1997 and rule/regulation made their under continued to serve the purpose. Where the devolution of power has provided opportunity to provinces to formulate laws in accordance to their needs (Khayam and

Ahmad, 2020), synchronization of these laws to achieve the national goals (Waheed et al., 2021), maintaining institutional capacities (Tapio Reinikainen, 2018), and disbursement of funds remain challenging for developing countries like Pakistan.

Present study adopted an approach to evaluate the impact of 18th amendment on environment governance framework. For the purpose an in depth study was carried out of legal framework developed after 18th amendment at provincial levels to identify gaps and conflicting areas. The study also adopted a multi criteria decision analysis approach. For the purpose six criteria (C1-C6) and 20 indicators Table 3.1 were used. The approach helped to remove biasness and collect perspective of relevant stakeholders based on their experiences.

Previous studies (Ahsan and Khawaja, 2013; Khayam and Ahmad, 2020; Pastakia, 2012; Zaheer, 2019) focused on content analysis and expert judgment to analyze impact of 18th amendment on environmental governance. Present study thus applies a criteria and indicator based approach to evaluate the impacts. The approach helped to develop governance index for federal, provincial and district levels to evaluate the adequacy and efficiency of environmental governance framework in post-devolution scenario. Gathering of data from 19 locations and 380 key informants helped to comprehensively cover the various perspectives and challenges faced by people working in various institution at federal, provincial and local levels.

5.4 Environmental Governance in Pakistan after 18th Amendment

Findings of the study portrayed that 18th amendment in the 1973 Constitution of Pakistan granted legislative power to provinces on the subject of environment. After 18th Amendment in 2010, provinces started their work on formulation of legal framework for their jurisdiction. All four provinces including GB and AJK has developed their acts and are in the process of developing respective regulatory framework as listed in various tables presented in part-I of results in tables 4.1 to 4.7.

The findings construe that 18th amendment provided an opportunity to provinces to integrate emerging environmental issues as part of their legal framework. Consequently,

BEPA, 2014 addresses issues like coastal areas, e-waste and SEA, inter-provincial coordination, hazardous and hospital waste, Sindh included SEA, environmental monitoring and auditing, and public participation, while KPK also inculcated theme of SEA, import of hazardous waste in KP Environmental Protection Act, 2014. GB Environmental Protection Act, 2015 is the youngest one but effectively addresses the areas like SEA, import of hazardous waste, environmental monitoring and auditing. However only Punjab province adopted PEPA 1997, with little modifications, while AJK Environmental Protection Act, 2000 and PEPA, 1997 were not revised in accordance with 18th Amendment.

In this context it is important to discuss here that before 18th amendment, the PEPA, 1997 was the only act and operated as federal law. Being federal law, PEPA, 1997 had an overriding effect on any other provincial or federal acts. Hence, any contradictory provision in any other law, whether provincial or federal were nullified. But after 18th amendment, the scenario is change now. Federal government has not repealed yet. While provincial legislations for environmental protection made by province, all federal laws can override these legislation (Pastakia, 2012).

Another problem arises due to jurisdictional conflicts by the federal authority. In the process of devolution, federal authority retained some areas in legislative jurisdiction of the federal government. During interviews with key informants following areas were identified, where jurisdiction conflicts between federal and provinces arises. These are areas that are in federal legislative list but provinces have made these areas as part of their legislation or where jurisdiction is still not clear:

- import of hazardous waste included in provincial acts, but in import is federal subject;
- control of pollution at coastal zones, maritime areas which is basically in jurisdiction of federal area although located in provinces;
- control of hazardous substances that are in federal control for example radioactive materials and wastes;
- environmental impact assessment of projects that are inter-provincial in nature or controlled by federal departments;

- uniformity in environmental quality standards between federal and provinces and among provinces;
- implementation and disbursement of funds related to international obligation of the Pakistan in provincial territorial borders;
- issues related to intellectual property rights, especially in case of genetically modified organisms; trademarks etc.;
- national surveys, monitoring and reporting requirements against provincial matters;
- lack of associated fiscal reforms for devolved matters, National Finance Commission (NFC) though established in 2010, but it failed to resolve conflicts in disbursement of funds among the partners

Similar nature of issues are also discussed by other researchers (Khayam and Ahmad, 2020; Pastakia, 2012; Tapio Reinikainen, 2018; Zaheer, 2019), however (Khan and Irfan, 2018) construe that devolution of power will result in better public participation. This is also evident from the inclusion of public participation concept in provincial environmental protection acts of the Sindh and KP government.

Another issue arises due to slow progress of provinces on environmental policy making. None of the provinces yet developed environmental policy. Policy act as a guiding document for governments to provide future direction for development (Charles Darwin University, 2011). Lack of policies result in decision based on segregated fashion and consequent incoherence in governance framework.

Findings are presented against all six criteria namely clarity of mandate (C1), Environmental governance framework (C2), regulatory framework (C3), institutional capacity (c4), harmonized arrangements (C5) and performance (C6) for federal, provincial and local areas to provide a comprehensive as well as comparative situational analysis. Findings revealed variation in score from criteria to criteria and among federal, provincial and district levels. Provinces performed better against C2 and C3, while for other criteria score obtained remained less than 5, depicting unsatisfactory performance against these criteria. In the case of vertical governance hierarchy performance at federal level was better as compare to provinces. Federal being the older governance

regime in Pakistan is better established, known to stakeholders and well developed policy instruments. However, provinces are in developmental phase due to late start on devolution agenda, consequently the trickling down of power to district level is not yet achieved.

This section portrays briefly the comprehensive overview of environmental governance structure and function in light of six selected criteria and 20 indicators respectively. The discussion section also provide an insight information gathered through FGDs and KIIs and analysis in the context of Eighteenth (18th) Constitutional Amendment in the Constitution of Pakistan at national level. The central leitmotif was to study the impact of Eighteenth (18th) Constitutional Amendment on Environmental Governance Systems in Pakistan which was a actually a multifaceted scholarship since of multi-dimensional discipline, cross cutting themes of the discipline in addition to the study under consideration.

Table 5.1 tabulates “Environmental Governance Index of Pakistan” and includes criteria wise index score against different components of environmental governance of Pakistan at federal, provincial levels, (including AJK and GB) and districts average scores together with overall average score. As clear from the index score Table 5.1, the environmental governance and supporting mechanism at the federal level displays the highest score of 8.60 (out of 10.00) in the table for Regulatory Framework (C3) Criteria of federal. The lowermost score of 1.61 goes to Performance (C6) Criteria of districts. The values of index score indicates that federal performance is relatively better with particular respect to Regulatory Framework (development of rules and regulation). It also gives a clear picture of Performance (C6) among districts is very poor in terms of pollution control, climate action, urban planning, sustainable resource exploitation and green growth.

According to Environmental Governance Index Score, Federal remained at top among all constituencies in all criteria from C1 to C6 except C4-Adequate Institutional Capacity where provinces achieved a little bit more score getting better position. It deciphers that overall environmental governance at federal level has a leading role as compared to all other constituencies which is in accordance with the regulatory role federal has enjoyed over a long time period. Federal being pioneer and mature environmental

governance mechanisms, and resources now has a well-developed act and associated policy, regulatory and institutional arrangement. Provinces are yet in developmental phase, though, a decade has already passed since execution of 18th Amendment. The worst case scenario revealed the situation in districts. The poor environmental index score against all criteria at district level reveals that 18th Amendment didn't have any trickle-down impacts to improve the situation in districts as desired. The criteria wise performance on environmental governance index was as follows:

5.4.1 Criteria 1: Clarity of Mandates

The governmental institutions at federal, provincial and local levels can perform better if clarity of mandate provided with defined roles and tasks conveyed to institutions. Provincial and federal environmental acts define powers and functions of environmental protection councils, EPAs and tribunals (Zaheer, 2019) but notified distribution of functions of concerned institutions at all levels after 18th amendment is still required. Responses gathered through KIIs and FGDs mainly highlighted ambiguities arising from notified status of PEPA-1997, notified jurisdiction of PEPA-1997 after 18th amendment and obligations of MEAs signed and ratified by the federal government in provincial jurisdiction (Khayam and Ahmad, 2020), provincial authority to tap international funding. The federal government retained some authority over matters like MEAs resulting in ambiguity among province regarding its implementation. Hence, the legislative competence of the federal and provincial governments overlapped as there are certain entries in the FLL Part I and Part II which are under exclusive legislative domain of parliament. One of those are MEAs that comes under the ambit of FLL I. However after 18th amendment through provincial environmental protection acts, provincial governments also have power to make laws/rules on matters related to MEAs (Khayam and Ahmad, 2020).

Similarly, current governance framework do not provide any mechanism for conflict resolution among provinces and federation. Only Balochistan province introduced inter-provincial coordination mechanism in its act, however it needs to be materialized yet (BEPA, 2012). The overall range of C1 from top to bottom is lying in the poor level at scale. The situation clearly depicts the lack of clarity of mandates among all constituencies from federal to district level and suggested to be addressed at faster pace.

For this criteria, Federal capital is at top in C1 followed by provinces and districts at bottom.

5.4.2 Criteria 2: Environmental Governance Framework

Environmental governance needs a systematic approach. Governments define their policies, which are then translated into acts, rules and regulations. Through acts, rules and regulations, institutions for its implementation and accountability are established. These are the founding stone of environmental governance framework and act as basic requirements at all levels of administration.

For Environmental Governance Framework (C2), the federal capital performed better than provinces. Federal lies in very good range at scale while provinces and districts at fair scale while mean score for C2 lies in good at scale.

5.4.3 Criteria 3: Regulatory Framework

Rules and regulations are essential instruments required to enact laws. It is the elementary requirement to complete the legislative process. The achievement of objectives for an administrative institute without making appropriate rules and regulations followed by a transparent mechanism of enforcement is an impossible way. Following the approval of policies and establishment of institutions, rules and regulations provide founding stones to the institutions to start their work. In the case of regulatory framework in Pakistan and its provinces, there are two patterns appearing;

- a. provinces formulate their own new rules and regulations,
- b. provinces accept/adopt and implement the federal rules and regulations after necessary amendments and modification accordingly. For the enforcement of law, therefore, development of Rules and Regulations is the basic necessity to complete the legislative process, so that objectives in context of provincial policy may be achieved.

Thus, Criteria 3 comprises the indicators of development of new rules and regulations (for provinces, federal, GB and AJK) or to accept the already existing federal regulations with necessary modifications (particularly for provinces). The federal capital is

also at upper top in C3 followed by provinces with an equal score of districts. C3 has the top most scores among all criteria for all constituencies including federal, provincial and districts along with the overall average. The federal is in very good scale while provinces and districts are in fair scale while overall average is at good scale. It discloses that provinces are stirring upward in evolving the rules and regulations and accepting the present national rules and regulations but improvement is necessarily required. The ultimate impacts of provincial activities of developing rules and regulations are re-flexed at district level.

5.4.4 Criteria 4: Adequate Institutional Capacity

The Adequate Institutional Capacity is an essential requirement in all facets for execution of environmental rules and regulations made under the law. It includes capacities in terms of human, technical, technological and financial resources. Environmental executing agencies needs funds for research, monitoring, auditing and reporting purposes. Devolution provides immense potential for effective environmental management, however, it has been mired in institutional capacities, coordination, funding, and capacity building issues at all levels of governance.

Labs at EPAs are not well established while staff to ensure essential monitoring requirements like in case of EIAs and complaints is lacking (Tapio Reinikainen, 2018). However, the index score for this criteria revealed interesting findings where provinces (though in poor category) performed relatively better than federal.

5.4.5 Criteria 5: Harmonized Arrangements

Federal and provincial institutions perform well provided to have harmonized arrangement for information exchange and coordination. It is a compulsory instrument in governance model which improve the efficiency and performance of the institutions both direct and indirect ways. It is also important with respect to environmental governance to discharge the functions and to exercise the powers to meet the international obligations on state under MEAs. Environmental governance systems requires coordination among provinces and state for effective and informed policy making, negotiations, supervision, monitoring and reporting of implementation of MEAs as part of international

obligations (Khayam and Ahmad, 2020). The Harmonized Arrangements (C5) recommends the competency of sharing data and facts and figures at various levels within and across the provinces not excluding federal capital, and distribution of tasks between federal and provincial institutions. The federal capital is moving at the same pace of being top for harmonized arrangements followed by provinces and districts are again at bottom side. The federal obtains a fair status, provinces stepping down to considerable and districts at poor scale while average is in between of poor and fair, i.e., considerable one. The picture provide an invitation to attend the issue and to make a devoted effort to synchronize the institutional arrangements in line with objectives to achieve the sustainability of the environment. For effective environmental governance, coordination mechanisms among federal, provincial, and local level agencies and among different sectors need to be effective and well-articulated (Khayam and Ahmad, 2020; Pastakia, 2012).

5.4.6 Criteria 6: Performance

For this criteria data was gathered against indicators of pollution control, climate action, urban planning, sustainable resource exploitation and green growth. It is the general supremacy instrument, significant with a comprehensible and well harmonized system measures at federal, provincial and local levels in Pakistan.

The Environmental Governance Index of Pakistan displays although federal at upper top followed by provinces, then districts but these are the lower most score among all criteria where top score holder lies at considerable scale and followers are at very poor scale with an average of poor scale for all constituencies. It portrays a very deprived image of enactment of environmental laws and efficiency of environmental governance system in terms of pollution control, climate deed, municipal design, sustainable resource exploitation and green growth.

Among other problems, climate governance posed another challenge after 18th amendment. National Climate Change Policy—a Framework for Implementation of Climate Change Policy—in 2012 and enacted the Pakistan Climate Change Act, 2017 as measures to prepare for climate emergency. Despite having primary legislation on the subject, the implementation of climate change policy and legislation is inadequate due to

the lack of coordination mechanism among federal and provincial institutions. Climate Change policy speaks of Federal and Provincial Climate Change Policy Implementation Committees, whereas, no such Committees have been established so far at federal or provincial level. The Pakistan Climate Change Act, 2017 envisages a National Climate Change Authority comprising of membership from amongst the provinces. However, the authority is not yet established.

Findings construe that cumulative average environmental governance index for all criteria for federal is better than provinces and other administrative areas, while provinces performed better than districts. Sufficient legal and regulatory framework exists at federal and provincial levels, but ambiguities in mandates, low institutional capacities, and non-synchronous arrangements among federal and provincial institutions result in weak enforcement and pose a major challenge in achieving desired objectives.

5.5 State of Environmental Governance in Khyber Pakhtunkhwa

Environmental governance framework in KP is governed by Environmental Protection Act, 2014. KP stands at mean overall score of 4.11 for overall environmental governance index.

5.5.1 Criteria 1: Clarity of Mandates

It is important that the institutions at federal as well as provincial level are clearly well aware of their mandates and responsibilities to execute the functionality at their end. It also impacts the efficiency of all level institutions to meet the international obligations signed or ratified by the national or federal govt.

KP gains a score of 2.55 for the criteria (C1), the clarity of mandates which is at poor level. The districts of KP including Peshawar (provincial headquarter), Abbottabad, Karak and South Waziristan obtains scores of 2.55, 2.11, 1.97 and 2.26 respectively with a mean score of 2.22 and over all districts average score of 2.11 for C1. It indicates the overall poor or very poor status of clarity of mandates among different level institutions.

5.5.2 Criteria 2: Environmental Governance Framework

Policy, law and institutions are the founding components of governance framework. The province KP in the environmental governance frameworks achieves the score of 6.17 which is good to some extent. The Mean Index Score of Environmental Governance Framework (C2) for all provinces is 5.70 which is quite fair moving upward to good.

Environmental Protection Act of the Province has been enacted in 2014. this Act has repealed the PEPA, 1997 to the extent of boundaries and jurisdiction of KP province, while Environmental Protection Council under section 3 of this Act and Environmental Protection Agency under section 5 of the same Act have been established to exercise the powers and to perform the functions as prescribe according to the act. However, the Environmental Policy of the Province KP has not been approved yet which is a drawback and need to cope with accordingly. A proposal of Climate Change Policy has also been initiated by LEAD for KP.

Among the districts of KP, Peshawar achieves score of 6.17, Abbottabad 5.81, Karak 5.21 and South Waziristan 5.17 with a mean of 5.59 for C2. Hence in the provincial as well as district level score for C2 of KP, the status is fair with a trend of ascending up which indicates the province and its districts are in the developing phase but space is there to improve the situation.

5.5.3 Criteria 3: Regulatory Framework

In Criteria wise Index Score of Provinces for overall Environmental Governance Index of Pakistan, Regulatory Framework (C3) yields a score of 5.85 which lies in the scale as fair. KP catches score of 7.21 for C3 which is good and highest score for C3 among provinces. The districts of KP succeed to get the good score; Peshawar-7.21, Abbottabad-6.71, Karak-6.28 and South Waziristan-6.26 with a mean of 6.62. This predicts the good status of KP in framing rules and regulation of the concerned units to accomplish an efficient regulatory framework for a higher level efficiency across the corners.

5.5.4 Criteria 4: Institutional Capacity of Provinces

The score stays at 6.64 in case of KP for C4 indicating an overall good pattern of institutional capacity in the province. Peshawar obtains score of 6.64, Abbottabad 5.77, Karak 4.77 and South Waziristan 4.73 with a mean of 5.48 regarding the institutional capacities which is fair and uprising to good but improvement is required by the provincial government to enable all institutions for future challenges which are not an easy task to cope with.

5.5.5 Criteria 5: Harmonized Arrangements

The Harmonized Arrangements (C5) intends to the delivery of data and information distribution at several levels with in the provinces and crosswise the provinces counting federal capital and distribution of tasks between federal and provincial institutions. The average score of provinces in environmental governance index stands at 4.39 which is less than the federal score (5.06) for the same criterion (C5). The situation of provinces again for harmonized arrangements is overall considerable and needs improvement regarding development of mechanisms of data and information sharing and making a clear distribution of tasks between federal and provincial institutions.

The Province KP takes score of 5.19 for the Harmonized Arrangements (C5) in the environmental governance index which is fair but not a good score for the criterion, but at the same time it is the uppermost score for C5 among other constituencies including AJK and GB. It clearly demonstrates that province with fair status of harmonized arrangements is at the top score so what about the other left behind.

Peshawar gets 5.19 being at top for C5 among districts of KP, Abbottabad 2.28, Karak 2.40, and South Waziristan 2.33 with a mean of 3.05. it is very clear that institutions are lacking the sharing of data and set of information and are at weaker side in context of clear distribution of tasks among all at districts, province and federal level.

5.5.6 Criteria 6: Performance

The overall governance mechanism is important with a coherent and well synchronized system arrangements at federal, provincial and local levels to achieve the sustainability

in Pakistan.

The score of KP at Environmental Governance Index for Performance (C6) is 2.00 which is the least score of KP for any criteria and unveils the poor arrangements of the province for the sustainability. The Provincial Government is highly responsible to initiate processes of taking comprehensive efforts and strong actions to provide efficient measures for pollution control. The climate change, particular in case of KP is a not less than a disaster which cannot be ignored at any cost, is another issue impacting the province adversely at higher graphs which needs consistent plans to be implemented to cope with. Urban Planning section should not be given special attention while significant and imperative measures are obligatory for resource exploitation, which should be marched on the sustainable track.

It shows the environmental governance Index is not bad at large but provincial government should take necessary actions to improve the overall conditions of environmental governance.

5.6 State of Environmental Governance in Punjab

Environmental governance framework in Punjab comprise structure of governance implied by the Punjab EPD/EPA including policies, acts, rules, regulations, procedure, guidelines and institutional setups to achieve the environment objectives set out by the provincial government (Tapio Reinikainen, 2018). After 18th Amendment, the new legal instruments were developed by the Punjab EPD are listed in Table 4.3. The Punjab EPD took progressive steps in promulgating environmental laws and regulation after 18th amendment including recently set Punjab Environmental Quality Standards, the overall performance (overall governance index 3.82) against governance indicators remained poor 5.7. (Khan and Irfan, 2018; Khan et al., 2018) identified enforcement as the big challenge for Punjab EPD.

5.6.1 Criteria 1: Clarity of Mandates

Clarity of institutional mandate at all levels of governance hierarchy is crucial for effective enforcement of laws and smooth functioning of the departments (Group, 2019).

Clarity of Mandates (C1) for Punjab province is at the score of 2.13 in the Environmental Governance Index, which unveils a poor state of affairs with respect to notified distribution of function among the departments.

5.6.2 Criteria 2: Environmental Governance Framework

Environmental governance frameworks in terms of policy, law and institutions at provincial levels is the basic requirement. Table 4.3 enlists all policies, acts and regulations promulgated by the Punjab EPD after 18th amendment. The performance of Punjab (criteria score = 5.69) against this criteria is good. Punjab Environmental Protection Department enacted Environmental Protection Act in 2012 and also developed Climate Change Policy, Policy to Control Smog, 2017 besides many other rules and regulations as listed in table. However at the same time by adopting the PEPA, 1997, Punjab missed the opportunity to inculcate emerging environmental concerns like e-waste, SEA etc in environmental governance framework which other provinces have inculcated (Z. N. Khan, 2018).

5.6.3 Criteria 3: Regulatory Framework

Without rules and regulations law cannot be enforced. Therefore, development of rules and regulations is the basic necessity to complete the legislative process in terms of achievement of the objectives in context of provincial policy. The provinces and provincial institutions either develop new rules and regulations as per requirements or adopt the existing federal rules and regulations with certain modifications (IUCN, 2018).

In case of Punjab, C3 obtains score of 4.89 which is the least score for this criteria among all constituencies. However, the score is indicative of progressing stage. Provincial Government is providing attention to the development of new rules and regulations and adopting the existing federal rules and regulations to cope with the issues and to enhance the efficiency of the relevant sections. Findings revealed that there are 26 various rules and regulations enlisted by Punjab EPD including 16 made after 2010, while ten were made before 2010 (Tapio Reinikainen, 2018). However, in majority of the cases, the provincial government has adopted the already existing rules and regulations and environmental quality standards with minimal alterations, modifications and

amendments.

Twelve (12) set of rules and regulation are in development process, draft are prepared to get the public opinion. With approval of these rules, it is anticipated that performance of Punjab against this score will improve.

5.6.4 Criteria 4: Institutional Capacity of Provinces

Institutional capacity in terms of human, technical, technological and financial resources is an essential requirement for proper enforcement of environmental rules and regulations made under the law. Criteria 4 gathered information regarding capacities of the institutions working on the environment related matters. For Punjab, the score for the criteria 4 is 4.31 which reveals the inadequacy of capacities of institutions of Punjab in terms of human, technical, technological and financial capacities. (Khan and Irfan, 2018) suggested institutional restructuring in Punjab to ensure effective monitoring and compliance mechanism in line with devolution of powers. Improvement in institutional capacities will require financial input, appointments and selections of relevant personnel and experts in accordance with prescribed procedures, capacity building of the existing staff through workshops and trainings.

5.6.5 Criteria 5: Harmonized Arrangements

In implementing these international obligations a harmonized coordination mechanism is required for allocation of resources and responsibilities at provincial and then district levels. Therefore, for discharging international obligations on state under MEAs, there must be a harmonized arrangement between federal and provincial institutions. The average score of provinces in environmental governance index stands at 4.39 which is less than the federal score (5.06) for the same criterion (C5). The situation of provinces again for harmonized arrangements is needs improvement regarding development of mechanisms of data and information sharing and making a clear distribution of tasks between federal and provincial institutions.

The Province Punjab takes score of 3.71 for the Harmonized Arrangements (C5) in the environmental governance index which is not a good score for the criterion among all constituencies except Balochistan, and hence at poor side. Other provinces have

assigned the duties of inter-provincial coordination to environmental protection councils through their respective environmental protection acts. In case of Punjab due to adoption of PEPA, 1997, ambiguity arises for inter-provincial coordination mechanism. The provincial government needs to synchronize with federal capital as well as other provinces for efficient communication to share data and information. Clarity in the distribution of tasks between the federal unit and provinces also appeared weak.

5.6.6 Criteria 6: Performance

Performance of the overall governance mechanism is important to decipher the efficiency and adequacy of the existing system. However for effective performance, beside development of legal instrument, effective enforcement, use of different policy instruments (Z. N. Khan, 2018) with a coherent and well synchronized system arrangements are required (Khayam and Ahmad, 2020; Zaheer, 2019; ?).

The score of Punjab at Environmental Governance Index for Performance (C6) is 2.23 which unveils the poor arrangements of the province for the sustainability. Focus group discussions though indicated provincial government's intention to take solid and strong actions to provide efficient measures for pollution control and monitoring (Tapio Reinikainen, 2018). The climate change is another issue impacting the country specially the province Punjab, adversely at higher graphs which needs consistent plans to be implemented to cope with the associate adverse impacts. Urban planning section should not be ignored while important and urgent measures are compulsory for resource exploitation which should be stepped on the sustainable path.

5.6.7 State of Environmental Governance in Selected Districts of Punjab

The criteria wise overall average score of districts in Punjab for all criteria at the environmental governance index is 3.82 as same for provincial headquarter Lahore. On average for the districts of Punjab, the mean criteria wise score of all districts at environmental governance index is poor (3.82). Averages of district wise score also showed same trend Lahore (3.82), Multan (4.09), Dera Ghazi Khan (3.60), and Mianwali (3.77). The only criteria that meet the satisfactory levels at district levels are C2 and C3, which

is obviously due to governance framework developed at provincial level against these criteria. The findings revealed no change in environmental governance structure at district level after 18th amendment.

The findings concludes that Punjab performance is currently unsatisfactory (Tapio Reinikainen, 2018) but anticipated to improve in future in terms of environmental governance framework. However, province has to work on building institutional capacities and enforcement of the existing rules and regulation to improve environmental governance performance.

5.7 State of Environmental Governance in Sindh

Environmental governance in Sindh is mainly dealt by Sindh Environmental Protection Act, 2014 and rules made their under.

5.7.1 Criteria 1: Clarity of Mandates

The Province Sindh hardly gets the score of 4.14 with respect to the clarity of mandate (C1) which is not good but considerable and expresses that the institutions of Sindh in the subject of environment are not clear about the roles and accountabilities of the institutions. The districts of Sindh are also having a poor condition about the same as average score of all districts for C1 stands at 2.35 which is alarming.

The obligatory measures and financial inputs of MEAs after the 18th Amendment, are not clear in various aspects in case of province Sindh as federal and provincial governments both have not communicated any clear policy about these matters.

Data collected from the districts of Sindh including provincial headquarter Karachi, Nawabshah, Larkana and Kashmore resulted in score of 4.14, 2.69, 2.60 and 1.77 with a mean of 2.80 against C1 which states poor and very poor status against the criteria.

5.7.2 Criteria 2: Environmental Governance Framework

Sindh obtains the score of 7.33 for the criteria in the Environmental Governance Framework Index which shows good status of the province in making law and establishing

institutions. The province still lacks a comprehensive Environment Policy but Sindh Environment Protection Agency and Sindh Environment Protection Council have been established under Sindh Environment Protection Act, 2014 and are functional in the province. The selected districts of Sindh i.e., Karachi, Nawabshah, Larkana and Kashmore got the score of 7.33, 5.79, 6.29, and 3.83 respectively for C2 with a mean of 5.81, an overall fair status of environmental governance framework, although Karachi is at top.

5.7.3 Criteria 3: Regulatory Framework

Law is always enforced with the help of rules and regulations. It is the basic need to complete the legislative process. An administrative unit cannot achieve the objective without making appropriate rules and regulations followed by a transparent mechanism of enforcement without which the policies turned down and face failure. Sindh achieved the score of 7.99 for C3 which is the highest score of Sindh among all criteria. It displays a very good index at scale for the province regarding development of regulatory framework. Karachi, Nawabshah, Larkana and Kashmore chased respectively the scores of 7.99, 6.79, 7.03 and 4.71, with a mean of 6.63 for C3. Kashmore is lagging behind while Karachi performed better. The overall average score of Sindh districts for C3 is 6.18. Sets of 17 rules, regulations have been made including the establishment of SEQS by the concerned institutes. The list of rules promulgated after 18th Amendment by Sindh Environmental Protection Agency are listed in table 4.4.

5.7.4 Criteria 4: Institutional Capacity of Provinces

Sindh obtains a score of 5.55 for C4 which is a fair state of capacities but not a good one. Among districts Karachi scores 5.55, Nawabshah 2.72, Larkana 0.74 and Kashmore 0.89 with a Mean score of 2.47 for C4. It shows that institutions are lacking essential resources including human, technical, technological and financial ones. The provincial government is suggested to look into the matter with great concern to improve the capacities which ultimately result in the efficiency of execution and performance in terms of sustainability.

5.7.5 Criteria 5: Harmonized Arrangements

A harmonized arrangement between federal and provincial institutions is a compulsory factor which affects the efficiency and performance of the institutions directly and indirectly. It is also important to discharge the functions and to exercise the powers to meet the international obligations on state under MEAs.

The Harmonized Arrangements (C5) proposes the facility to share data stats and information at different ranks with in the provinces and across the provinces inclusive of federal capital and distribution of tasks between federal and provincial institutions. Within an average score of 4.39 for C5 for all the provinces, Sindh contributes 4.36 score which is again at considerable stage and needs the attention of the govt. to develop a rapid mechanism of data and information sharing at all tiers horizontally and vertically. Coming towards the districts, Karachi gets highest score of 4.36 for C5 as compared to other districts Nawabshah, Larkana and Kashmore which meet the score of 2.97, 1.33, and 0.95 with a mean of 2.40. The situation is at very poor stage and in need of a devoted attention

5.7.6 Criteria 6: Performance

For performance (C6), the state of Sindh is again at very poor scale with a score of 1.69 which is the least score of the province among all its criteria. Province as a result facing many environmental problems from waste management to climatic changes and water scarcity.

5.7.7 State of Environmental Governance in Selected Districts of Sindh

The districts Karachi, Nawabshah, Larkana and Kashmore hardly achieves 1.69, 1.64, 1.62, and 1.60 respectively making an average of 1.64, which is also the least score of districts of Sindh among all criteria. It clearly depicts the performance in terms of actions about the control of pollution, action on climatic issues, proper urban design, sustainable resource exploitation and green growth in Sindh is very poor as like of other provinces. The provincial government is suggested to make a comprehensive

plan followed by strict actions to make it sure the improvement of this situation.

5.8 State of Environmental Governance in Balochistan

Environmental governance framework in Balochistan is governed by Balochistan Environmental Protection Act, 2012 along with rules, regulations, procedure, guidelines and institutional setups developed to achieve the environment objectives set out by the provincial government (BEPA, 2021).

5.8.1 Criteria 1: Clarity of Mandates

In case of Balochistan, Clarity of Mandates (C1) stands with score of 1.31 which is the lowest score among all constituencies including Federal Capital, AJK and GB which shows the lack of clarity of institutional mandates in provincial government. Well documented role and responsibilities in performing functions at provincial level are lacking. In this context, Balochistan provincial assembly has passed the Balochistan Environmental Protection Bill 2012, the Bill No. 9 of 2010 on December 24, 2012 followed by the assent of the Governor of Balochistan on January 09, 2013 and published in the Balochistan Gazette (Extra Ordinary) as an Act No. VIII of 2012 as notified vide No. PAB/Legis: V (9)/ 2013, on January 15, 2013 from Quetta titled as “Balochistan Environmental Protection Act, 2012” which extends to the all areas of the province excluding the tribal areas in the territory of Balochistan. The BEPA Act, 2012 repeals PEPA, 1997 and provide its jurisdictional scope as whole of Balochistan including 730 km long coastal belt The obligations of MEAs are supposed to be fulfilled by the federal government after signing and ratifying any international agreement or treaty and protocol. MEAs need a clear set of guideline about the jurisdiction, territory, finance, authority, functionality and accountability in case the concerned issues or places are lying in provinces. However. BEPA, 2012, Section 12 of the act titled as ““Multilateral Environmental Agreements”” and states; “12. (1) The obligation of the International Conventions, Treaties and Protocols shall be observed as before devolution of the subject of environment to the province on environment or climate Change. In case of any international/ bilateral cooperation, the matter shall be proceeded with consultation with the concerned Federal Ministries. (2) The Government of Balochistan/ Environ-

mental Protection Agency shall extend support to those obligation of the International Conventions, Treaties and Protocols where adequate assistance provided by the Federal Government” (BEPA, 2021).

5.8.2 Criteria 2: Environmental Governance Framework

Balochistan secured 3.98 score against this criteria. Criteria has three indicators that deals with promulgation of environmental policy, environmental protection act and establishment of environmental institutions. Environmental governance frameworks in term of policy, law and institutions at provincial levels is the basic requirement for a complete and an efficient environmental governance system. For this purpose, Balochistan Environmental Protection Agency promulgated BEPA in 2012 (BEPA, 2012). The act consists of thirty one (31) pages in total comprising forty two (42) sections and one (01) schedule (as per section thirty nine (39) of the Act). BEPA, 2012 provides details of powers and functions of environmental protection councils, environmental protection agencies, provincial sustainable development fund board, and environmental tribunals, BEPA, 2012 is distinct from other provincial and federal acts in following key aspects:

1. Section 11 inter-provincial environmental issues
2. Section 12 Multilateral environmental agreements
3. Section 13 strategic environmental assessment
4. Section 18 electronic waste
5. Section 19 General prohibition in relation to solid and hospital waste management and waste management license
6. Section 20 management of water resources
7. Section 21 Alien species and living modified organisms
8. Section 23 Coastal Zones

However, the province has not yet developed the environmental policy while a draft of CSR Environmental Policy 2021 (BEPA, 2021) is drafted. Balochistan Environmental Protection Council has been established with chief minister of the province as chairman

of the council. However, lower score at this criteria might be indicative of less attention by the provincial government and weak enforcement.

5.8.3 Criteria 3: Regulatory Frameworks

Rules and regulations are instruments implied to enforce laws. Therefore, development of rules and regulations is the basic necessity to complete the legislative process in terms of achievement of the objectives in context of provincial policy. The provinces and provincial institutions either develop new rules and regulations as per requirements or adopt the existing federal rules and regulations with certain modifications.

Balochistan secured a score of 5.05 against this criteria wise showing performance categorized as fair. Balochistan has recently developed many rules and regulations which are listed in 4.5. Whereas necessary Balochistan Environmental Protection Agency has also adopted the existing federal rules and regulations but it can be further improved by taking necessary steps. Governance index score and recent developments in development of regulatory framework deciphered the provincial government's commitments for strengthening environmental governance framework.

So far the provincial government of Balochistan has developed almost twenty (20) sets of rules and regulations including various environmental quality standards with a majority established in 2020. However, in most of the cases, the provincial government has adopted the already existing rules and regulations and environmental quality standards which needs to be tailored according to conditions in the province.

5.8.4 Criteria 4: Institutional Capacity of Provinces

Institutional capacity in all aspects is essential requirement for enforcement of environmental rules and regulations made under the law. Institutions need financial, technical, technological, and human resource to carry out roles and responsibilities assigned to them through different legal instruments. Mapping institutional capacity reflects state of administration for environmental governance. Provincial average score for this criteria was 3.82 which depicts the institutional capacities of all provinces are inadequate and needs improvement in terms of human, technical, technological and financial capacities.

For Balochistan, the score for this criteria was drastically low that is 1.60. Findings discloses the severe inadequacy of capacities of institutions in Balochistan. It should be noted that without enhancement of suitable abilities of the institutions in multi directions, the good governance of environment is a dream. The same sufficient capacities are compulsory at district level as well provincial level for proper enforcement of rules and regulations to improve the performance in terms of achieving the sustainability goals.

5.8.5 Criteria 5: Harmonized Arrangements

Criteria 5 calls for providing and establishing a synchronous arrangement for discharging international obligations of state under MEAs among federal, provincial and district level institutions. The harmonized arrangements (C5) intends to the provision of data and information sharing at various levels with in the provinces and across the provinces including federal capital and distribution of tasks between federal and provincial institutions. Balochistan obtained score of 3.42 for this criteria in the environmental governance index which is once again the least score for the criterion among all constituencies, and hence at poor side. Focus group discussion with relevant stakeholders identified the need to coordinate with federal capital as well as other provinces for efficient communication to share data and information and clarify distribution of tasks between the federal unit and province. The key informants suggested the development of a network for data sharing for all districts with provincial headquarter and federal to achieve an efficient system of coordination, communication, data sharing and distribution of task in the district's boundaries as well. This will ultimately improve the overall performance at district and provincial level resulting a move towards sustainability.

“BEPA Act 2012-Section 11” deals with issues lying in jurisdiction of more than one provinces and states as; “Inter-Provincial Environmental issues: - 11. (1) The project falling within the geographical jurisdiction of two or more Provinces, the IEE or EIA may be submitted by the proponent to each Provincial Environmental Agencies for review and approval. (2) In case of any dispute or concerns the matter shall be settled through mutual consultation of the Provinces to avoid any inconveniences or future litigation. (3) The concerned Provinces may constitute a joint technical or review committee including a representative of the concerned Federal Ministry dealing with En-

vironment and coordination. (Balochistan Environmental Protection Agency, 2012)” However this need to be materialized.

5.8.6 Criteria 6: Performance

Sustainability of the overall governance mechanism is important with a coherent and well synchronized system arrangements at federal, provincial and local levels in Pakistan. The Performance (C6) score of Balochistan at Index is 1.55 which is again the least score of the province for same criteria among all constituencies however well in accordance with the slow development process with regard to rules and regulations against BEPA, 2012 and inadequate institutional capacities. The province is facing serious issues related to climate change, water scarcity and pollution (Kanwa et al., 2015), soil erosion and air pollution.

5.8.7 State of Environmental Governance in Selected Districts of Balochistan

Data was gathered from four districts located in Balochistan, namely Quetta, Lasbela, Jhal Magsi and Gwadar. The provincial headquarter Quetta obtained average score of 2.82 at environmental governance index. This is least score of all provincial headquarters of the country and hence shows the poor environmental governance in Quetta. For other selected cities of the province, the average score of Gwadar is 2.86, Lasbela is 2.41, Jhal Magsi 2.31 depicting poor performance at large. Responses from key informants and focus group discussion helped to decipher factors that are of multi-dimensional and multi-level complexity including safety, security, gender discrimination, illiteracy, corruption, scattered population with low density, uneven topography, low GDP, weather conditions, ethno-linguistic groups, non-availability or less availability of resources, sense of being ignored and being inferior resulting in the frustration complex in general and specially in young generation (LEAD, 2017).

5.9 State of Environmental Governance in Azad Jammu and Kashmir

History of environmental governance in AJK starts from 1996 with enactment of AJK Environmental Protection Order which then repealed by Environmental Protection Act, 2000 (AJK Environmental Protection Agency, 2000) . Overall governance index for AJK was calculated as 4.24 Table 5.11, which is slightly below the desired value of 5. Due to constitutional status of AJK, 18th amendment had least impact on governance system of AJK.

5.9.1 Criteria 1: Clarity of Mandates

AJK Environmental Protection Act, 2000 elaborates power and functions of institutions for environmental governance. Clarity of institutional mandate of federal and provincial governments is essential to define role and responsibilities in performing functions at local, national and international levels. AJK score for this criteria was 3.55 which is less than satisfactory levels. Findings revealed issues pertaining to the obligation of MEAs which is still not clear in case of AJK as neither federal government nor government of AJK has communicated any clear policy about the matters including administrative, technical and financial natures related to MEAs in case if implementation projects are in the territory of the AJK.

5.9.2 Criteria 2: Environmental Governance Framework

AJK secured 7.72 score for this criteria, which corresponds to early start of legislation process and enactment of another law Wildlife (Protection, Preservation, Conservation and Management), 2014 besides, Environmental Protection Act, 2000 and decision implemented thereunder.

5.9.3 Criteria 3: Regulatory Framework

AJK has developed rules and regulations 4.6. Majority of the rules were formulated in 2009 (Govt., 2009, 009b,c,d). In case of AJK, Regulatory Framework (C3) obtains

score of 4.97 which is the relatively lower for this criteria as compare to other constituencies. Findings from focus group discussion and interviews from key informant reveals the slow pace of development of regulatory framework since 2009. Recently AJK EPA has accorded approval of State Environmental Quality Standards for Ambient Air, Water, Emissions, Noise and Effluents in 2018.

5.9.4 Criteria 4: Institutional Capacity of Provinces

Institutional capacity in all aspects is essential requirement for enforcement of environmental rules and regulations made under the law. An appropriate set of human resource equipped with technical and technological capacities along with the financial one boost up the efficiency and confidence of the institutions. For AJK, the score at Environmental Governance Index for Adequate Institutional Capacity (C4) is 2.87 at the Environmental Governance Index which is poor at scale and reveals that adequate capacities of institutions of AJK.

5.9.5 Criteria 5: Harmonized Arrangements

The AJK score for this criteria was 4.79 in the environmental governance index which is at considerable stage. The Government of AJK needs to synchronize its policies with federal particularly to fulfill obligations under MEAs.

5.9.6 Criteria 6: Performance

The score of AJK at Environmental Governance Index for Performance (C6) is 1.57 which is the lowest score of AJK against all six criteria adjudged.

5.9.7 State of Environmental Governance in Selected Districts of AJK

The criteria wise overall average score of districts of AJK for all criteria at the environmental governance index is 4.24 and same for the headquarter Muzaffarabad.

5.10 State of Environmental Governance in Gilgit-Baltistan

Environmental governance framework in Gilgit Baltistan is in its infancy stages. The GB was given autonomy in 2009 to establish its own legislative assembly. The Environmental Protection was enacted in 2015. Being at its developmental phase, the GB is trying hard to overcome environmental governance issues. Development of Climate Change Policy and Action Plan in 2017 is one of such examples. However, at the current state of affair GB only secured environmental governance index score 3.03-poor according to the index scale. The main reason identified during FGDs and KIIs are lack of notified distribution of functions, particularly in case of MEAs and lack of enforcement. Following sections discuss the performance of GB environmental governance framework against all six criteria individually.

5.10.1 Criteria 1: Clarity of Mandates

Clarity of Mandates (C1) for GB is at the score of 1.45 (lowest against all six criteria) in the Environmental Governance Index of Pakistan among all constituencies including all provinces, AJK and Federal Capital. Findings revealed that problem arises due to non-clarification of jurisdiction of PEPA and implementation of MEAs in administrative area of GB after 18th amendment. After 18th Amendment, the obligation of MEAs is not clear in case of GB as neither federal government nor government of GB has communicated any clear policy about the matters including administrative, technical and financial natures, in case of lying in the territory of the GB and about the implementation of MEAs, accountability and responsibility along with receiving funds, in case of, from International donors/agencies or foreign governments. Here in GB, the situation is more complex, because neither GB an independent state nor a province of Pakistan but it has given the right of being self-governed by an Order made by the Govt. of Pakistan and commonly known as region or territory being administered by Pakistan, thus having a status, in a way of de facto province of Pakistan. Gilgit city also showing the same pattern as of GB with 1.45 score at index.

5.10.2 Criteria 2: Environmental Governance Framework

GB obtains the score of 3.32 for the criteria which is poor but likely to improve with the passage of time. The score depicts the unsatisfactory condition for developing policy, act and proper institutions to achieve the objectives of sustainability but meanwhile the situation in this criteria is moving up. The same is the pattern at district Gilgit and needs a comprehensive consideration of authorities.

5.10.3 Criteria 3: Regulatory Framework

For GB, Regulatory Framework (C3) obtains score of 4.98 which is considerable and slanting toward fair. Although it is considerable status moving upward which depicts that GB Government is providing attention to the development of rules and regulations and adopting the existing federal rules and regulations which is although a quite good symbol but it also needs more improvement to cope with the issues and to enhance the efficiency of the relevant sections. Like GB, the district Gilgit reveals the same pattern for C3 and hence needs the stated measures.

5.10.4 Criteria 4: Institutional Capacity of Provinces

Institutional capacity in all aspects is essential requirement for enforcement of environmental rules and regulations made under the law. An appropriate set of human resource equipped with technical and technological capacities along with the financial one boost up the competence of the institution and self-confidence of the workers. For GB, the score at Environmental Governance Index for Adequate Institutional Capacity (C4) is 1.94 at the Environmental Governance Index which is poor at scale and reveals that adequate capacities of institutions of GB are lacking various human, technical, technological and financial capacities and necessitated to be improved by providing sufficient financial input together with trainings and seminars/workshops. Findings revealed that the hiring procedures needs the transparency in accordance with prescribed procedures. Personnel working in EPA identified the need of training, and technical resources for monitoring and enforcement during KIIs.

5.10.5 Criteria 5: Harmonized Arrangements

For the Harmonized Arrangements (C5), GB scored 4.90, though performance is considerable but GB needs to synchronize with federal capital as well as with other provinces for efficient communication.

5.10.6 Criteria 6: Performance

The score of GB at Environmental Governance Index for Performance (C6) is 1.62 which is the second lowest score of GB after C1, among all criteria scores of GB and unveils the poor arrangements of the GB for the sustainability. The low score at index shows the weak enforcement of existing laws, and lack of institutional capacities to ensure enforcement. In comparison, the average score of GB and its district Gilgit for all above mentioned criteria is almost the least one excluding Balochistan and its district's average score. Therefore, it needs a consistent and devoted efforts to improve the situation as discussed.

Finding construe administrative, jurisdictional, financial and institutional problems that have arise after 18th amendments. These problems needs to be sorted out to achieve the overall environmental objectives and targets set under National Sustainable Development Strategy. For the purpose, a combined policy and governance regime through effective cooperation and collaboration between federal to provincial and among provinces will be required.

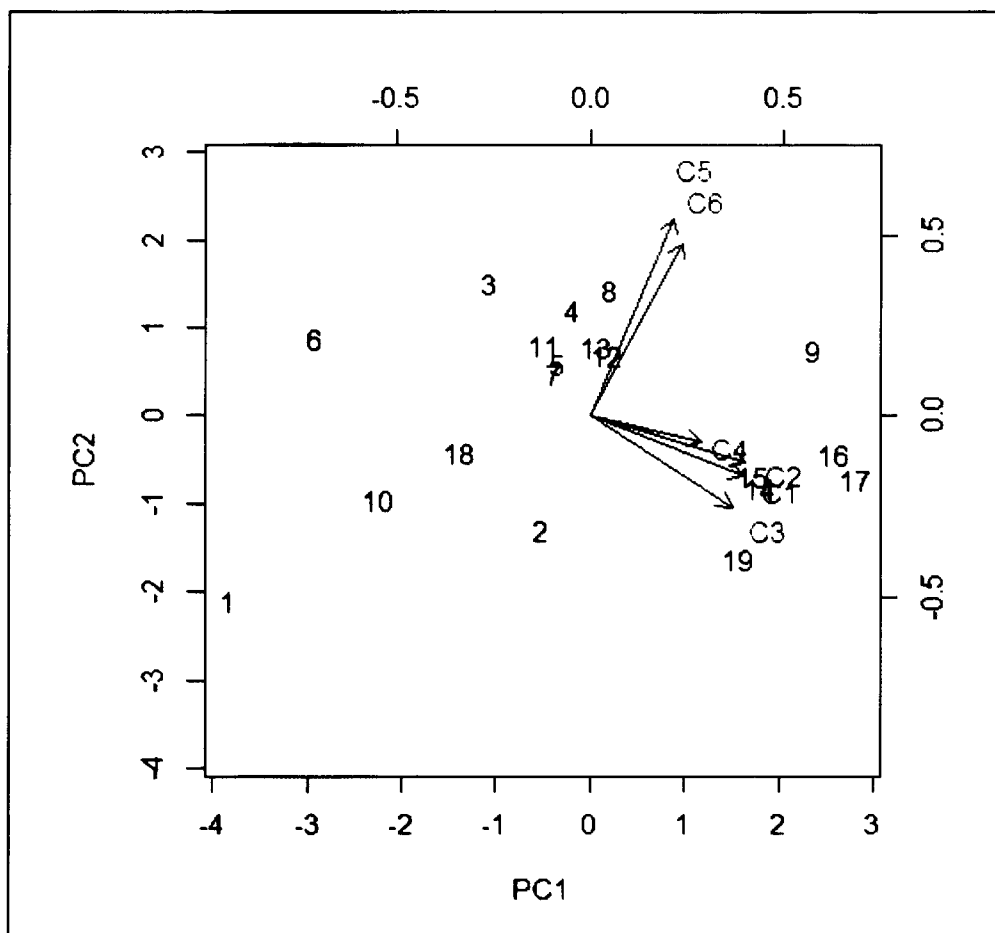


Figure 5.8: Biplot of First Two PCs.

Chapter 6

DISCUSSION

6.1 Discussion

Reinforcing the interface among science (Parviainen et al., 2022), strategy and work on (Koetz et al., 2012), organizing multi-sectoral and cross-scalar methodologies (Singh et al., 2021), knowing the enforceability and flexibility of natural administration to rising future difficulties from local to global levels (Schultz et al., 2015), and multi-centred environmental governance model based on the independent management system of the residents should be the key considerations for sustainability of environmental governance system (Jansson et al., 2018; Watson, 2009; Yiftachel and Hedgcock, 1993) of Pakistan after 18th amendment (Shah et al., 2010). The overlapping and ambiguities in terms of policy set, law making (Randeria, 2007; Zahariadis, 2003) and its implementation through institutions, responsibilities and accountabilities needed to be clearly defined for a functional set of governance system (Armitage et al., 2012a; Hupe and Hill, 2007; Paavola, 2007). The overlapping domain of climate change and environmental protection (Meleady and Crisp, 2017) between the federal, provincial and even at local district levels in specific environments (Schneider, 1992) needs a clear cut set of responsibility for smooth functioning of all level institutions (Biesbroek et al., 2010; Council et al., 2011; Leck and Simon, 2013).

The legislation at national and provincial level clearly speaks about the harmonization/synchronization of arrangements (Chandra et al., 2020) at different levels to exe-

cute the duties and responsibilities (Lian and Robinson, 2002; Tschopp and Nastanski, 2014). Therefore, it was very significant to clearly analyze the legislative documents of federation and provinces of Pakistan to find out the space, overlying and doubts between federal and provincial legislation.

The applicability of different policies takes a start at local level, for example drinking water, water and sanitation, waste management, forest management and sites of minerals, mines and belongings. Therefore, the applicability of such policies at local governance level, in terms of rules of business, if available, should be necessarily sorted out. The policies launched before 18th amendment need to be cleared about their status and fate. The National, Provincial and Local level along with implementation status is a main question to clear the pre and post 18th amendment scenario (Khan and Irfan, 2018). The status of PEPA 1997 needs to be clarified keeping in view the mandate of federal law and provincial law. The question needs clear answer that “Who is responsible for implementation of national obligations as signed in MEAs at provincial and local level in general and specific cases and who stands answerable”.

The institutional capacity mapping includes human resource, its capacity in term of relevancy in academic, experience and skills. The technical capacity and technological capacity, legal capacity and financial capacities are to be measured to have a clear view of institutional output capacity in the local, provincial and national governance system and to cope with international obligations signed at federal level in specific cases where applicable.

Federal, provincial and local tears need a clear, strong and transparent coordination system free of overlapping and ambiguities of executing powers, performing functions, taking responsibility and benefits and accountability. The MEAs signed by federal government also need clear cut process of implementation at provincial and local levels. How sustainable the existing arrangements of environmental governance at national, provincial and local level and to meet the international obligations of Multilateral Environmental Agreements (MEAs).

In the context, the choice and screening measures of the indicators inside the four sub-systems that include:

1. Considering the steadiness and accessibility of the information;

2. Covering and addressing the segments of natural assets, pollution feedback, governmental administration, and lawful association;
3. Reflecting the country's large scale techniques and planning; and
4. Selecting usually referred to, generally basic and obvious indicators for simpler and clearer interpretations.

6.2 Analysis

The subjects listed in the concurrent list were well thought but environmental pollution and ecology in the list was added at a later stage after the UN Conference on Human Environment held from 5-12 June, 1972 at Stockholm. A three member delegation from Pakistan lead by the then First Lady, Mrs. Nusrat Bhutto represented Pakistan in the UN Conference. In October, 1972 the draft of the bill for Constitution of Pakistan, 1973 was under review by political leaders and no article pertinent to environmental protection or pollution control or management could be added in the main text of the constitution. Therefore, it was decided to include "Environmental Pollution and Ecology" in the Concurrent Legislative List in 4th Schedule of the constitution referred by Article 70(4), which provides powers to legislate on this subject.

The concurrent legislative list in the Fourth Schedule of the Constitution of Pakistan, 1973 referred by Article 70(4) was for a period of ten years and it was agreed that after ten years (i.e. in 1983) this list will be abolished and provinces will have the power to make legislation of subjects listed in the concurrent list. Unfortunately, in 1977 the constitution was abrogated under martial law until 1985 and again in 1988, the parliament was dissolved by the military dictator an afterword due to political instability no parliament could complete its tenure and in 1999 again there was a military coup. The first parliament and political government which completed its five years term was from 2008 to 2013 and during this period, under 18th amendment in the constitution, the concurrent legislative list was abolished in 2010, i.e., after 38 years instead of agreed 10 years. There was a political pressure from provinces for constitutional autonomy, hence, under that situation the subject of environment also devolved to provinces being

part of the concurrent legislative list.

Chapter 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Based on the analysis of data, derived results and discussion the following are conclusions from this study:

1. The results of this study suggest that there is a lack of clarity of mandate among federal and provincial environmental protection instruments and institutions. As the PEPA 1997 has not been repealed so far by the federal government after 18th Constitutional amendment, but the provincial government of Balochistan, through BEPA, 2014 repealed PEPA, 1997 without considering the fact that 735km long coast of Balochistan falls under federal jurisdiction of PEPA, 1997, being a federal instrument. In the same context, provinces are yet in process of developing their regulatory framework in line with provincial environmental protection acts, and till then, they are relying on the regulatory framework developed under PEPA, 1997.
2. In this context, another important area of concern is multilateral environmental agreements which are global instruments ratified by the federal government. However, their implementation is to be carried out by the provinces for which

they seek support from federal government out of the global funds provided for implementation of MEAs.

3. About environmental governance framework, results suggest that performance of the federal government and AJK is better, which is obviously because of their early foundation of environmental governance framework during 1990s. However performance in Sindh has been found at par with federal and AJK. Whereas, Khyber Pakhtunkhwa and Punjab and are still developing their environmental governance system and are lagging behind. Findings revealed that least developed governance framework is in Balochistan province and Gilgit Baltistan region.
4. As far as regulatory framework is concerned, provinces are in the process of developing rules and regulations. Provinces have developed their environmental quality standards for effluents and emissions as well as ambient air and water quality. Where rules and regulation are not yet developed, provinces by notification, adopted the already promulgated federal rules and regulations. This mechanism provides effective cover to tackle the essential matters like review of IEE and EIA, environmental approval of development projects, environmental monitoring and other legal matters.
5. From governance framework index score for institutional capacity criteria, it may be concluded that institutional capacity has not been satisfactorily developed at federal as well as provincial levels, except in KP government where it is relatively better.
6. The arrangements for federal to provincial and inter-provincial mechanism of coordination, distribution of tasks and data sharing are not adequate.
7. Environmental protection and conservation performance in terms of pollution control, climate action, urban planning, sustainable resource exploitation, and green growth is found poor, which may be resulted from weak enforcement of environmental protection rules and regulations due to inadequate institutional capacity, lack of clarity in institutional mandates, poor coordination among federal and provincial bodies, and lack of horizontal and vertical coherence.
8. In a nutshell it is deciphered that the 18th constitutional amendment could not

bring desired positive impacts in the last ten years.

7.2 Recommendations

Based on the findings of this study, following key suggestions are being made to improve environmental governance framework in Pakistan at federal and provincial levels in post 18th constitutional amendment setup:

1. PEPA 1997 needs a thorough revision in the context of its mandate and jurisdiction in post 18th constitutional amendment scenario.
2. Ambiguities in federal and provincial institutional mandates, arisen from 18th constitutional amendment need to be removed with meaningful consultation with relevant stakeholders.
3. Provinces should develop their own environmental policies to guide future environmental governance in their respective jurisdictions.
4. Platforms to improve coordination and data sharing regarding environmental parameters should be developed.
5. The institutional capacities in terms of human, technical, technological and financial resources for development and enforcement of regulatory framework need to be enhanced at all levels particularly district departments.
6. Mechanism of coordination for implementation of multilateral environmental agreements between the federal and provincial institutions including allocation of funds from international agencies should be developed.

Bibliography

- Abbas, H. G., Chughtai, A. M., and Hussain, K. (2022). Juvenile justice system in pakistan: A critical appraisal. *International Research Journal of Education and Innovation*, 3(1):76–92.
- Abdi, H. and Williams, L. J. (2010). Principal component analysis. *Wiley interdisciplinary reviews: computational statistics*, 2(4):433–459.
- Abid, N., Ikram, M., Wu, J., and Ferasso, M. (2021). Towards environmental sustainability: Exploring the nexus among iso 14001, governance indicators and green economy in pakistan. *Sustainable Production and Consumption*, 27:653–666.
- Adeniyi, A. (2014). Resource governance and the challenges of community development in the nigerian bitumen belt. *Resources Policy*, 40:42–47.
- Agrawal, A. and Lemos, M. C. (2007). A greener revolution in the making?: Environmental governance in the 21st century. *Environment: Science and Policy for Sustainable Development*, 49(5):36–45.
- Ahmad, A., Zhao, Y., Shahbaz, M., Bano, S., Zhang, Z., Wang, S., and Liu, Y. (2016). Carbon emissions, energy consumption and economic growth: An aggregate and disaggregate analysis of the indian economy. *Energy Policy*, 96:131–143.
- Ahsan, I. and Khawaja, S. A. (2013). *Development of environmental laws and jurisprudence in Pakistan*. Asian Development Bank.

- Aldieri, L. and Vinci, C. P. (2018). Green economy and sustainable development: The economic impact of innovation on employment. *Sustainability*, 10(10):3541.
- Ali, G., Khan, I., Saleem, M. M., and Ali, A. (2021). Comparative review of khyber pakhtunkhwa and federal environmental protection laws in pakistan. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 18(5):22–31.
- Ali, M. (2015). Decentralized governance initiatives in pakistan: Post 18th amendment perspective. *Pakistan Perspective*, 20(2).
- Alkon, M. and Wong, A. (2020). Authoritarian energy transitions undermined? environmental governance cycles in china's power sector. *Energy Research & Social Science*, 68:101531.
- Anshelm, J., Haikola, S., and Wallsten, B. (2018). Politicizing environmental governance—a case study of heterogeneous alliances and juridical struggles around the ojnare forest, sweden. *Geoforum*, 91:206–215.
- Armin Razmjoo, A., Sumper, A., and Davarpanah, A. (2020). Energy sustainability analysis based on sdgs for developing countries. *Energy Sources, Part A: Recovery, Utilization, and Environmental Effects*, 42(9):1041–1056.
- Armitage, D., De Loë, R., and Plummer, R. (2012a). Environmental governance and its implications for conservation practice. *Conservation letters*, 5(4):245–255.
- Armitage, D., de Loë, R., and Plummer, R. (2012b). Environmental governance and its implications for conservation practice.
- Arshad, S., Shafqat, A., Khan, A. A., and Safdar, Q. (2013). Youth environmental complaints in bahawalpur city, pakistan: An informational intervention for local environmental governance. *Human Geographies*, 7(1):71.
- Arts, B. and Buizer, M. (2009). Forests, discourses, institutions: A discursive-institutional analysis of global forest governance. *Forest policy and economics*, 11(5-6):340–347.
- Asante, D., He, Z., Adjei, N. O., and Asante, B. (2020). Exploring the barriers to renewable energy adoption utilising multimooora-edas method. *Energy Policy*, 142:111479.

- Ashfaq, K. and Rui, Z. (2018). Revisiting the relationship between corporate governance and corporate social and environmental disclosure practices in pakistan. *Social Responsibility Journal*.
- AtKisson, A. (2009). A global green new deal for climate, energy, and development. *Geneva, Switzerland: United Nations Department of Economic and Social Affairs (UN DESA)*.
- Auras, M., Beer, S., Bundschuh, P., Eichhorn, J., Mach, M., Scheuvs, D., Schorling, M., von Schumann, J., Snethlage, R., and Weinbruch, S. (2013). Traffic-related immissions and their impact on historic buildings: implications from a pilot study at two german cities. *Environmental earth sciences*, 69(4):1135–1147.
- Aven, T. and Renn, O. (2018). Improving government policy on risk: Eight key principles. *Reliability engineering & system safety*, 176:230–241.
- Awan, M. Z. K., Asim, M., and Manzoor, S. (2020). A retrospective and prospective overview of the developmental trends of environmental laws in pakistan. *European Journal of Environment and Earth Sciences*, 1(1).
- Azam, M. and Emirullah, C. (2014). The role of governance in economic development: evidence from some selected countries in asia and the pacific. *International Journal of Social Economics*.
- Bäckstrand, K. (2006). Multi-stakeholder partnerships for sustainable development: rethinking legitimacy, accountability and effectiveness. *European environment*, 16(5):290–306.
- Bakker, K. and Ritts, M. (2018). Smart earth: A meta-review and implications for environmental governance. *Global environmental change*, 52:201–211.
- Bank, W. (2006). Pakistan strategic country environmental assessment.
- Bank, W. (2019). Opportunities for a clean and green pakistan: A country environmental analysis.
- Bayyurt, N. and Yılmaz, S. (2012). The impacts of governance and education on agricultural efficiency: an international analysis. *Procedia-Social and Behavioral Sciences*, 58:1158–1165.

- Begum, S., Ashraf, M. I., Ishaque, W., et al. (2018). National plan for devolution of power under 18th amendment: Challenges for government in the new pakistan. *Global Social Sciences Review*, 3(2):71–80.
- Bello, I. E. and Rilwani, M. L. (2016). Quantitative assessment of remotely sensed data for landcover change and environmental management. *The Indonesian Journal of Geography*, 48(2):135.
- BEPA (2012). Balochistan environmental protection agency. (2012). balochistan environmental protection act, 2012.
- BEPA (2021). Balochistan environmental protection agency. (2021). balochistan environmental csr policy, 2021.
- Berkes, F. (2017). Environmental governance for the anthropocene? social-ecological systems, resilience, and collaborative learning. *Sustainability*, 9(7):1232.
- Bhandari, M. P. (2013). Environmental performance and vulnerability to climate change: A case study of india, nepal, bangladesh and pakistan. In *Climate change and disaster risk management*, pages 149–167. Springer.
- Bhandari, M. P. and Bhattarai, K. (2017). Institutional architecture for sustainable development (sd): a case study from bangladesh, india, nepal, and pakistan.
- Biermann, F., Kanie, N., and Kim, R. E. (2017). Global governance by goal-setting: the novel approach of the un sustainable development goals. *Current Opinion in Environmental Sustainability*, 26:26–31.
- Biesbroek, G. R., Swart, R. J., Carter, T. R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M. D., and Rey, D. (2010). Europe adapts to climate change: comparing national adaptation strategies. *Global environmental change*, 20(3):440–450.
- Bignall, S., Hemming, S., and Rigney, D. (2016). Three ecosophies for the anthropocene: environmental governance, continental posthumanism and indigenous expressivism. *Deleuze Studies*, 10(4):455–478.
- Bildirici, M. and Gokmenoglu, S. M. (2020). The impact of terrorism and fdi on environmental pollution: evidence from afghanistan, iraq, nigeria, pakistan, philip-

- pinos, syria, somalia, thailand and yemen. *Environmental Impact Assessment Review*, 81:106340.
- bin Jailani, M. A. K., Rahim, F. A., et al. (2014). Assessing the situational analysis of heritage tourism industry in melaka. *Procedia-Social and Behavioral Sciences*, 130:28–36.
- Bodin, Ö. (2017). Collaborative environmental governance: achieving collective action in social-ecological systems. *Science*, 357(6352):eaan1114.
- Borchers, P. J. (2001). The problem with general jurisdiction. *U. Chi. Legal F.*, page 119.
- Boța-Avram, C., Groșanu, A., Răchișan, P.-R., and Gavriletea, M. D. (2018). The bidirectional causality between country-level governance, economic growth and sustainable development: A cross-country data analysis. *Sustainability*, 10(2):502.
- Brown, K. W. and Kasser, T. (2005). Are psychological and ecological well-being compatible? the role of values, mindfulness, and lifestyle. *Social indicators research*, 74(2):349–368.
- Bugge, M. M., Fevolden, A. M., and Klitkou, A. (2019). Governance for system optimization and system change: The case of urban waste. *Research Policy*, 48(4):1076–1090.
- Butz, D. and Cook, N. (2016). Political ecology of human-environment change in gojal, gilgit-baltistan, pakistan. In *Mapping Transition in the Pamirs*, pages 197–214. Springer.
- Campos-Guzmán, V., García-Cáscales, M. S., Espinosa, N., and Urbina, A. (2019). Life cycle analysis with multi-criteria decision making: A review of approaches for the sustainability evaluation of renewable energy technologies. *Renewable and Sustainable Energy Reviews*, 104:343–366.
- Chandra, M. J. A., Wahyuni, P. M., and Santi, Y. (2020). Draft regulations and harmonization synchronization legislation on executive agencies. In *International Conference on Law Reform (INCLAR 2019)*, pages 64–69. Atlantis Press.
- Ciplet, D., Adams, K. M., Weikmans, R., and Roberts, J. T. (2018). The transformative

- capability of transparency in global environmental governance. *Global Environmental Politics*, 18(3):130–150.
- Ciplet, D. and Roberts, J. T. (2017). Climate change and the transition to neoliberal environmental governance. *Global Environmental Change*, 46:148–156.
- Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in society*, 28(1-2):63–80.
- Cornea, N. L., Véron, R., and Zimmer, A. (2017). Everyday governance and urban environments: Towards a more interdisciplinary urban political ecology. *Geography Compass*, 11(4):e12310.
- Council, N. R. et al. (2011). *Informing an effective response to climate change*. National Academies Press.
- de Oliveira, J. A. P. (2019). Intergovernmental relations for environmental governance: Cases of solid waste management and climate change in two malaysian states. *Journal of environmental management*, 233:481–488.
- DeCaro, D. A., Chaffin, B. C., Schlager, E., Garmestani, A. S., and Ruhl, J. (2017). Legal and institutional foundations of adaptive environmental governance. *Ecology and society: A journal of integrative science for resilience and sustainability*, 22(1):1.
- den Herder, M., Kurttila, M., Leskinen, P., Lindner, M., Haatanen, A., Sironen, S., Salminen, O., Juusti, V., and Holma, A. (2017). Is enhanced biodiversity protection conflicting with ambitious bioenergy targets in eastern finland? *Journal of Environmental Management*, 187:54–62.
- do Rosário Bernardo, M. (2014). Performance indicators for enhancing governance of projects. *Procedia-Social and Behavioral Sciences*, 119:55–64.
- Dobriban, E. (2017). Sharp detection in pca under correlations: All eigenvalues matter. *The Annals of Statistics*, 45(4):1810–1833.
- Driessen, P. P., Dieperink, C., Van Laerhoven, F., Runhaar, H. A., and Vermeulen, W. J. (2012). Towards a conceptual framework for the study of shifts in modes of environmental governance—experiences from the netherlands. *Environmental policy and governance*, 22(3):143–160.

- Duit, A. (2016). The four faces of the environmental state: environmental governance regimes in 28 countries. *Environmental Politics*, 25(1):69–91.
- Dunlap, A. and Sullivan, S. (2020). A faultline in neoliberal environmental governance scholarship? or, why accumulation-by-alienation matters. *Environment and Planning E: Nature and Space*, 3(2):552–579.
- Edwards, W. (1977). How to use multiattribute utility measurement for social decision-making. *IEEE transactions on systems, man, and cybernetics*, 7(5):326–340.
- Elavarasan, R. M., Pugazhendhi, R., Jamal, T., Dyduch, J., Arif, M. T., Kumar, N. M., Shafiullah, G., Chopra, S. S., and Nadarajah, M. (2021). Envisioning the un sustainable development goals (sdgs) through the lens of energy sustainability (sdg 7) in the post-covid-19 world. *Applied Energy*, 292:116665.
- Ernst, A. (2019). How participation influences the perception of fairness, efficiency and effectiveness in environmental governance: An empirical analysis. *Journal of environmental management*, 238:368–381.
- Fahad, S. and Wang, J. (2020). Climate change, vulnerability, and its impacts in rural pakistan: a review. *Environmental Science and Pollution Research*, 27(2):1334–1338.
- Faisal, F. (2017). Sustainability: An imperative for improving governance and management in pakistan. *Pakistan Economic and Social Review*, 55(1):81–106.
- Faisal, F. and Jafri, A. (2017). Corruption as a source of failure of good governance and management in pakistan: Proposed remedial measures. *Journal of the Punjab University Historical Society (JPUHS)*, 30(1):57–75.
- Flynn, A. and Hacking, N. (2019). Setting standards for a circular economy: A challenge too far for neoliberal environmental governance? *Journal of Cleaner Production*, 212:1256–1267.
- Fougère, L. and Bond, S. (2018). Legitimising activism in democracy: A place for antagonism in environmental governance. *Planning Theory*, 17(2):143–169.
- Friedman, B. M. (2017). The moral consequences of economic growth. In *Markets, morals & religion*, pages 29–42. Routledge.

- Gera, W. (2016). Public participation in environmental governance in the philippines: The challenge of consolidation in engaging the state. *Land Use Policy*, 52:501–510.
- Gerlak, A. K. and Heikkila, T. (2019). Tackling key challenges around learning in environmental governance.
- Gerlak, A. K., Heikkila, T., and Newig, J. (2020). Learning in environmental governance: opportunities for translating theory to practice. *Journal of Environmental Policy & Planning*, 22(5):653–666.
- Giannopoulos, M. N. (2016). *ROBUST PRINCIPAL COMPONENT ANALYSIS: THEORETICAL ASPECTS AND ALGORITHMIC COMPARATIVE EVALUATION FOR DIMENSIONALITY REDUCTION*. PhD thesis, NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS.
- Gkatsou, S., Kounenou, M., Papanagiotou, P., Seremeti, D., and Georgakellos, D. (2014). The impact of green energy on employment: a preliminary analysis. *International Journal of Business and Social Science*, 5(1).
- Gouldson, A., Colenbrander, S., Sudmant, A., Papargyropoulou, E., Kerr, N., McAnulla, F., and Hall, S. (2016). Cities and climate change mitigation: Economic opportunities and governance challenges in asia. *Cities*, 54:11–19.
- Govt., A. Azad jammu and kashmir environmental protection agency, 2000.
- Govt., A. (2009). Azad jammu and kashmir environmental quality standards for municipal and liquid industrial effluents, (2009a).
- Govt., A. (2009b). Azad jammu and kashmir environmental protection agency, (2009b).
- Govt., A. (2009c). Ajk environmental protection agency. (2009c). environmental sample rules, 2009.
- Govt., A. (2009d). Ajk environmental protection agency. (2009d). pollution charge rules for industries.
- Group, W. B. (2019). *Pakistan at 100: Environmental Sustainability*. World Bank.
- Gulbrandsen, L. H. (2010). *Transnational environmental governance: the emergence and effects of the certification of forest and fisheries*. Edward Elgar Publishing.

- Guo, W., Gu, J., Liu, D., and Shang, L. (2016). Peach variety identification using near-infrared diffuse reflectance spectroscopy. *Computers and Electronics in Agriculture*, 123:297–303.
- Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., Nooteboom, S., and Bergsma, E. (2010). The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy*, 13(6):459–471.
- Gustafsson, K. M. and Lidskog, R. (2018). Boundary organizations and environmental governance: Performance, institutional design, and conceptual development. *Climate Risk Management*, 19:1–11.
- Ha, T., Dieperink, C., Otter, H. S., Hoekstra, P., et al. (2018). Governance conditions for adaptive freshwater management in the vietnamese mekong delta. *Journal of Hydrology*, 557:116–127.
- Haas, P. M. (2015). Social constructivism and the evolution of multilateral environmental governance. In *Epistemic Communities, Constructivism, and International Environmental Politics*, pages 143–171. Routledge.
- Hajjar, R., Newton, P., Adshead, D., Bogaerts, M., Maguire-Rajpaul, V. A., Pinto, L. F., McDermott, C., Milder, J., Wollenberg, E., and Agrawal, A. (2019). Scaling up sustainability in commodity agriculture: Transferability of governance mechanisms across the coffee and cattle sectors in brazil. *Journal of Cleaner Production*, 206:124–132.
- Hassan, J. (1996). Environmental law of pakistan. *Glob. Env'tl. L. Ann.*, page 15.
- Hassan, M., Khan, M. I., Mumtaz, M. W., and Mukhtar, H. (2021). Energy and environmental security nexus in pakistan. In *Energy and Environmental Security in Developing Countries*, pages 147–172. Springer.
- Hassan, M., Khan Afridi, M., and Irfan Khan, M. (2019). Energy policies and environmental security: A multi-criteria analysis of energy policies of pakistan. *International Journal of Green Energy*, 16(7):510–519.

- Hassan, P. (2007). Environmental protection, rule of law and the judicial crisis in pakistan. *Asia Pac. J. Envtl. L.*, 10:167.
- Havice, E. and Campling, L. (2017). Where chain governance and environmental governance meet: Interfirm strategies in the canned tuna global value chain. *Economic geography*, 93(3):292–313.
- Hens, L., Block, C., Cabello-Eras, J. J., Sagastume-Gutierrez, A., Garcia-Lorenzo, D., Chamorro, C., Mendoza, K. H., Haeseldonckx, D., and Vandecasteele, C. (2018). On the evolution of “cleaner production” as a concept and a practice. *Journal of cleaner production*, 172:3323–3333.
- Hernandez, Y., Barbosa, P., Corral, S., and Rivas, S. (2018). An institutional analysis to address climate change adaptation in tenerife (canary islands). *Environmental science & policy*, 89:184–191.
- Hillman, M. (2002). Environmental justice: a crucial link between environmentalism and community development? *Community Development Journal*, 37(4):349–360.
- Ho, P. (2001). Greening without conflict? environmentalism, ngos and civil society in china. *Development and Change*, 32(5):893–921.
- Homsy, G. C., Liu, Z., and Warner, M. E. (2019). Multilevel governance: Framing the integration of top-down and bottom-up policymaking. *International Journal of Public Administration*, 42(7):572–582.
- Howes, S. and Wyrwoll, P. (2012). Asia’s wicked environmental problems.
- Hupe, P. and Hill, M. (2007). Street-level bureaucracy and public accountability. *Public administration*, 85(2):279–299.
- Hussain, M., Butt, A. R., Uzma, F., Ahmed, R., Irshad, S., Rehman, A., and Yousaf, B. (2020). A comprehensive review of climate change impacts, adaptation, and mitigation on environmental and natural calamities in pakistan. *Environmental monitoring and assessment*, 192(1):1–20.
- Hussain, S. and Khan, M. S. (2017). Urbanization and literacy rate in khyber pakhtunkhwa: relationship and projections. *Academy of Educational Leadership Journal*, 21(1):1–12.

- Hussain, S. S. and Sabri, P. S. U. (2014). National environmental policy development for sustainable economic growth in developing countries: a case study of pakistan. *The International Journal of Social Quality*, 4(1):78–94.
- Ike, G. N., Usman, O., Alola, A. A., and Sarkodie, S. A. (2020). Environmental quality effects of income, energy prices and trade: the role of renewable energy consumption in g-7 countries. *Science of The Total Environment*, 721:137813.
- Ikram, M., Zhou, P., Shah, S., and Liu, G. (2019). Do environmental management systems help improve corporate sustainable development? evidence from manufacturing companies in pakistan. *Journal of Cleaner Production*, 226:628–641.
- Index, G. C. R. (2014). Germanwatch.
- Iqbal, K. M. J., ur Rehman, W., and Khan, M. I. (2020). Preservation of historic heritage in energy dependent anthropocene: A challenge for climate compatible development. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(10):4153–4172.
- Islam, M. M., Barman, A., Kundu, G. K., Kabir, M. A., and Paul, B. (2019). Vulnerability of inland and coastal aquaculture to climate change: Evidence from a developing country. *Aquaculture and Fisheries*, 4(5):183–189.
- Jamal, H. (2021). Educational status of pakistan: Pre and post 18th amendment scenario.
- Jamil, E. and Siddiqui, D. A. (2020). Assessing firms' environmental, social and governance performance (esgp) and its effect on financial performance: Evidence from pakistan. *Social and Governance Performance (ESGP) and Its Effect on Financial Performance: Evidence from Pakistan (August 26, 2020)*.
- Jansson, M., Vogel, N., Fors, H., and Randrup, T. B. (2018). The governance of landscape management: new approaches to urban open space development. *Landscape Research*.
- Javeed, S. A., Latief, R., and Lefen, L. (2020). An analysis of relationship between environmental regulations and firm performance with moderating effects of product market competition: Empirical evidence from pakistan. *Journal of Cleaner Production*, 254:120197.

- Job, H., Becken, S., and Lane, B. (2017). Protected areas in a neoliberal world and the role of tourism in supporting conservation and sustainable development: an assessment of strategic planning, zoning, impact monitoring, and tourism management at natural world heritage sites. *Journal of Sustainable Tourism*, 25(12):1697–1718.
- Jordan, A. and Adger, W. N. (2009). *Governing Sustainability*. Cambridge University Press Cambridge.
- Kanwa, S., Taj, M. K., Taj, I., Abbas, F., Ahmed, Z., Samad, A., Sheikh, I. S., Mustafa, M. Z., Samreen, Z., Hassani, T. M., et al. (2015). Water pollution in balochistan province of pakistan. *International Journal of Engineering and Applied Sciences*, 2(6):257885.
- Karlsson-Vinkhuyzen, S., Boelee, E., Cools, J., van Hoof, L., Hospes, O., Kok, M., Peerlings, J., van Tatenhove, J., Termeer, C. J., and Visseren-Hamakers, I. J. (2018). Identifying barriers and levers of biodiversity mainstreaming in four cases of transnational governance of land and water. *Environmental Science & Policy*, 85:132–140.
- Kenney-Lazar, M. (2019). Neoliberalizing authoritarian environmental governance in (post) socialist laos. *Annals of the American Association of Geographers*, 109(2):338–348.
- Kessler, J. J., van Ginniken, P., Cornelissen, W., Romijn, B., et al. (2011). Environmental management: Towards a conceptual framework for environmental governance. Technical report, Inter-American Development Bank.
- Khalid, I. S. and Khaver, A. A. (2019). Political economy of water pollution in pakistan: an overview.
- Khan, A. N., Collins, A. E., Qazi, F., et al. (2011). Causes and extent of environmental impacts of landslide hazard in the himalayan region: a case study of murree, pakistan. *Natural Hazards*, 57(2):413–434.
- Khan, K. M. J. I. and Irfan, M. (2018). Climate governance: implementing water sector adaptation strategies in pakistan. *Policy Perspectives*, 15(3):139–155.
- Khan, M. (2019). Does macroeconomic instability cause environmental pollution?

- the case of pakistan economy. *Environmental Science and Pollution Research*, 26(14):14649–14659.
- Khan, M., Chaudhary, M. N., Ahmad, S. R., Saif, S., and Mehmood, A. (2018). Challenges to eia consultants whilst dealing with stakeholders in punjab, pakistan. *Environmental Impact Assessment Review*, 73:201–209.
- Khan, M., Chaudhry, M. N., Ahmad, S. R., and Saif, S. (2020). The role of and challenges facing non-governmental organizations in the environmental impact assessment process in punjab, pakistan. *Impact Assessment and Project Appraisal*, 38(1):57–70.
- Khan, M. I. and Chang, Y.-C. (2021). Love for the climate in sino–pakistan economic romance: a perspective of environmental laws. *Clean Technologies and Environmental Policy*, 23(2):387–399.
- Khayam, M. U. and Ahmad, I. (2020). Decentralization of environment in pakistan: Issues in governance. *Policy Perspectives*, 17(2):101–116.
- Kivimaa, P., Hildén, M., Huitema, D., Jordan, A., and Newig, J. (2017). Experiments in climate governance—a systematic review of research on energy and built environment transitions. *Journal of Cleaner Production*, 169:17–29.
- Klein, U. and Müller, H. (2012). Humans and environment: Cause and effect analysis supported by spatial data infrastructures. *FIG Working Week, Rome*.
- Koebele, E. A. (2019). Policy learning in collaborative environmental governance processes. *Journal of Environmental Policy & Planning*, 21(3):242–256.
- Koetz, T., Farrell, K. N., and Bridgewater, P. (2012). Building better science-policy interfaces for international environmental governance: assessing potential within the intergovernmental platform for biodiversity and ecosystem services. *International environmental agreements: politics, law and economics*, 12(1):1–21.
- Kotzé, L. J. (2020). Earth system law for the anthropocene: Rethinking environmental law alongside the earth system metaphor. *Transnational Legal Theory*, 11(1-2):75–104.

- Kovar, J. D. (1993). A short guide to the rio declaration. *Colo. J. Int'l Envtl. L. & Pol'y*, 4:119.
- Kowarsch, M. and Jabbour, J. (2017). Solution-oriented global environmental assessments: Opportunities and challenges.
- Kumar, R. and Murck, B. W. (1992). *On common ground: managing human-planet relationships*. Wiley.
- Kuzdas, C., Wiek, A., Warner, B., Vignola, R., and Morataya, R. (2015). Integrated and participatory analysis of water governance regimes: The case of the costa rican dry tropics. *World Development*, 66:254–268.
- Lahiri-Dutt, K. and Brown, H. (2017). Governing the ungovernable? reflections on informal gemstone mining in high-altitude borderlands of gilgit-baltistan, pakistan. *Local Environment*, 22(11):1428–1443.
- Landberg, L. (2019). The road to (in) security: India's perception of insecurity towards the china-pakistan economic corridor.
- Lavrinenko, O., Ignatjeva, S., Ohotina, A., Rybalkin, O., and Lazdans, D. (2019). The role of green economy in sustainable development (case study: the eu states). *Entrepreneurship and Sustainability Issues*, 6(3):1113.
- Leach, M., Mearns, R., and Scoones, I. (1999). Environmental entitlements: dynamics and institutions in community-based natural resource management. *World development*, 27(2):225–247.
- Leck, H. and Simon, D. (2013). Fostering multiscalar collaboration and co-operation for effective governance of climate change adaptation. *Urban Studies*, 50(6):1221–1238.
- Lehtonen, M. (2004). The environmental–social interface of sustainable development: capabilities, social capital, institutions. *Ecological economics*, 49(2):199–214.
- Lian, K. K. and Robinson, N. A. (2002). Regional environmental governance: Examining the association of southeast asian nations (asean) model. *Global environmental governance: Options and opportunities*, pages 101–121.

- Lihua, W., Tianshu, M., Yuanchao, B., Sijia, L., and Zhaoqiang, Y. (2020). Improvement of regional environmental quality: Government environmental governance and public participation. *Science of the Total Environment*, 717:137265.
- Lipschutz, R. D. (1992). Reconstructing world politics: the emergence of global civil society. *Millennium*, 21(3):389–420.
- Liu, X. (2020). *Discriminative principal component analysis for high dimensional classification with applications in NIR spectroscopy*. PhD thesis, UCL (University College London).
- Lo, K. W., Chan, S. C., Ngai, G., Kalenzi, J., Sindayehaba, P., and Habiyaemye, I. (2019). From beneficiary to community leader: Capacity building through a renewable energy project in rwanda. In *2019 IEEE Global Humanitarian Technology Conference (GHTC)*, pages 1–7. IEEE.
- Lockwood, M., Davidson, J., Curtis, A., Stratford, E., and Griffith, R. (2010). Governance principles for natural resource management. *Society and natural resources*, 23(10):986–1001.
- LÓPEZ-MARRERO, T. (2010). An integrative approach to study and promote natural hazards adaptive capacity: a case study of two flood-prone communities in puerto rico. *Geographical Journal*, 176(2):150–163.
- Majeed, R. A. and Akhtar, S. (2021). The role of 18th amendment in democracy of pakistan. *Pakistan Study Centre*, 14(2):144–153.
- Mamat, R., Sani, M. S. M., Sudhakar, K., et al. (2019). Renewable energy in southeast asia: Policies and recommendations. *Science of the total environment*, 670:1095–1102.
- Manglis, A., Fourkiotou, A., and Papadopoulou, D. (2020). The accessible underwater cultural heritage sites (auchs) as a sustainable tourism development opportunity in the mediterranean region. *Tourism: An International Interdisciplinary Journal*, 68(4):499–503.
- Masud, M., Kaium, A., Nurunnabi, M., and Bae, S. M. (2018). The effects of corporate governance on environmental sustainability reporting: Empirical evidence from

- south asian countries. *Asian Journal of Sustainability and Social Responsibility*, 3(1):1–26.
- Meadowcroft, J. and Steurer, R. (2018). Assessment practices in the policy and politics cycles: a contribution to reflexive governance for sustainable development? *Journal of Environmental Policy & Planning*, 20(6):734–751.
- Meleady, R. and Crisp, R. J. (2017). Redefining climate change inaction as temporal intergroup bias: Temporally adapted interventions for reducing prejudice may help elicit environmental protection. *Journal of Environmental Psychology*, 53:206–212.
- Melica, G., Bertoldi, P., Kona, A., Iancu, A., Rivas, S., and Zancanella, P. (2018). Multilevel governance of sustainable energy policies: The role of regions and provinces to support the participation of small local authorities in the covenant of mayors. *Sustainable cities and society*, 39:729–739.
- Middeldorp, N. and Le Billon, P. (2019). Deadly environmental governance: authoritarianism, eco-populism, and the repression of environmental and land defenders. *Annals of the American Association of Geographers*, 109(2):324–337.
- Ministry of Climate Change, G. o. P. Pakistan climate change act, 2017.
- Moorthy, K., Patwa, N., Gupta, Y., et al. (2019). Breaking barriers in deployment of renewable energy. *Heliyon*, 5(1):e01166.
- Morkūnaitė, Ž., Kalibatas, D., and Kalibatienė, D. (2019). A bibliometric data analysis of multi-criteria decision making methods in heritage buildings. *Journal of Civil Engineering and Management*, 25(2):76–99.
- Morrison, T. H., Adger, W. N., Brown, K., Lemos, M. C., Huitema, D., Phelps, J., Evans, L., Cohen, P., Song, A., Turner, R., et al. (2019). The black box of power in polycentric environmental governance. *Global Environmental Change*, 57:101934.
- Morseletto, P. (2017). Analysing the influence of visualisations in global environmental governance. *Environmental Science & Policy*, 78:40–48.
- Mumtaz, M. and Ali, S. H. (2019). Adaptive governance and sub-national climate change policy: A comparative analysis of khyber pukhtunkhawa and punjab provinces in pakistan. *Complexity, Governance & Networks*, 5(1):81–100.

- Munene, M. B., Swartling, Å. G., and Thomalla, F. (2018). Adaptive governance as a catalyst for transforming the relationship between development and disaster risk through the sendai framework? *International journal of disaster risk reduction*, 28:653–663.
- Munk Ravnborg, H., Bashaasha, B., Pedersen, R. H., Spichiger, R., and Turinawe, A. (2013). *Land tenure under transition: tenure security, land institutions and economic activity in Uganda*. Number 2013: 03. DIIS Working Paper.
- Mustafa, D. and Reeder, P. (2009). 'people is all that is left to privatize': water supply privatization, globalization and social justice in belize city, belize. *International Journal of Urban and Regional Research*, 33(3):789–808.
- Myers, R., Larson, A. M., Ravikumar, A., Kowler, L. F., Yang, A., and Trench, T. (2018). Messiness of forest governance: How technical approaches suppress politics in redd+ and conservation projects. *Global Environmental Change*, 50:314–324.
- Nahuelhual, L., Saavedra, G., Henríquez, F., Benra, F., Vergara, X., Perugache, C., and Hasen, F. (2018). Opportunities and limits to ecosystem services governance in developing countries and indigenous territories: The case of water supply in southern chile. *Environmental Science & Policy*, 86:11–18.
- Najam, A. (2005). Developing countries and global environmental governance: From contestation to participation to engagement. *International Environmental Agreements: Politics, Law and Economics*, 5(3):303–321.
- Nakano, R., Zusman, E., Nugroho, S. B., Jaeger, A., Janardhanan, N., Muchtar, M., Verma, A., Chaturvedula, S., Kolsepatil, N., Malik, S., et al. (2017). Low carbon governance in indonesia and india: A comparative analysis with recommendations. *Procedia engineering*, 198:570–588.
- Nasrullah, M., Chang, L., Saddozai, K., Khalid, A., and Bayisenge, R. (2019). G hameed. 2019. cost and net return of tobacco growers—a case study of district mardan (kp-pakistan). *Sarhad Journal of Agriculture*, 35(2):565–571.
- Naureen, M. (2009). Development of environmental institutions and laws in pakistan. *Pakistan Journal of History and Culture*, 30(1):93–112.

- Nazir, M. S., Iftikhar, M., and Rana, A. H. (2010). Reviewing corporate social responsibility initiatives of tobacco industry in pakistan. Available at SSRN 1532625.
- Nef, J. (1999). *Human security and mutual vulnerability: The global political economy of development and underdevelopment*. Idrc.
- Ngan, S. L., How, B. S., Teng, S. Y., Promentilla, M. A. B., Yatim, P., Er, A. C., and Lam, H. L. (2019). Prioritization of sustainability indicators for promoting the circular economy: The case of developing countries. *Renewable and Sustainable Energy Reviews*, 111:314–331.
- Nizam, H. A., Zaman, K., Khan, K. B., Batool, R., Khurshid, M. A., Shoukry, A. M., Sharkawy, M. A., Aldeek, F., Khader, J., and Gani, S. (2020). Achieving environmental sustainability through information technology: “digital pakistan” initiative for green development. *Environmental Science and Pollution Research*, 27(9):10011–10026.
- Noronha, C., PEREIRA, L., PEREIRA, N., and Guide, N. R. (2016). Smart home automation. Technical report, ST. FRANCIS INSTITUTE OF TECHNOLOGY.
- Norris, R., Webb, J., Nichols, S., Stewardson, M., and Harrison, E. (2012). Analyzing cause and effect in environmental assessments: using weighted evidence from the literature. *Freshwater Science*, 31(1):5–21.
- Nunn, P. D., Aalbersberg, W., Lata, S., and Gwilliam, M. (2014). Beyond the core: community governance for climate-change adaptation in peripheral parts of pacific island countries. *Regional Environmental Change*, 14(1):221–235.
- Ochieng, R., Visseren-Hamakers, I., Arts, B., Brockhaus, M., and Herold, M. (2016). Institutional effectiveness of redd+ mrv: Countries progress in implementing technical guidelines and good governance requirements. *Environmental Science & Policy*, 61:42–52.
- Okpara, U. T., Stringer, L. C., and Dougill, A. J. (2018). Integrating climate adaptation, water governance and conflict management policies in lake riparian zones: Insights from african drylands. *Environmental Science & Policy*, 79:36–44.

- Paavola, J. (2007). Institutions and environmental governance: A reconceptualization. *Ecological economics*, 63(1):93–103.
- Park, J., Conca, K., and Finger, M. (2008). *The crisis of global environmental governance: Towards a new political economy of sustainability*. Routledge.
- Parthesius, R. (2011). Shared heritage? shared responsibility: reflections on the role of ‘shared’ colonial heritage within capacity building programmes in the post-colonial world. In *Proceedings of the Inaugural Asia-Pacific Regional Conference on Underwater Cultural Heritage*. Asian Academy for Heritage Management. Manila, Philippines, pages 641–651.
- Parviainen, T., Kuikka, S., and Haapasaari, P. (2022). Enhancing science-policy interface in marine environmental governance: Oil spill response models as boundary objects in the gulf of finland, baltic sea. *Marine Policy*, 135:104863.
- Pastakia, F. (2012). *Environmental Protection and The Eighteenth Amendment*. Iucn.
- Pattberg, P. and Widerberg, O. (2015). Theorising global environmental governance: key findings and future questions. *Millennium*, 43(2):684–705.
- Phillips, H. (2015). The capacity to adapt to climate change at heritage sites—the development of a conceptual framework. *Environmental Science & Policy*, 47:118–125.
- Pillay, Y. P. and Buschke, F. T. (2020). Misaligned environmental governance indicators and the mismatch between government actions and positive environmental outcomes. *Environmental Science & Policy*, 112:374–380.
- Prakash, A. and Potoski, M. (2006). Racing to the bottom? trade, environmental governance, and iso 14001. *American journal of political science*, 50(2):350–364.
- Qazi, U., Jahanzaib, M., Ahmad, W., and Hussain, S. (2017). An institutional framework for the development of sustainable and competitive power market in pakistan. *Renewable and Sustainable Energy Reviews*, 70:83–95.
- Qureshi, A. S. (2020). Groundwater governance in pakistan: From colossal development to neglected management. *Water*, 12(11):3017.

- Randeria, S. (2007). The state of globalization: Legal plurality, overlapping sovereignties and ambiguous alliances between civil society and the cunning state in india. *Theory, Culture & Society*, 24(1):1–33.
- Ringel, M. and Knodt, M. (2018). The governance of the european energy union: Efficiency, effectiveness and acceptance of the winter package 2016. *Energy Policy*, 112:209–220.
- Ringnér, M. (2008). What is principal component analysis? *Nature biotechnology*, 26(3):303–304.
- Rist, S., Chidambaranathan, M., Escobar, C., Wiesmann, U., and Zimmermann, A. (2007). Moving from sustainable management to sustainable governance of natural resources: The role of social learning processes in rural india, bolivia and mali. *Journal of rural studies*, 23(1):23–37.
- Rojas, O. (2020). Agricultural extreme drought assessment at global level using the fao-agricultural stress index system (asis). *Weather and Climate Extremes*, 27:100184.
- Romero, R. and Emanuel, K. (2017). Climate change and hurricane-like extratropical cyclones: Projections for north atlantic polar lows and medicanes based on cmip5 models. *Journal of Climate*, 30(1):279–299.
- Rosilawati, Y., Rafique, Z., Nikku, B. R., and Habib, S. (2018). Civil society organizations and participatory local governance in pakistan: An exploratory study. *Asian Social Work and Policy Review*, 12(3):158–168.
- Roweis, S. (1997). Em algorithms for pca and spca. *Advances in neural information processing systems*, 10.
- Runnalls, D. (1995). The story of pakistan’s national conservation strategy: an analysis of its evolution.
- Sajeva, M., Lemon, M., and Mitchell, A. (2020). Making ‘soft’ economics a ‘hard science’: planning governance for sustainable development through a sustainability compass. In *Sustainable Food Chains and Ecosystems*, pages 103–133. Springer.
- Salik, K. M., Jahangir, S., ul Hasson, S., et al. (2015). Climate change vulnerability

- and adaptation options for the coastal communities of pakistan. *Ocean & Coastal Management*, 112:61–73.
- Sarker, P. K., Rahman, M. S., and Giessen, L. (2019). Regional economic regimes and the environment: stronger institutional design is weakening environmental policy capacity of the south asian association for regional cooperation. *International Environmental Agreements: Politics, Law and Economics*, 19(1):19–52.
- Schmalensee, R. (2012). From “green growth” to sound policies: An overview. *Energy Economics*, 34:S2–S6.
- Schneider, S. K. (1992). Governmental response to disasters: The conflict between bureaucratic procedures and emergent norms. *Public Administration Review*, pages 135–145.
- Schultz, L., Folke, C., Österblom, H., and Olsson, P. (2015). Adaptive governance, ecosystem management, and natural capital. *Proceedings of the National Academy of Sciences*, 112(24):7369–7374.
- Schwartz, J. (2004). Environmental ngos in china: roles and limits. *Pacific Affairs*, pages 28–49.
- Sen, S. and Ganguly, S. (2017). Opportunities, barriers and issues with renewable energy development – a discussion. *Renewable and Sustainable Energy Reviews*, 69:1170–1181.
- Shah, A., Siddiqui, R., and Sayeed, A. (2010). Empowering states and provinces or unshackling local governments: Does it matter for peace, order, good government, and growth?[with comments]. *The Pakistan Development Review*, pages 333–362.
- Shah, I. H., Dong, L., and Park, H.-S. (2020). Characterization of resource consumption and efficiency trends in bangladesh, india and pakistan: Economy-wide biotic and abiotic material flow accounting from 1978 to 2017. *Journal of Cleaner Production*, 250:119554.
- Shah, M. (1999). Synthesis of ecology and economics: towards a new theoretical paradigm. *Economic and Political Weekly*, pages 3293–3298.

- Shahbaz, M. (2013). Does financial instability increase environmental degradation? fresh evidence from pakistan. *Economic Modelling*, 33:537–544.
- Shahzad, M., Qu, Y., Javed, S. A., Zafar, A. U., and Rehman, S. U. (2020). Relation of environment sustainability to csr and green innovation: A case of pakistani manufacturing industry. *Journal of Cleaner Production*, 253:119938.
- Shukla, N. Self-discipline as a regulatory instrument for environmental governance (eg) and gandhian approach.
- Sidibé, A., Totin, E., Thompson-Hall, M., Traoré, O. T., Traoré, P. C. S., and Olabisi, L. S. (2018). Multi-scale governance in agriculture systems: Interplay between national and local institutions around the production dimension of food security in mali. *NJAS-Wageningen Journal of Life Sciences*, 84:94–102.
- Singh, B. K., Arnold, T., Biermayr-Jenzano, P., Broerse, J., Brunori, G., Caron, P., De Schutter, O., Fan, S., Fanzo, J., Fraser, E., et al. (2021). Enhancing science-policy interfaces for food systems transformation. *Nature food*, 2(11):838–842.
- Smits, C. C., van Leeuwen, J., and van Tatenhove, J. P. (2017). Oil and gas development in greenland: a social license to operate, trust and legitimacy in environmental governance. *Resources Policy*, 53:109–116.
- Sneddon, C., Howarth, R. B., and Norgaard, R. B. (2006). Sustainable development in a post-brundtland world. *Ecological economics*, 57(2):253–268.
- Spangenberg, J. H., Pfahl, S., and Deller, K. (2002). Towards indicators for institutional sustainability: lessons from an analysis of agenda 21. *Ecological indicators*, 2(1-2):61–77.
- Spennemann, D. H. and Graham, K. (2007). The importance of heritage preservation in natural disaster situations. *International Journal of Risk Assessment and Management*, 7(6-7):993–1001.
- Speth, J. G. and Haas, P. M. (2007). *Global environmental governance*. Pearson Education India.
- Spiller, P. T. and Tommasi, M. (2003). The institutional foundations of public policy: a

- transactions approach with application to argentina. *Journal of Law, Economics, and Organization*, 19(2):281–306.
- Stenberg, K., Hanssen, O., Edejer, T. T.-T., Bertram, M., Brindley, C., Meshreky, A., Rosen, J. E., Stover, J., Verboom, P., Sanders, R., et al. (2017). Financing transformative health systems towards achievement of the health sustainable development goals: a model for projected resource needs in 67 low-income and middle-income countries. *The Lancet Global Health*, 5(9):e875–e887.
- Stone, P. G. (2015). The challenge of protecting heritage in times of armed conflict. *Museum International*, 67(1-4):40–54.
- Stone, S. (2011). Towards a green economy: Pathways to sustainable development and poverty eradication—a synthesis for policy makers. *Environment*, pages 1–34.
- Swain, R. B. and Karimu, A. (2020). Renewable electricity and sustainable development goals in the eu. *World Development*, 125:104693.
- Tapio Reinikainen, Ville Hokka, J. P. A. H. H. I. S. S. A. A. T. K. (2018). Restructuring and capacity building of environment protection department punjab. Technical report, The Urban Unit, Govt. of the Punjab, Lahore, Pakistan.
- Taylor Jr, J. M. and Love, B. N. (2014). Simple multi-attribute rating technique for renewable energy deployment decisions (smart redd). *The Journal of Defense Modeling and Simulation*, 11(3):227–232.
- Thornton, P. K., Whitbread, A., Baedeker, T., Cairns, J., Claessens, L., Baethgen, W., Bunn, C., Friedmann, M., Giller, K. E., Herrero, M., et al. (2018). A framework for priority-setting in climate smart agriculture research. *Agricultural Systems*, 167:161–175.
- Tiwari, P. C. and Joshi, B. (2015). Local and regional institutions and environmental governance in hindu kush himalaya. *Environmental science & policy*, 49:66–74.
- Tschopp, D. and Nastanski, M. (2014). The harmonization and convergence of corporate social responsibility reporting standards. *Journal of business ethics*, 125(1):147–162.

- Van der Molen, F. (2018). How knowledge enables governance: The coproduction of environmental governance capacity. *Environmental science & policy*, 87:18–25.
- Van der Ven, H., Rothacker, C., and Cashore, B. (2018). Do eco-labels prevent deforestation? lessons from non-state market driven governance in the soy, palm oil, and cocoa sectors. *Global environmental change*, 52:141–151.
- Vatn, A. (2018). Environmental governance—from public to private? *Ecological economics*, 148:170–177.
- Virtudes, A. (2016). ‘good’ governance principles in spatial planning at local scale. *Procedia engineering*, 161:1710–1714.
- Vollmer, D., Bezerra, M. O., Martínez, N. A., Ortiz, O. R., Encomenderos, I., Marques, M. C., Serrano-Durán, L., Fauconnier, I., and Wang, R. Y. (2021). Can we take the pulse of environmental governance the way we take the pulse of nature? applying the freshwater health index in latin america. *Ambio*, 50(4):870–883.
- Wabelo, T. S. (2020). Legal and institutional frameworks regulating rural land governance in ethiopia: Towards a comparative analysis on the best practices of other african countries. *Beijing L. Rev.*, 11:64.
- Waheed, A., Bernward Fischer, T., and Khan, M. I. (2021). Climate change policy coherence across policies, plans, and strategies in pakistan—implications for the china-pakistan economic corridor plan. *Environmental Management*, 67(5):793–810.
- Wang, J.-J., Jing, Y.-Y., Zhang, C.-F., and Zhao, J.-H. (2009). Review on multi-criteria decision analysis aid in sustainable energy decision-making. *Renewable and sustainable energy reviews*, 13(9):2263–2278.
- Wang, X., Wong, Y. D., Yuen, K. F., and Li, K. X. (2020). Environmental governance of transportation infrastructure under belt and road initiative: A unified framework. *Transportation Research Part A: Policy and Practice*, 139:189–199.
- Watson, V. (2009). ‘the planned city sweeps the poor away...’: Urban planning and 21st century urbanisation. *Progress in planning*, 72(3):151–193.
- Wei, P., Huo, C., Niu, S., Ke, X., Zhang, H., and Zhang, R. (2020). Exploration and practice of key technologies for control strategy optimization of large-scale central-

- ized integration renewable energy generation. In *2020 IEEE Sustainable Power and Energy Conference (iSPEC)*, pages 277–282. IEEE.
- Weingessel, A. and Hornik, K. (2000). Local pca algorithms. *IEEE Transactions on Neural Networks*, 11(6):1242–1250.
- Weitz, N., Strambo, C., Kemp-Benedict, E., and Nilsson, M. (2017). Closing the governance gaps in the water-energy-food nexus: Insights from integrative governance. *Global Environmental Change*, 45:165–173.
- Wiersema, A. (2009). The new international law-makers-conferences of the parties to multilateral environmental agreements. *Mich. J. Int'l L.*, 31:231.
- Williams, J., Alter, T., and Shrivastava, P. (2018). Systemic governance of sustainable agriculture: Implementing sustainable development goals and climate-friendly farming. *Outlook on Agriculture*, 47(3):192–195.
- Wilshusen, P. R. and MacDonald, K. I. (2017). Fields of green: Corporate sustainability and the production of economistic environmental governance. *Environment and Planning A: Economy and Space*, 49(8):1824–1845.
- Woodwell, G. M. (2002). On purpose in science, conservation and government. *AMBIO: A Journal of the Human Environment*, 31(5):432–436.
- Wu, F., Geng, Y., Tian, X., Zhong, S., Wu, W., Yu, S., and Xiao, S. (2018). Responding climate change: A bibliometric review on urban environmental governance. *Journal of Cleaner production*, 204:344–354.
- Yakubu, O. H. (2017). Addressing environmental health problems in ogoniland through implementation of united nations environment program recommendations: environmental management strategies. *Environments*, 4(2):28.
- Ye, Q., Zhou, R., Anwar, M. A., Siddiquei, A. N., and Asmi, F. (2020). Entrepreneurs and environmental sustainability in the digital era: Regional and institutional perspectives. *International Journal of Environmental Research and Public Health*, 17(4):1355.
- Yiftachel, O. and Hedgcock, D. (1993). Urban social sustainability: the planning of an australian city. *Cities*, 10(2):139–157.

- Young, O. R. and Gasser, L. (2002). *The institutional dimensions of environmental change: fit, interplay, and scale*. MIT press.
- Zahariadis, N. (2003). *Ambiguity and choice in public policy: Political decision making in modern democracies*. Georgetown university press.
- Zaheer, F. (2019). Legislation and the practices of environmental governance for sustainable development in pakistan: A post 18th amendment assessment. *Journal of Political Studies*, 26(2):97–110.
- Zhang, G., Deng, N., Mou, H., Zhang, Z. G., and Chen, X. (2019). The impact of the policy and behavior of public participation on environmental governance performance: Empirical analysis based on provincial panel data in china. *Energy policy*, 129:1347–1354.
- Zia, A. S. (2018). Gender analysis for technical assistance for the balochistan rural development and community empowerment programme.
- Zimmerer, K. S. (2015). Environmental governance through “speaking like an indigenous state” and respatializing resources: Ethical livelihood concepts in bolivia as versatility or verisimilitude? *Geoforum*, 64:314–324.

APPENDICES

Appendix-I

Criteria wise average Score Sheet for study on Post 18th Amendment Environmental Governance Analysis in Pakistan

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
1	3.59	7.84	10.00	2.75	5.01	2.94
2	4.52	8.31	8.00	3.00	5.07	3.33
3	3.60	7.11	9.50	2.25	4.92	2.94
4	3.53	7.91	8.50	3.00	4.56	2.92
5	4.31	7.58	7.00	3.25	5.01	2.95
6	3.33	7.57	8.50	3.25	5.05	3.08
7	3.46	8.18	8.00	2.75	5.10	2.89
8	3.87	6.76	9.50	3.00	5.10	3.09
9	3.65	7.84	9.50	3.25	5.01	2.92
10	3.62	7.86	10.00	3.50	4.93	3.14
11	3.64	7.41	7.50	3.25	4.94	2.99
12	3.97	7.95	9.50	3.25	5.38	2.99
13	3.69	7.42	8.50	3.50	4.72	2.86
14	3.98	7.52	8.00	2.75	5.32	3.14
15	3.48	7.70	8.50	3.50	5.29	3.02
16	3.57	7.99	8.00	3.50	5.29	3.00
17	3.26	8.05	8.00	3.00	5.06	2.81
18	3.83	7.81	8.50	3.00	5.44	2.88
19	3.20	7.33	8.50	2.75	4.74	3.12
20	3.59	7.35	8.50	3.75	5.25	3.34
21	1.82	5.60	5.25	4.23	3.73	2.28
22	1.94	5.99	4.42	3.97	3.85	2.04
23	2.54	5.91	4.52	4.30	3.94	2.46

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
24	2.38	5.64	4.28	4.64	3.47	2.45
25	2.40	5.52	4.55	4.28	3.82	2.28
26	2.36	5.89	4.48	4.63	3.50	2.23
27	1.57	5.53	4.46	3.88	3.61	2.06
28	2.44	5.54	5.45	4.46	3.58	2.21
29	1.73	5.63	4.91	4.45	3.90	2.50
30	2.00	5.65	5.44	4.36	3.69	2.24
31	1.89	5.81	4.80	4.33	3.74	2.22
32	2.28	5.90	4.42	4.46	3.98	2.50
33	2.46	5.61	5.35	4.05	3.47	2.32
34	2.27	5.84	4.76	4.57	3.60	2.21
35	1.91	5.53	5.20	4.59	4.03	2.42
36	2.42	5.54	5.65	4.16	3.65	1.89
37	1.59	5.59	5.17	4.10	3.48	1.97
38	1.91	5.73	4.62	4.19	3.82	1.92
39	2.38	5.75	5.47	4.49	3.66	2.22
40	2.21	5.64	4.59	4.02	3.66	2.08
41	3.05	6.67	7.92	3.58	2.50	1.49
42	3.66	6.23	8.16	3.43	2.00	1.71
43	2.84	6.35	8.07	3.38	1.50	1.79
44	3.05	6.77	7.41	3.69	1.50	1.82
45	3.45	6.24	8.05	3.73	2.00	1.70
46	3.50	6.33	7.84	3.40	1.50	1.48
47	2.93	6.88	7.47	3.86	3.00	1.92
48	2.99	6.37	7.73	3.53	2.00	1.58
49	3.49	6.33	7.45	3.59	1.50	1.74
50	2.73	6.20	8.30	3.70	1.50	1.52
51	3.22	6.23	7.65	3.54	1.50	1.65
52	3.31	6.53	7.60	3.46	1.00	1.72
53	3.23	6.21	7.66	3.63	3.00	1.44
54	3.81	6.20	7.80	3.53	1.50	1.69
55	2.99	6.18	7.89	3.61	2.50	1.29
56	3.19	6.05	7.09	3.76	2.50	1.70

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
57	3.15	5.96	7.47	3.79	2.00	1.60
58	3.14	6.15	8.13	3.71	2.50	1.56
59	3.09	6.38	7.54	3.88	3.00	1.24
60	3.37	6.24	8.17	3.63	1.00	1.68
61	2.70	5.67	6.63	2.14	2.36	1.50
62	2.81	5.79	7.14	2.17	2.20	1.47
63	2.64	5.78	7.07	2.39	2.37	1.60
64	2.44	5.58	6.77	2.44	2.24	1.80
65	3.23	5.74	7.49	2.21	1.91	1.88
66	2.49	5.51	7.18	2.50	2.23	1.50
67	2.21	5.86	7.32	2.26	2.14	1.47
68	3.07	5.80	7.04	2.59	1.70	1.70
69	2.73	5.82	7.02	2.46	1.81	1.48
70	2.97	5.72	7.28	2.41	1.78	1.45
71	3.09	5.72	6.99	2.36	2.05	2.01
72	3.12	5.70	6.83	2.37	2.07	1.66
73	2.57	6.03	7.02	2.55	1.83	1.45
74	2.42	6.05	7.16	2.53	1.76	1.64
75	2.90	5.75	7.08	2.37	2.12	1.50
76	2.69	5.93	6.81	2.30	1.93	1.73
77	3.24	5.74	6.65	2.28	2.04	1.88
78	2.39	5.97	6.83	2.47	2.06	1.71
79	2.27	5.82	7.34	2.44	2.06	1.59
80	2.91	5.70	6.94	2.27	2.22	1.71
81	2.67	5.91	6.55	2.42	3.15	1.73
82	2.35	5.85	6.67	2.71	2.97	1.71
83	2.46	6.08	6.81	2.67	3.06	1.49
84	2.63	5.78	6.67	2.65	3.16	1.87
85	3.13	5.65	6.79	2.80	3.03	1.51
86	2.81	5.78	6.69	2.70	2.95	1.55
87	3.11	5.69	6.36	2.90	3.22	1.65
88	2.76	5.90	6.57	2.76	2.96	1.54

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
89	2.16	5.87	7.00	3.01	3.13	1.47
90	2.49	5.65	6.85	2.67	2.86	1.88
91	2.87	5.90	6.78	2.87	3.00	1.77
92	2.26	5.98	6.36	2.66	3.06	1.51
93	2.63	5.82	7.19	2.58	2.65	1.74
94	2.63	6.13	7.14	2.76	3.11	1.66
95	2.36	5.84	6.53	2.79	3.26	1.82
96	2.50	6.23	6.83	2.89	2.69	1.78
97	2.19	6.05	6.77	2.73	2.81	1.78
98	3.07	6.01	6.59	2.65	3.32	1.52
99	2.31	5.61	6.55	2.63	2.88	1.60
100	2.84	6.13	6.79	2.69	3.09	1.69
101	3.65	7.39	8.13	5.66	4.36	1.66
102	3.96	7.24	7.93	5.48	4.44	1.65
103	3.91	7.31	8.04	5.55	4.17	1.61
104	3.97	7.42	7.93	5.53	4.66	1.95
105	4.45	7.47	8.06	5.76	4.34	1.45
106	3.92	7.42	8.00	5.54	4.33	1.81
107	4.29	7.09	8.00	5.68	4.53	1.67
108	3.86	7.10	8.05	5.56	4.34	1.45
109	3.91	7.22	8.00	5.56	4.30	1.68
110	4.56	7.49	7.99	5.37	4.45	1.87
111	4.36	7.38	7.79	5.66	4.29	1.74
112	4.15	7.33	8.38	5.41	4.57	1.72
113	3.82	7.17	8.06	5.37	4.25	1.79
114	4.28	7.35	7.92	5.67	4.39	1.68
115	4.43	7.51	7.92	5.60	4.16	1.85
116	4.02	7.63	7.61	5.62	4.37	1.67
117	4.24	7.23	8.06	5.40	4.27	1.50
118	4.23	7.31	8.04	5.54	4.25	1.53
119	4.55	7.31	7.91	5.60	4.35	1.74
120	4.23	7.30	7.97	5.51	4.30	1.82

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
121	3.13	5.79	6.38	2.65	2.94	1.80
122	2.89	5.83	6.94	2.60	3.28	1.61
123	3.10	6.01	6.45	2.86	3.10	1.65
124	2.34	5.75	7.08	2.94	3.02	1.66
125	2.12	6.01	6.46	2.83	3.10	1.56
126	2.75	5.83	6.54	2.89	3.04	1.44
127	2.57	5.80	6.78	2.63	2.99	1.77
128	2.78	5.90	6.92	2.82	3.03	1.80
129	2.83	5.73	6.58	2.75	2.74	1.66
130	2.84	5.85	7.03	3.10	2.71	1.65
131	2.62	5.58	6.86	2.61	3.17	1.26
132	2.65	5.59	6.83	2.72	3.22	1.78
133	2.47	5.97	6.37	2.58	2.66	1.47
134	2.81	5.89	6.95	2.90	2.53	1.80
135	2.37	5.93	6.56	2.59	3.08	1.66
136	2.69	5.50	7.19	2.66	3.11	1.78
137	2.49	5.50	7.19	2.50	2.71	1.52
138	3.14	5.77	7.16	2.64	2.79	1.69
139	2.45	5.69	6.55	2.59	2.89	1.75
140	2.78	5.94	7.05	2.55	3.36	1.51
141	2.58	6.58	6.91	1.00	1.00	1.80
142	2.33	6.31	7.07	1.00	1.00	1.57
143	2.62	5.99	7.27	0.50	1.00	1.63
144	2.66	6.39	7.34	1.25	1.00	1.55
145	2.52	6.39	6.95	1.25	1.00	1.64
146	2.54	6.35	7.07	0.75	1.50	1.68
147	2.35	6.03	6.87	0.75	1.50	1.64
148	2.56	6.44	6.90	0.25	1.50	1.73
149	2.65	6.20	7.24	0.75	0.50	1.44
150	2.74	6.06	7.24	1.00	2.50	1.69
151	2.48	6.26	7.02	1.00	1.00	1.65
152	2.26	6.46	7.11	0.75	2.50	1.49
153	2.94	6.26	6.65	0.25	2.00	1.49

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
154	2.55	6.45	7.03	0.50	1.00	1.49
155	2.84	6.20	7.24	1.00	1.00	1.71
156	2.91	6.27	6.98	1.00	1.00	1.43
157	2.56	6.13	6.61	0.50	1.00	1.64
158	2.73	6.49	7.23	0.50	2.00	1.82
159	2.42	6.31	6.97	0.25	1.00	1.65
160	2.76	6.22	6.98	0.50	1.50	1.62
161	1.29	4.04	4.79	0.75	1.00	1.71
162	1.64	3.80	4.64	1.00	0.50	1.76
163	1.60	3.84	4.83	0.50	2.00	1.47
164	1.85	3.96	4.77	1.75	1.50	1.62
165	1.89	3.68	4.92	1.75	1.50	1.34
166	1.58	3.79	4.91	0.75	1.00	1.55
167	2.24	3.65	4.54	0.75	1.50	1.57
168	2.12	3.95	4.30	0.50	0.50	1.47
169	1.75	3.79	5.05	1.25	1.00	1.70
170	1.84	4.02	4.60	1.25	0.00	1.70
171	1.98	3.67	4.49	0.25	0.50	1.73
172	1.61	3.92	5.04	0.50	0.50	1.23
173	1.68	3.70	4.58	0.50	1.50	1.94
174	1.15	3.93	4.91	1.00	1.00	1.71
175	2.27	3.81	4.66	0.00	2.00	1.82
176	2.31	3.90	4.72	1.00	0.50	1.51
177	1.86	3.91	4.74	1.50	0.50	1.45
178	2.34	3.73	4.48	0.75	0.50	1.54
179	1.13	3.97	4.44	1.00	0.50	1.85
180	1.29	3.58	4.73	1.00	1.00	1.31
181	2.03	6.25	7.18	6.58	5.37	2.18
182	2.63	6.27	7.57	6.42	5.40	2.26
183	2.61	6.22	7.03	6.68	5.18	2.05
184	2.31	6.04	7.43	6.69	5.11	2.18
185	2.60	6.19	7.05	6.77	5.29	2.10
186	2.81	6.10	7.58	6.76	5.34	2.11

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
187	2.59	6.25	7.63	6.65	5.12	1.88
188	2.21	6.51	7.29	6.57	5.05	2.01
189	2.34	5.99	6.93	6.78	5.28	1.81
190	2.37	6.16	7.25	6.86	5.03	2.07
191	3.00	6.14	6.94	6.70	4.97	1.78
192	2.40	5.95	7.33	6.58	5.10	1.99
193	2.56	6.12	7.38	6.61	5.00	2.01
194	2.88	6.10	7.42	6.55	5.28	1.95
195	3.24	6.18	7.39	6.66	4.84	2.02
196	2.86	6.32	6.87	6.76	5.59	1.85
197	2.44	6.21	6.79	6.35	4.91	1.94
198	2.28	6.12	6.98	6.46	5.26	2.01
199	2.53	6.18	7.18	6.85	5.55	2.12
200	2.36	6.07	6.94	6.52	5.10	1.78
201	2.19	6.10	6.65	5.89	1.62	1.45
202	2.14	5.57	6.98	5.55	1.82	1.64
203	2.16	6.15	6.30	5.72	2.28	1.62
204	2.44	5.92	6.98	5.69	2.07	1.46
205	2.19	5.78	7.02	5.80	2.52	1.89
206	2.54	5.61	6.48	5.71	1.84	1.77
207	2.42	5.87	6.87	5.83	2.28	1.57
208	2.18	5.88	6.85	6.00	1.54	1.47
209	1.67	5.56	6.46	5.89	3.35	1.86
210	2.29	5.83	6.66	5.67	1.86	1.49
211	1.70	5.83	6.80	5.60	2.45	1.48
212	1.96	5.76	6.40	6.06	2.12	1.89
213	2.16	5.81	6.59	5.64	2.73	1.47
214	1.77	5.63	6.65	5.69	2.65	1.43
215	1.91	6.02	6.80	5.62	2.32	1.52
216	1.84	5.90	6.85	5.91	2.16	1.49
217	2.05	5.72	6.97	5.62	2.26	1.72
218	1.79	5.85	6.58	5.82	1.80	1.61
219	2.52	5.52	6.71	5.83	2.66	1.66

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
220	2.26	5.89	6.60	5.86	3.32	1.77
221	2.07	5.31	6.27	4.99	2.13	1.80
222	2.14	5.29	6.37	4.54	2.63	1.96
223	2.10	5.15	5.83	4.52	2.80	1.97
224	1.74	5.36	6.22	4.82	2.83	1.64
225	2.16	5.35	6.01	4.80	2.49	1.47
226	2.29	5.23	6.39	4.97	1.57	1.21
227	1.94	5.13	6.20	4.71	1.92	1.45
228	1.92	5.08	6.58	4.77	2.33	1.62
229	1.63	4.98	6.13	4.86	2.11	1.52
230	2.04	5.43	6.24	4.60	2.85	1.50
231	2.06	5.39	6.41	4.75	2.94	1.70
232	1.97	5.21	6.36	4.69	2.84	1.68
233	2.37	5.06	6.31	4.50	1.40	1.42
234	1.89	5.14	6.27	4.72	1.42	1.58
235	1.67	4.89	6.47	4.68	2.89	1.53
236	2.01	5.28	6.30	4.82	3.19	1.67
237	1.85	5.35	6.23	4.92	1.36	1.69
238	1.68	5.26	6.35	4.93	2.45	1.67
239	1.90	5.04	6.10	4.91	3.01	1.36
240	1.94	5.23	6.65	4.83	2.78	1.48
241	2.12	5.25	6.50	4.46	2.82	1.36
242	2.34	5.49	6.23	4.56	1.69	1.27
243	2.09	5.19	6.39	4.58	2.98	1.58
244	2.40	4.86	6.64	4.90	1.38	1.69
245	2.20	5.16	6.55	5.06	2.18	1.57
246	2.21	5.35	5.93	4.48	2.90	1.58
247	1.90	5.09	6.28	4.84	1.47	1.53
248	2.26	4.96	6.21	4.70	1.36	1.60
249	2.12	5.29	6.05	4.63	3.21	1.44
250	2.16	5.22	6.31	4.71	2.86	1.82
251	2.45	5.45	6.14	4.88	3.14	1.60
252	2.40	5.14	6.30	4.80	2.03	1.56

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
253	2.66	5.05	6.59	4.67	1.99	1.29
254	1.77	5.24	6.48	4.66	2.14	1.53
255	2.57	5.07	6.09	5.01	2.42	1.81
256	2.27	5.20	6.08	4.65	2.79	1.76
257	2.20	5.09	6.21	4.78	3.07	1.63
258	2.44	5.12	6.22	4.68	1.52	1.67
259	2.40	4.93	6.20	4.76	2.06	1.47
260	2.19	5.32	5.89	4.77	2.62	1.50
261	1.09	4.38	5.05	1.75	4.25	1.82
262	1.27	4.15	4.98	1.50	3.99	1.53
263	1.53	4.22	4.80	1.50	3.53	1.52
264	1.31	3.77	4.95	1.50	3.02	1.41
265	1.32	4.15	4.88	1.75	3.19	1.25
266	1.15	4.15	4.93	1.75	4.03	1.54
267	1.46	4.28	5.02	2.00	3.61	1.63
268	1.13	3.94	5.10	1.50	2.84	1.70
269	1.42	3.72	5.30	0.75	2.98	1.68
270	0.81	3.98	5.00	2.00	2.85	1.35
271	1.43	3.66	4.75	1.50	4.18	1.55
272	1.05	3.86	5.00	1.50	3.39	1.48
273	1.15	3.75	5.27	2.25	2.98	1.67
274	0.93	4.19	4.98	1.25	3.80	1.71
275	1.13	4.13	5.25	1.50	3.45	1.39
276	1.61	3.81	5.32	1.50	3.71	1.77
277	1.59	3.67	5.13	2.00	3.03	1.41
278	1.41	3.96	5.11	1.25	3.25	1.69
279	1.92	3.61	4.99	1.75	3.15	1.50
280	1.40	4.18	5.13	1.50	3.15	1.35
281	1.34	4.05	4.85	1.75	3.48	1.70
282	1.45	4.06	5.09	2.00	3.17	1.73
283	0.77	3.80	5.26	2.00	3.68	1.52
284	1.01	4.17	5.25	1.75	4.21	1.60
285	1.20	4.26	4.80	2.25	3.00	1.51

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
286	1.25	4.27	5.03	1.50	3.83	1.32
287	1.02	3.70	5.03	1.50	3.53	1.40
288	0.93	4.18	4.61	0.75	2.88	1.47
289	1.72	4.29	4.97	1.25	3.72	1.43
290	1.05	4.06	4.99	1.50	3.44	1.59
291	1.29	4.16	5.35	1.50	3.08	1.51
292	1.18	4.35	5.17	1.50	2.92	1.77
293	1.43	3.77	5.23	2.00	3.98	1.52
294	1.18	4.02	4.65	1.50	4.08	1.48
295	1.44	3.58	5.15	1.25	4.07	1.68
296	1.48	4.34	4.96	1.50	3.86	1.60
297	1.46	4.21	5.01	2.25	3.65	1.50
298	1.39	3.88	5.40	1.75	4.07	1.48
299	1.29	3.98	5.01	1.25	3.67	2.05
300	1.03	4.02	4.98	2.00	3.38	1.67
301	1.34	4.28	3.87	1.25	2.73	1.65
302	0.94	3.60	4.04	1.25	2.57	1.65
303	0.75	3.52	4.27	1.25	2.65	1.60
304	0.76	3.41	4.07	1.75	2.84	1.31
305	1.09	3.40	4.31	1.75	2.65	1.85
306	1.09	4.01	3.62	1.00	2.73	1.55
307	1.16	4.05	4.18	1.25	2.01	1.79
308	1.08	3.94	4.08	1.50	2.94	1.41
309	1.22	4.07	4.18	1.25	2.12	1.60
310	1.31	3.52	3.92	1.50	2.72	1.69
311	0.97	3.70	4.25	1.00	2.39	1.72
312	0.95	4.16	3.77	1.50	1.92	1.34
313	1.04	4.23	4.19	1.25	3.15	1.48
314	0.91	4.02	3.95	1.50	1.75	1.73
315	0.61	3.44	3.90	1.50	2.55	1.78
316	1.05	4.14	4.33	1.50	2.92	1.73
317	1.00	3.82	4.13	1.75	2.07	1.57
318	1.09	4.02	3.81	1.00	2.14	1.51

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
319	1.49	3.66	3.92	1.50	2.78	1.52
320	0.85	3.80	4.08	1.50	2.79	1.65
321	1.39	3.41	3.60	1.50	2.84	1.48
322	0.84	3.61	3.20	2.00	2.18	1.80
323	1.19	3.15	3.57	1.75	2.80	1.38
324	1.29	3.31	3.53	1.75	2.17	1.60
325	1.09	3.69	3.52	2.00	2.64	1.55
326	1.34	3.63	3.67	0.75	2.95	1.40
327	1.24	3.19	3.71	1.25	3.00	1.71
328	0.80	3.01	3.64	1.50	2.80	1.62
329	0.96	3.36	3.41	2.00	2.16	1.89
330	1.69	3.14	3.76	2.00	2.82	1.71
331	1.48	3.46	3.24	1.75	1.85	1.73
332	1.62	3.73	3.28	2.00	1.86	1.72
333	0.96	3.52	3.51	2.00	1.75	1.57
334	1.43	3.69	3.55	1.25	3.03	1.37
335	0.80	3.42	3.50	1.50	2.44	1.84
336	1.33	3.33	3.78	1.25	2.38	1.86
337	0.94	3.44	3.25	2.00	2.33	1.57
338	1.19	3.25	3.76	0.75	2.65	1.45
339	1.05	3.48	3.68	1.25	3.00	1.49
340	0.78	3.24	3.68	1.50	2.67	1.68
341	3.52	7.68	5.02	2.86	4.61	1.70
342	3.55	7.79	4.95	2.67	5.06	1.48
343	3.84	7.85	4.82	3.07	4.62	1.69
344	3.61	7.90	5.15	2.80	4.81	1.48
345	3.44	7.71	5.26	3.01	4.81	1.44
346	3.38	7.59	4.63	2.94	4.60	1.80
347	3.34	7.80	4.98	3.26	5.11	1.52
348	3.56	7.71	4.95	2.78	4.48	1.38
349	3.56	7.59	4.92	2.63	5.09	1.37
350	3.44	7.71	5.02	2.96	4.68	1.54
351	3.75	7.82	4.85	3.06	4.82	1.35

Respondent ID	Clarity of Mandates	Environmental Governance Framework	Regulatory Frameworks	Adequate Institutional Capacity of Provinces	Harmonized Arrangements	Performance
	C-1	C-2	C-3	C-4	C-5	C-6
352	3.68	7.69	5.14	2.90	4.52	1.71
353	3.19	7.96	4.74	2.84	4.61	1.86
354	3.73	7.84	4.98	2.99	4.63	1.75
355	3.71	7.71	4.80	2.79	4.52	1.50
356	3.63	7.60	5.23	2.59	4.76	1.51
357	3.49	7.50	4.99	2.93	5.01	1.33
358	3.60	7.76	4.72	3.04	5.09	1.85
359	3.45	7.55	5.05	2.74	5.20	1.72
360	3.58	7.52	5.08	2.64	4.67	1.53
361	1.59	3.42	5.39	1.50	4.93	1.26
362	1.51	3.47	4.94	1.75	4.83	1.90
363	1.17	3.30	4.89	1.75	5.00	1.67
364	1.42	3.27	4.99	2.00	4.63	1.46
365	0.88	3.52	5.03	2.25	4.75	1.32
366	1.57	3.29	5.24	2.25	4.82	1.33
367	1.68	3.16	5.06	2.00	5.35	1.60
368	1.68	3.28	4.78	2.25	4.91	1.54
369	1.92	3.37	4.83	2.00	4.75	1.92
370	1.86	3.20	4.87	2.50	4.78	1.42
371	1.32	3.70	4.96	1.75	4.89	1.67
372	1.48	3.37	4.71	1.50	5.20	1.71
373	1.16	3.35	4.88	1.25	5.34	1.66
374	1.64	3.27	4.73	1.75	4.88	1.60
375	1.56	3.29	5.09	1.25	4.87	1.96
376	1.42	3.27	5.42	2.75	4.87	1.57
377	1.31	3.18	4.99	2.75	5.23	1.78
378	1.50	3.47	4.96	2.00	4.65	1.57
379	1.34	3.03	4.79	1.50	4.61	1.78
380	0.94	3.20	5.02	2.00	4.81	1.64
	2.33	5.44	6.09	3.10	3.12	1.74

ANNEXURES

ANNEXURE-I

AN OVERVIEW OF ALL CONSTITUTIONAL AMENDMENTS IN THE CONSTITUTION-1973 OF ISLAMIC REPUBLIC OF PAKISTAN: FROM FIRST (1ST) AMENDMENT – 1974 TO TWENTY SIXTH (26TH) AMENDMENT – 2019, INCLUDING 18TH AMENDMENT

Prepared By: Hafiz Muhammad Naseer, PhD Scholar

Sr #	Sr # NA List	Amendm ent No.	Amendme nt Title	Parliament Session		Date of Approval	Date Published in Gazette of Pakistan	Articles/Schedules amended	Status	Period of PM	Link/ Source
				From	To						
1	103	First (1st) Amendment	CONSTITUTION (FIRST AMENDMENT) ACT, 1974	14 April 1972	10 January 1977	President's Assent Received: 4th May 1974, Saturday	Gazette of Pakistan, Extraordinary, Part I, 8th May 1974	To Redefined the boundaries of Pakistan and removed references to East Pakistan It amended articles 1, 8, 17, 61, 101, 127, 193, 199, 200, 209, 212, 250, 259, 260, 272, and the First Schedule of the constitution of Pakistan The amendment to Article 1 redefined the boundaries of Pakistan and removed references to East	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/uploads/documents/1491799355_185.pdf

2	120	Second (2nd) Amendment	CONSTITUTION (SECOND AMENDMENT) ACT, 1974	14 April 1972	10 January 1977	President's Assent Received: 17th September 1974, Tuesday	Gazette of Pakistan, Extraordinary, Part I, 21st September 1974	Pakistan after the recognition of Bangladesh by Pakistan.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/uploads/documents/1491799433_754.pdf
3	143	Third (3rd) Amendment	CONSTITUTION (THIRD AMENDMENT) ACT, 1974	14 April 1972	10 January 1977	President's Assent Received: 13th February 1975, Thursday	Gazette of Pakistan, Extraordinary, Part I, 18th February 1975	To extend the period of preventive detention It amended Articles 10 and 232 of the Constitution of Pakistan.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/uploads/documents/1491974309_389.pdf
4	192	Fourth (4th) Amendment	CONSTITUTION (FOURTH AMENDMENT) ACT, 1975	14 April 1972	10 January 1977	President's Assent Received: 21st November 1975	Gazette of Pakistan, Extraordinary, Part I, 25th November 1975	To Decree additional seats for minorities, it also deprived courts of the power to grant bail to any person detained under any preventive detention.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/uploads/documents/1491974219_713.pdf

5	267	Fifth (5th) Amendment	CONSTITUTION (FIFTH AMENDMENT) ACT, 1976	14 April 1972	10 January 1977	September 13, 1976 President's Assent Received: 16th September 1976	Gazette of Pakistan, Extraordinary, Part I, 16th September 1976	To Widened the scope of restriction on the High Courts. It amended Articles 101, 160, 175, 179, 180, 187, 192, 195, 196, 199, 200, 204, 206, 212, 260, 280 and Amendment of the First Schedule and Amendment of the Fourth Schedule of the Constitution of Pakistan.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/upload/s/documents/1493112906562.pdf
6	290	Sixth (6th) Amendment	CONSTITUTION (SIXTH AMENDMENT) ACT, 1976	14 April 1972	10 January 1977	President's Assent Received: 31st December 1976, Friday	Gazette of Pakistan, Extraordinary, Part I, 4th January 1977	To Provided that Chief Justice of Supreme Court will be retired at the age of 65 and High Court judges at age 62.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/upload/s/documents/1493182339938.pdf

7	14	Seventh (7th) Amendment	CONSTITUTION (SEVENTH AMENDMENT) ACT, 1977	26 March 1977	05 July 1977	President's Assent Received: 16th May 1977	Gazette of Pakistan, Extraordinary, Part I, 16th May 1977	To Enables the Prime Minister to obtain a vote of confidence of the people of Pakistan. It amended Articles 96 by adding new 96A, 101 and 245 of the Constitution of Pakistan	It amended Articles 179, 195, 246, and 260 of the Constitution of Pakistan.	Come into force at once	Zulfiqar Ali Bhutto	http://www.w.na.gov.pk/uploads/documents/1491536235_301.pdf
8	21, 23	Eighth (8th) Amendment	CONSTITUTION (EIGHTH AMENDMENT) ACT, 1985	20 March 1985	29 May 1988	President's Assent Received: 09 November 1985	Gazette of Pakistan, Extraordinary, Part I 11 th November, 1985	To Changed Pakistan's government from a Parliamentary system to a Semi-presidential system by giving the President a number of additional powers It amended Articles 48, 51, 56, 58, 59, 60, 75, 90, 91, 101, 105, 106, 112, 116, 130, 144, 152 (omission)	Come into force at once except section 19 which shall come into force on the day on which the proclamation of the fifth day of July,	Muhammad Khan Junejo	http://www.w.na.gov.pk/uploads/documents/1485318332_808.pdf , http://www.w.na.gov.pk/uploads/documents/1336450060_95	

9	Not Listed	Ninth (9th) Amendment Bill	CONSTITUTION (NINTH AMENDMENT) BILL, 1985	20 March 1985	29 May 1988	The Senate Passed the Bill and sent it to National Assembly on 07 August 1986	The Minister for justice and parliamentary affairs, Wasim Sajjad, referred the bill to committee supposed to submit a report within 30 days but before the report could be presented assembly was dissolved and bill lapsed	152A), 270 (Substitution of Article 270-A) and after the Sixth Schedule, the Seventh Schedule added of the Constitution of Pakistan	1977 is revoked	Muhammad Khan Junejo	http://www.pakistan.gov.pk/uploads/documents/9amendment.html	5.pdf
10	33	Tenth (10th) Amendment	CONSTITUTION (TENTH AMENDMENT) ACT, 1987	20 March 1985	29 May 1988	President's Assent Received: 25 March 1987, Wednesday	Gazette of Pakistan, Extraordinary, Part I, 29th March 1987	To impose Shariah law as the supreme law of land By Amending Article 2, 203b and 203D of Constitution of Pakistan	Not Passed by National Assembly as it was dissolved before the discussion on bill.	Muhammad Khan Junejo	http://www.pakistan.gov.pk/uploads/documents/1336457097_968.pdf	

11	Not Listed	Eleventh (11th) Amendment	CONSTITUTION (ELEVENTH AMENDMENT) BILL, 1989	30 November 1988	26 June 1990	The Bill, 1989 was introduced in the Senate on 31 December, 1989 by Senators; Mr. Muhammad Ali Khan, Dr. Noor Jehan Panezai and Syed Faseih Iqbal, sought to restore twenty (20) women seats in the National Assembly	Report of the Standing Committee was presented on 29 August 1990. The Bill was withdrawn on 23 August 1992 by its movers after assurance given by the Minister for Law and Justice that the Government intends to introduce the same Bill very soon.	To restore the reserved seats for women in the national and the provincial assemblies It amended the Article 51 of the Constitution of Pakistan	Withdrawn by its movers	Moharrrama Benazir Bhutto	http://www.pakistan.org/pakistan/constitution/amendments/11amendment.html
12	21	Twelfth (12th) Amendment	CONSTITUTION (TWELFTH AMENDMENT) ACT, 1991	03 November 1990	18 July 1993	President's Assent Received: 27 July 1991, Saturday	Gazette of Pakistan, Extraordinary, Part I, 28th July, 1991	It amended Articles 212, Added 212B and Amended Fifth Schedule of the Constitution of Pakistan	Come into force at once	Mian Muhammad Nawaz Sharif	http://www.w.na.gov.pk/uploads/documents/1335241881_850.pdf
13	1	Thirteenth	CONSTITUTION	15	27 July	President's	Gazette of	To Strip the	Come into	Mian	http://www

15	Not Listed	(14th) Amendment ACT XXIV of 1997, No.F.22(104)/97-Legis.	ON (FOURTEENTH AMENDMENT) ACT, 1997	February 1997	1999	Assent Received: 03 July 1997 Thursday	Pakistan, Extraordinary, Part I, 04 July 1997, Friday	of parliament to be dismissed if they defect It amended Articles 63 (Added 63A), 101, 112 and 243 of the Constitution of Pakistan	force at once	Muhammad Nawaz Sharif	www.na.gov.pk/uploads/documents/13246_07484_177.pdf
15	Listed	Fifteenth Amendment Bill	CONSTITUTION (FIFTEENTH AMENDMENT) BILL, 1998			The Bill was Passed by the National Assembly on 28 August 1998 and sent to the Senate	It was never passed in the Senate	To impose Shariah law as supreme law of land It amended Articles 2 (Added 2B) and 239 of the Constitution of Pakistan	Never Passed by Senate	Mian Muhammad Nawaz Sharif	http://www.pakistan.org/pakistan/constitution/amendments/15amendment.html
16	51	Sixteenth Amendment	CONSTITUTION (SIXTEENTH AMENDMENT) ACT, 1999	15 February 1997	27 July 1999	President's Assent Received: 03 August 1999 Tuesday	Gazette of Pakistan, Extraordinary, Part I, 05 August 1999, Thursday	To provide opportunity and representation to all classes of persons and areas in services and to increase the term appointed for quota system as per 1973 Constitution from 20 to 40 years. It amended Article 27 of the Constitution of Pakistan	Come into force at once	Mian Muhammad Nawaz Sharif	http://www.na.gov.pk/uploads/documents/13246_02789_861.pdf

17	03	Seventeenth (17th) Amendment	CONSTITUTION (SEVENTEENTH AMENDMENT) ACT, 2003	16 November 2002	15 November 2007	President's Assent Received: 31 December 2003, Wednesday	Gazette of Pakistan, Extraordinary, Part I, 31 December 2003, Wednesday	Passed by Senate on 03 June, 1999, by National Assembly on 27 July, 1999 Promulgated on 05 August 1999	Come into force at once	Mir Zafar Ullah Khan Jamali	http://www.w.na.gov.pk/uploads/documents/1321274383_862.pdf
18	18	Eighteenth (18th) Amendment	CONSTITUTION (EIGHTEENTH AMENDMENT)	17 March 2008	16 March 2013	President's Assent Received: 19 April 2010, Monday	Gazette of Pakistan, Extraordinary, Part I, 20 April 2010, Tuesday	Passed by Senate on 03 June, 1999, by National Assembly on 27 July, 1999 Promulgated on 05 August 1999	Come into force at once	Syed Yousaf Raza Gillani	http://www.w.na.gov.pk/uploads/documents/1302138356_93

19	32	Nineteenth Amendment	CONSTITUTION (NINETEENTH AMENDMENT) ACT, 2010	17 March 2008	16 March 2013	Passed by the national Assembly: 22 December 2010,	Gazette of Pakistan, Extraordinary, Part I, 04 January 2011 Tuesday	To reform the judicial appointment procedure as well as expanding the Federally Administered Tribal Areas	154, 155, 156 (Substitution), 157, 160, 161, 167, 168, 170, 171, 172, 175 (Added 175A), 177, 193, 194, 198, 199, 200, 203C, 203D, 209, 213, 215, 216, 218, 219, 221, 224, 226 (Substitution), 228, 232, 233, 234, 242, 243 (Substitution), 246, 260, 267 (Added 267A & 267B), 260, 270A, 270AA (Substitution), 270B, (Added 270BB) and Amendment to Annexure & Third Schedule and Fourth Schedule and Omission of Sixth & Seventh Schedule of the Constitution of Pakistan	Come into force at once	Syed Yousaf Raza Gillani	http://www.w.na.gov.pk/uploads/documents/1302135596_176.pdf
----	----	----------------------	---	---------------	---------------	--	---	---	--	-------------------------	--------------------------	---

20	62	Twentieth (20th) Amendment	CONSTITUTION ON (TWENTIETH AMENDMENT) ACT, 2012	17 March 2008	16 March 2013	Passed by the Senate: 30 December 2010, President's Assent Received: 01 January 2011, Saturday	Passed by the national Assembly: 14 February 2012	Passed by the Senate: 20 February 2012	President's Assent Received: 28 February 2012, Tuesday	Gazette of Pakistan, Extra-ordinary, Part I, 29 February 2012, Wednesday	In the light of directions by the Supreme Court to the Federation to constitute Election Commission of Pakistan, and give it due independence and to provide for the manifestation of the Interim Cabinets	It amended the Articles 81, 175, 175A, 182, 213 and 246 of the Constitution of Pakistan	Come into force at once	Syed Yousaf Raza Gillani	http://www.w.na.gov.pk/uploads/documents/1331184343_217.pdf
21	13	Twenty	CONSTITUTION	01 June	31 May	Passed by	Passed by	Passed by	Passed by	Gazette of	To establish the	It amended the Articles 48, 214, 215, 216, 218, 219, 224, (Added 224A) and Amended the Second & Third Schedule of the Constitution of Pakistan	Come into	Mian	

	22	61	First (21st) Amendment	ON (TWENTY FIRST AMENDMENT) ACT, 2015	2013	2018	the national Assembly & Senate: 06 January 2015 President's Assent Received: 07 January 2015, Wednesday	Pakistan, Extraordinary, Part I, 08 January 2015, Thursday	speedy trial military courts for terrorist offenses, waging war against Pakistan in extraordinary situation and circumstances, for duration of two years, introduced after the Peshawar Army Public School Massacre It amended the Article 175 and First Schedule of the Constitution of Pakistan	force at once for next two years	Muhammad Nawaz Sharif	http://www.w.na.gov.pk/upload/s/docs/nts/1420800195_264.pdf
	22	61	Twenty Second (22nd) Amendment	CONSTITUTION (TWENTY SECOND AMENDMENT) ACT, 2016	01 June 2013	31 May 2018	President's Assent Received: 08 June 2016, Wednesday	Gazette of Pakistan, Extraordinary, Part I, 10 June 2016, Friday	To amend the procedure for the appointment, qualifications and other prerequisites for the Chief Election Commissioner (CEC) and four members of Election Commission of Pakistan It includes amendment of Article 81, Amendment of	Come into force at once	Mian Muhammad Nawaz Sharif	http://www.w.na.gov.pk/upload/s/docs/nts/1466671756_856.pdf

23	97	Twenty Third (23rd) Amendment	CONSTITUTION (TWENTY THIRD AMENDMENT) ACT, 2017, (Act No. XII of 2017)	01 June 2013	31 May 2018	President's Assent Received: 30 March 2017, Monday	Gazette of Pakistan, Extraordinary, Part I, 03 April 2017, Friday	To grant legal cover to Military Courts, and to revive expired provisions of the Twenty-First Amendment with certain modifications It amended Article 175 and First Schedule of the Constitution of Pakistan	Come into force at once and shall be deemed to have taken effect on and from 07 th January 2017	Mian Muhammad Nawaz Sharif	http://www.w.na.gov.pk/uploads/documents/1491460727_515.pdf
24	123	Twenty Fourth (24th) Amendment	CONSTITUTION (TWENTY FOURTH AMENDMENT) ACT, 2017, (Act No. XXXVI of 2017)	01 June 2013	31 May 2018	President's Assent Received: 22, 2017, Friday	Gazette of Pakistan, Extraordinary, Part I, December 26, 2017, Tuesday	Modifies allocation of National Assembly seats among provinces based on the results of the 2017 census, the overall number of seats in the national Assembly of Pakistan will remain same with Punjab losing seats, Baluchistan and Khyber Pukhtunkhwa gaining		Shahid Khaqan Abbasi	http://www.w.na.gov.pk/uploads/documents/1514450210_421.pdf

25	155	Twenty Fifth (25th) Amendment	CONSTITUTION (TWENTY FIFTH AMENDMENT) ACT, 2018, (Act No. of XXXVII of 2018)	01 June 2013	31 May 2018	President's Assent Received: May 31, 2018	Gazette of Pakistan, Extraordinary, Part I, June 05, 2018	seats and Sindh retaining the same number of seats Amendment of Article 51 of the Constitution of Pakistan Presented in National Assembly on January 26th, 2017 To increase pension payments to widows of Supreme Court and High Court judges It amended Article 1, 51, 59, 62, 106, 155, 246 and Omitted article 247	Except as provided in this act, it shall come into force at once	Imran Khan	http://www.w.na.gov.pk/uploads/documents/1528788450_669.pdf
26	09	Twenty Sixth (26th) Amendment	CONSTITUTION (TWENTY SIXTH AMENDMENT) ACT, 2019	13 August 2018	To Present		13 May 2019, Monday	To ensure the proper representation to the areas of erstwhile FATA It amended Articles 51 and 106 of the Constitution of Pakistan	Come into force at once	Imran Khan	http://www.w.na.gov.pk/uploads/documents/1557903893_479.pdf





Education Policy Coherence With Environmental Governance Mechanism After 18th Constitutional Amendment In Pakistan

Hafiz Muhammad Naseer*, Department of Environmental Science, International Islamic University, Sector H-10, 44000 Islamabad, Pakistan,

Muhammad Irfan Khan, Department of Environmental Science, International Islamic University, Sector H-10, 44000 Islamabad, Pakistan,

Abstract. All matters related to ecology and pollution of environment used to be addressed at federal level till 2010 until 18th constitutional devolved the mandate to provinces with considering the fact whether provinces are ready for taking this responsibility or not. The federal Environmental Protection Act of 1997 was not repealed is still intact. Whereas, provinces have legislated their own environmental protection acts, which has created problem of mandate and policy distortion. This study analyzed the impacts of this amendment in the constitution on the based on six criteria of governance for assessing coherence of educational policies with environmental policies using standard techniques of qualitative data analysis in the provincial policies. The study concluded on the basis of results that environment based education has to be provided at elementary and secondary level for sustainable development. The reason to focus the environment based elementary education is that students at primary level are too young to understand the things clearly although they get concept memorized while the students of secondary and higher secondary level in Pakistan are mentally directed to focus their future field or profession on the basis of which they have to choose some subjects and to leave others in a system thus limiting to the option numbers. The elementary level is the most important age group of children where they can be focused through lessons, class room and school environment, contents of curriculum, practical's, field trips and tours to the national parks, rivers, oceanic coasts, zoo, gardens, thus inspiring them to be a friend of nature in life.

Keywords: Education policy, coherence, environment, governance mechanism, 18th Amendment, environment-based education

INTRODUCTION

Environmental governance is based on three pillars of policy, legal and institutional frameworks. The policy framework is important if it provides integration of environmental consideration across policies and plans including education and environmental policies. Pakistan launched its National Environmental Policy (NEP) in 2005. Creation of demand for environment through mass awareness and community mobilization is one of the objectives of NEP of Pakistan. The policy described integration of environment in educational curricula at all level as a mean of implementation of policy. The human and environment relationships mostly rely on education and environment (Lucas, 1980). The human as a collective foundation of educational transformation (Rees, 2010) in a quickly altering globe with growing pressure of human tempted conversion as well as human nature itself play the central role (Jordan et al., 1990; Malik, 2013). Talking about the literacy rate in Pakistan which is ordered at 113 out of 120 countries (Rehman et al., 2015) and overall literacy rate in Pakistan is 58 % while the literacy rate of women is 48% (Mustafa et al., 2019).

The countries in developing phase are consistently facing the multifaceted challenges of environmental problems (Gleick, 1989) and has no escape. Along with other efforts being made for remedial measures and rehabilitation of already degraded environment, these are also focusing now to inbuilt environmental education in the curricula at school level through integrating into education policy at national and sub-national level and implementing at school level (Kalsoom and Qureshi, 2019). Pakistan is one of the top listed countries facing severe challenges of environment and climate changes (Mumtaz et al., 2019). The government of Pakistan, in the current scenario of industrialized world, needs to give due consideration to inculcate the environment based education in the curricula at school level in all provinces including Azad Jammu and Kashmir and Gilgit Baltistan and to make an efficient and



constant linkage between environmental governance and education governance. It will ultimately develop the future human resource with environment friendly attitude and will leave a long term impact on future generations across the nation.

The 18th amendment in the national constitution of Pakistan has played a significant role in the parliamentary history of the country (Siddiqui, 2010; Akram et al.; Khan, 2015; Ahmad, 2014; Ali, 2015). It has given a strong impression of Pakistan as a federation (Hussain and Kokab, 2012; Adeney, 2012) and decentralized the domain of education and environment to the provinces (Zubair et al., 2019). After the 18th constitutional amendment in 2010, the subject of environment and ecology has also been devolved and decentralized from federal to provincial level (Tahir, 2012). The school education with exception of few components was already dealt at provincial level in government setup in Pakistan, but now the curriculum development has also become under the umbrella of provinces. Apparently, 18th amendment gives a positive outlook since both institutions are now provincial where more coordinated mechanism can easily be evolved or might have already developed which needs to be examined as there is a general perception that 18th amendment have negative impact on institutional performance due to multiple reasons. Hence it is important to look into the coherence of education policy and governance with the environmental policy and governance mechanism after 18th amendment.

The modifying concerns about the environment and problems related to it have linkages and strong association with the definition and promotion of environmental education as the history of environmental education has been revealed. Here, it is also required to examine horizontal alignment between institutions in provincial context since environment and education both are cross cutting in nature and overlap each other. In other words the environment and education are having a very strong bonding in term of human thoughts, actions and their attitude and behavior towards nature.

The state of development of environmental education cannot be ignored and in national strategies (Dillon, 2003; Smyth, 2006). It is an important dogma to be inculcated in the curricula of primary, elementary and secondary education (Disinger, 2001) by the government, as it got importance at global level due to the declaration of United Nations as the decade of education for sustainable development from 2005 to 2014 (Abd Rahman et al., 2018; Combes, 2005). The role of School Education in creating environment friendly approach with green thoughts (Cherian and Jacob, 2012) followed by green actions in the majority of children (Sagala et al., 2019), the 80% of whom live in developing countries (Glewwe and Kremer, 2006) is a key factor (Yunmei, 2003). The attitudes based on environmental care (Feinberg and Willer, 2013), inspiration (Sandell and Ohman, 2013) and behaviour of environmental respect (De Leeuw et al., 2015), if developed through education at school level (Otto and Pensini, 2017) have long life impact on the personalities of the children (Hsiao and Shih, 2016).

In this context, this paper an attempt has been made to analyze the education policy coherence with developed segment of environment at province level after the 18th constitutional amendment in Pakistan. The education policy of Pakistan including primary, elementary, secondary and higher secondary education at school and college level along with higher education is in dire need to be studied in depth to make better decisions about future generations in term of achievement of sustainability and environmental protection and conservation through incorporating environment based educational content in the curricula across the country at federal as well provincial levels.

METHODOLOGY

The present study is extracted from doctoral studies work of first author and primarily a qualitative research (Payne, 2006) in the field of environmental science focused on environmental governance to take a view of coherence between the education policy in term of curriculum contents, field trips and tours and practical aspects for students including teacher education and training (Prihantoro, 2015) and environmental governance mechanism.

Content Analysis

First, policy and legal documents were scrutinized using standard content analysis technique as described by Prihantoro, (2015); Kozikoglu and Senemoglu, (2015) and Waheed et al, (2021) which include but not limit to environment policy (national/provincial), education policy (national/provincial),



climate change policy (national/provincial), national environmental protection act, provincial environmental protection acts and contents of elementary and secondary school curricula in Pakistan.

A comprehensive literature review was also carried out including policy documents, curriculum approaches documents, books, journals, magazines, newspapers and online published national and international articles of various research groups accessed through the internet, Google Scholar, digital library resources of International Islamic University Islamabad - Pakistan and digital library of Higher Education Commission of Pakistan.

Cause and effect analysis

Secondly, for deepening the understanding of studies including both educational and environmental linkages as suggested by Ramsarup et al., (2017) and mechanism between them, the cause and effect analysis (Derman and Gurbuz, 2018; AE and BA)/life-cycle model (Troxel, 2013) with the help of network diagram by using flip charts (Strayer, 2007; Glewwe et al., 2004) in an in-house exercise was done repeatedly for federal and provincial contexts.

Problem Tree Analysis

Thirdly, a detailed problem tree analysis (Norris et al., 2012; bin Jailani et al., 2014; Iqbal et al., 2020) was done for setting the criteria and indicators for quantitative analysis under the scope of objectives of the study. For this study, prior to qualitative analysis, following six criteria were developed along with various indicators for each to analyze the impact of 18th constitutional amendment of the Islamic Republic of Pakistan on coherence of environmental education and environmental governance in Pakistan. The following are the criteria set for the analysis purpose:

Criteria 1 (C1): Clarity of Mandates

Clarity of institutional mandate of federal and provincial governments is essential to define role and responsibilities in performing functions at national and provincial levels.

Indicators of C1: (i) Notified distribution of functions of concerned institutions of federal and provincial governments (ii) Notified status of Education and Environment based Legislation (iii) Notified jurisdiction of Federal and provincial administrative units in term of education and environment after 18th amendment (iv) Obligations of national education policy and national environmental policy.

Criteria 2 (C2): Frameworks of Environmental and educational Governance

Environmental Governance and Educational Governance frameworks in term of policy, law and institutions at provincial levels is the basic requirement. Indicators of C2: Development of i) Environmental Policy and Educational Policy ii) Environmental Act(s) and Educational Act(s) iii) Environmental Institutions and Educational Institutions as provided by legislative documented decisions.

Criteria 3 (C3): Regulatory Frameworks

Without rules and regulations law cannot be enforced. Indicators of C3: Development of; i) Rules and Regulations ii) Adoption of existing federal rules and regulations.

Criteria 4 (C4): Institutional Capacity of Provinces

Institutional capacity in all aspects is essential requirement for enforcement of environmental rules and regulations made under the law. Indicators of C4: Institutional capacity is adequate i) Human capacity ii) Technical capacity iii) Technological capacity iv) Financial capacity.

Criteria 5 (C5): Harmonized Arrangements

For discharging national obligations on state, there must be a harmonized arrangement between federal and provincial institutions. Indicators of C5: Development of mechanisms of i) Data and information sharing ii) Distribution of tasks between federal and provincial institutions.



Criteria 6 (C6): Performance

Indicators of C6: i) Contents developed for Pollution Control, Climate Action and Urban Planning ii) Contents developed for Sustainable Resource Exploitation and Green Growth iii) Contents developed for change in attitude and behavior. Fourthly, it thoroughly examined horizontally at province level between the two institutions and vertically between provincial and federal institutions against set criteria and cause and effect model based, on which it generated discussion. Analysis is developed in the form of matrix based on which discussion was generated and along with working out findings. Finally, the inference was drawn as both environmental and educational set up at provincial levels need improvement in structural and functional settings along with developing and improving the interconnection and intercommunication between both for future planning to work out for sustainability through green education.

RESULTS

Figure 1 shows network analysis model for the outcome of behavioral change through environmental education.

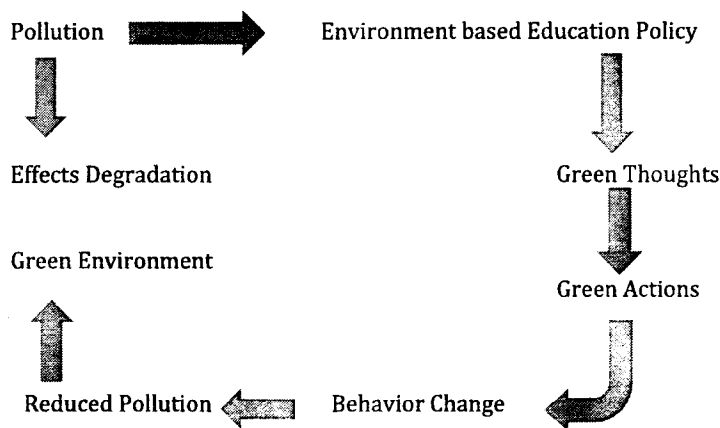


Figure 1: Network Diagram

Pakistan is a federal nature governed country under the Constitution of Pakistan with governing authority of the Islamabad as Capital Territory, four autonomous sub national domains or provinces: Sindh, Punjab, Khyber Pakhtunkhwa and Balochistan, two self-governed autonomous territories inclusive of Azad Jammu Kashmir and Gilgit-Baltistan with their own separate legislature.

18th Amendment and Federal Setup of Education Governance in Pakistan

At federal level, for education, "Ministry of Federal education and Professional Training" is working with twenty two (22) listed different departments and organizations. In wake of the 18th Constitutional Amendment, the Concurrent List was abolished and the subjects in the Concurrent List were devolved to provinces including Education and Curriculum is not an exception. Due to this step, various ministries were devolved from 5th April 2011 to 30th June 2011 including the Ministry of Education.

Ministry of Professional and Technical Training was established in July 2011 following the 18th amendment in the Constitution of Islamic Republic of Pakistan and few departments of Ministry of Labour and Manpower (MOLM) and Ministry of Education (MOE) were included in the ministry. But later according to the judgment and directions of Supreme Court of Pakistan, on 25 th November, 2011, referring Article 25-A of the Constitution, the Federal Government cannot absolve itself from the responsibility of providing Education to its citizens, ministry was renamed as Ministry of Education and Training with the approval of Prime Minister followed by notification of Cabinet Division on 24th July,



2012 and subsequent endorsement of Council of Common Interest (CCI) in meeting of 8th November, 2012. The Ministry was again retitled as Ministry of Education, Trainings and Standards in Higher Education according to the notification of Cabinet Division on 07th June, 2013. The ministry got another new title on 19th June, 2014 as per notification of Cabinet Division as Ministry of Federal Education and Professional Training (<http://www.mofept.gov.pk/index>). It was an important step to maintain the constitutional mandate and to meet the responsibilities of the government to the nation. One may read the Federal Legislative list, Part 1, Entry 16 as follows; Federal Agencies and Institutes for the following purposes that is to say, for research, for professional and technical training, or for the promotion of special studies will be organized by the Federal Government. Therefore, the Federal Government retained the Federal Agencies and Institutes imparting professional and technical training and research.

18th Amendment and federal setup of environmental governance in Pakistan

For Environment, at federal level, "Ministry of Climate Change is working with four (4) attached departments and seven (7) wings and sections. In the month of April 2012, Ministry of National Disaster Management was retitled as the Ministry of Climate Change which was moved down as a Division in July 2013. Later on, it was moved up again and Climate Change Division (CCD) has been now upraised to a level of ministry at federation in Pakistan. The ministry now comprises one hundred and seventy eight (178) total employees strength which includes fifty eight (58) officers and one hundred and thirteen (113) staff members. Figure 2 portrays the organizational hierarchy of MoCC.

DISCUSSION

National Climate Change Policy-2012 of Pakistan and Environmental Education

The National Climate Change Policy 2012 (Mumtaz, 2018), under "4.7-Disaster Preparedness" in Policy Measures (f) states to "Redesign and construct disaster resilient multi-purpose school buildings to be used as shelters during natural calamities". The policy, in its preamble, aimed to take appropriate measures relating to disaster preparedness and introduction of the climate change issue in higher education curricula to be incorporated as important components of the policy. In the domain of Forestry, to enhance the adaptive capacity, the policy is focused to ensure inclusion of climate change as a compulsory subject in forest education systems. The policy states that the capacity enhancement will be carried out in climate change professionals by sending young scientists and students to reputable institutions abroad for higher studies, by strengthening national climate change science related institutions, in particular the Global Change Impact Studies Centre (GCISC) and universities, in terms of necessary financial and technical support, and Development and introduction of curriculum on climate change and environmental planning with particular emphasis on Disaster Risk Reduction (DRR) and introduce it into the formal education system at all levels, particularly into the higher education system.

For awareness raising, the policy aimed to ensure advocacy and mass awareness regarding the importance of water and energy conservation, the impact of climate change on various sectors including forest ecosystems, biodiversity and so on, using mass media, public private partnerships, students and community mobilization, and incorporate these issues into the formal education systems at all levels. In the technology transfer, the policy urged to establish a base for technology transfer and absorption at technical institutes, engineering colleges and universities.

National Environmental Policy-2005 of Pakistan and Environmental Education

The National Environmental Policy-2005 of Pakistan, in its Policy Instruments includes Public Awareness and Education aimed to integrate environmental education into all levels of curricula and syllabi from primary to university level. It further states to encourage the establishment of environmental education and training institutions. Moreover, the policy announces to support all educational institutions throughout the country to establish environmental clubs. The policy, under the heading of Public Private Civil Society Partnership, urges to include the concept of "Participatory Approaches and Practices" in the curricula of environmental education and training programs. Talking about the "Gender and Environment", it is focused to include gender and environment in the curricula of education and training programs on environment.



National Education Policy Framework-2018 and Environmental Education

The National Education Policy Framework-2018 of Pakistan was brought forward in November, 2018 and states as Pakistan faces significant education challenges in providing uniform and quality education across the nation for all children, and in the past decades the progressive indicators of education have been found very inadequate. Improved educational governance system with financial efficiency of the education system is the dire need of the country as governance and management of the education sector has been cited as one of the biggest stumbling blocks in achievement of education targets in Pakistan. It also talks about the Lack of coherence and coordination in curriculum frameworks, textbooks and examination systems. Unfortunately, in the policy framework, no road map of revision of curricula to inculcation of environment and climate change based education found.

National Forest Policy-2015 of Pakistan and Environmental Education

According to NATIONAL FOREST POLICY-2015, The National institution shall promote high-quality research and education by building linkages with regional and international forestry institutions. The National institution shall also develop and maintain updated databases related to all aspects of forestry, biodiversity and allied disciplines, conduct periodic national forest assessment and publish state-of-the-art forest report after every 2 years. The environment based education and linkages with education sector at school, colleges and university level, however has not been stated in the policy.

Provinces and Environmental Education

Almost all the provinces, AJK and Gilgit Baltistan are having their respective boards under the ministry of education for developing curriculum. These all are coordinated with the National Curriculum Committee working for one curriculum across the nation. These boards need stronger coordination and improve the contents of environment and its belongings in the curricula of all levels of education.

CONCLUSION

The environment and climate change based education is a major support to the nation to cope with the challenge of global environmental stewardship in 21st century which can be addressed by key of environmental governance in perspective of sustainability. Different levels and multifaceted governance can be brought forward for the country integrating environmental education. The environment based education will give a long term fruit of the education based environment with full of natural beauty and plenty of natural resources for present as well as future generations. The reason to focus the environment based elementary education is the students at primary level are too young to understand the things clearly although they get concept memorized while the students of secondary and higher secondary level in Pakistan are mentally directed to focus their future field or profession on the basis of which they have to choose some subjects and to leave others in a system thus limiting to the option numbers. The elementary level is the most important age group of children where they can be focused through lessons, class room and school environment, contents of curriculum, practical's, field trips and tours to the national parks, rivers, oceanic coasts, zoo, gardens, thus inspiring them to be a friend of nature in life.

The government of Pakistan, with the help of educationists and environmentalists should take proactive steps to inculcate the different problems of environment and the responsibilities of a citizen in this scenario in the curricula of all levels of education including primary, elementary, secondary, higher secondary schools, colleges and universities. Although the higher education sector has started the environmental sciences and environmental management like courses and degrees at university levels but school level education system and curricula, particularly the elementary level needs to revisit the courses for the promotion of environment based education.

The religious set of educational network in the society is also have a strong influence on the students of schools and colleges of the nation. The Friday sermons, Dars-e-Quran and Dars-e-Hadith can be arranged in mosques periodically across the nation to teach and preach the importance of nature and natural components which are narrated as "Signs of Almighty". It will give a stronger stewardship concept to the young generation and they will be a good human being, with nature loving attitude and



nurturing it. The contents of religious book of Muslims, The Holy Quran and teachings of The Holy prophet Muhammad (Peace be upon Him) preaches the best philosophies and practices for environment and nature. It leads to eternal peace of human being, expressed as individual peace which ultimately leads to the social peace. This is how the universal peace can be obtained across the globe.

REFERENCES

- Abd Rahman, N., Halim, L., Ahmad, A. R., and Soh, T. M. T. (2018). Challenges of environmental education: Inculcating behavioral changes among indigenous students. *Creative Education*, 9(1):43–55.
- Adeney, K. (2012). A step towards inclusive federalism in Pakistan? The politics of the 18th amendment. *Publius: The Journal of Federalism*, 42(4):539–565.
- AE, I. and BA, S. A. Application of cause-and-effect-analysis for evaluating causes of fire disasters in public and private secondary schools in Ilorin metropolis, Nigeria.
- Ahmad, K. (2014). National agenda for policy-oriented research. *Policy Perspectives*, 11(1).
- Akhtar, J., Anjum, N., and Iftikhar, N. (2013). Evaluation of the impact of noise pollution on students in congested area of Rawalpindi. *NURTURE: Journal of Pakistan Home Economics Association*, 7.
- Akram, S., Azhar, M. M., and Waris, M. 18th constitutional amendment and rejuvenation of Pakistan's parliamentary system: An analysis.
- Ali, M. (2015). Decentralized governance initiatives in Pakistan: Post 18 th amendment perspective. *Pakistan Perspective*, 20(2).
- Aminrad, Z., Zakariya, S., Hadi, A. S., and Sakari, M. (2013). Relationship between awareness, knowledge and attitudes towards environmental education among secondary school students in Malaysia. *World Applied Sciences Journal*, 22(9):1326–1333.
- Asch, J. and Shore, B. M. (1975). Conservation behavior as the outcome of environmental education. *The Journal of Environmental Education*, 6(4):25 – 33.
- Ballantyne, R., Fien, J., and Packer, J. (2001). School environmental education programme impacts upon student and family learning: A case study analysis. *Environmental Education Research*, 7(1):23–37.
- Bin Jailani, M. A. K., Rahim, F. A., et al. (2014). Assessing the situational analysis of heritage tourism industry in Melaka. *Procedia-Social and Behavioral Sciences*, 130:28–36.
- Braun, T., Cottrell, R., and Dierkes, P. (2018). Fostering changes in attitude, knowledge and behavior: Demographic variation in environmental education effects. *Environmental Education Research*, 24(6):899–920.
- Brophy, J. (2008). Developing students' appreciation for what is taught in school. *Educational psychologist*, 43(3):132–141.
- Cherian, J. and Jacob, J. (2012). Green marketing: A study of consumers' attitude towards environment friendly products. *Asian social science*, 8(12):117.
- CHIKATI, T. (2019). Implementation of Integrated Environmental Education in the Secondary School Curriculum for Managing Environmental Degradation in Machakos Sub-County, Kenya. PhD thesis.
- Combes, B. P. (2005). The United Nations decade of education for sustainable development (2005–2014): Learning to live together sustainably. *Applied Environmental Education and Communication*, 4(3):215–219.
- Day, C. and Midbjer, A. (2007). *Environment and children*. Routledge.



- De Leeuw, A., Valois, P., Ajzen, I., and Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *Journal of environmental psychology*, 42:128–138.
- Derman, M. and Gurbuz, H. (2018). Environmental education in the science curriculum in different countries: Turkey, Australia, Singapore, Ireland, and Canada. *Journal of Education in Science Environment and Health*, 4(2):129 – 141.
- Dillon, J. (2003). On learners and learning in environmental education: Missing theories, ignored communities. *Environmental Education Research*, 9(2):215 – 226.
- Dillon, J. and Teamey, K. (2002). Reconceptualizing environmental education: Taking account of reality. *Canadian Journal of Science, Mathematics and Technology Education*, 2(4):467–483.
- Disinger, J. F. (2001). K-12 education and the environment: Perspectives, expectations, and practice. *The journal of environmental education*, 33(1):4 – 11.
- Erhabor, N. I. and Don, J. U. (2016). Impact of environmental education on the knowledge and attitude of students towards the environment. *International Journal of Environmental and Science Education*, 11(12):5367–5375.
- Esa, N. (2010). Environmental knowledge, attitude and practices of student teachers. *International Research in Geographical and Environmental Education*, 19(1):39–50.
- Farmer, J., Knapp, D., and Benton, G. M. (2007). An elementary school environmental education field trip: Long-term effects on ecological and environmental knowledge and attitude development. *The journal of environmental education*, 38(3):33–42.
- Feinberg, M. and Willer, R. (2013). The moral roots of environmental attitudes. *Psychological science*, 24(1):56–62.
- Gambro, J. S. and Switzky, H. N. (1999). Variables associated with American high school students' knowledge of environmental issues related to energy and pollution. *The Journal of Environmental Education*, 30(2):15–22.
- Gleick, P. H. (1989). Climate change and international politics: problems facing developing countries. *Ambio*, pages 333–339.
- Glewwe, P. and Kremer, M. (2006). Schools, teachers, and education outcomes in developing countries. *Handbook of the Economics of Education*, 2:945–1017.
- Glewwe, P., Kremer, M., Moulin, S., and Zitzewitz, E. (2004). Retrospective vs. prospective analyses of school inputs: the case of flip charts in Kenya. *Journal of development Economics*, 74(1):251–268.
- Gratton, A., Sinclair, M., and Purnell, K. (2004). Changes in attitudes, beliefs and behavior: A critical review of research into the impacts of environmental education initiatives. *Australian Journal of Environmental Education*, 20(2):41–52.
- Hammami, M., M. E. H. A. A.-K. M. A. F. A. S. D. N. (2017). Survey on awareness and attitudes of secondary school students regarding plastic pollution: implications for environmental education and public health in Sharjah city, UAE. *Environmental Science Pollution Research*, 24(25):20626–20633.
- Hassan, M., Khan Afridi, M., and Irfan Khan, M. (2019). Energy policies and environmental security: A multi-criteria analysis of energy policies of Pakistan. *International Journal of Green Energy*, 16(7):510–519.
- Hsiao, C.-Y. and Shih, P.-Y. (2016). Exploring the effectiveness of picture books for teaching young children the concepts of environmental protection. *International Research in Geographical and Environmental Education*, 25(1):36–49.
- Hungerford, H. R. and Volk, T. L. (1990). Changing learner behavior through environmental education. *The journal of environmental education*, 21(3):8–21.



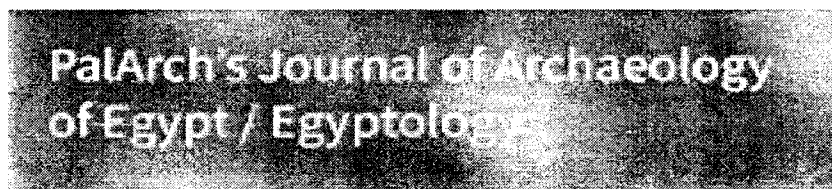
- Hussain, M. and Kokab, R. U. (2012). Eighteenth amendment in the constitution of Pakistan: success and controversies. *Asian Social Science*, 8(1):81.
- Iqbal, K. M. J., ur Rehman, W., and Khan, M. I. (2020). Preservation of historic heritage in energy dependent Anthropocene: A challenge for climate compatible development. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(10):4153-4172.
- Jordan, M., Meyer, W. B., Kates, R. W., Clark, W. C., Richards, J. F., Turner, B. L., Mathews, J. T., et al. (1990). The earth as transformed by human action: global and regional changes in the biosphere over the past 300 years. CUP Archive.
- Kalsoom, Q. and Qureshi, N. (2019). Teacher education for sustainable development in Pakistan: content analysis of teacher education curriculum and standards. Available at SSRN 3388457.
- Kasapoğlu, A. and Turan, F. (2008). Attitude-behaviour relationship in environmental education: a case study from turkey. *International Journal of Environmental Studies*, 65(2):219-231.
- Khan, K. (2015). Post 18th amendment scenario of higher education: A case study of Sindh. *Pakistan Perspective*, 20(2).
- Khan, M. R., Arshad, M., Ayub Rashid, C., Hashmi, S. U., William, J., and Raza, S. A. Environmental sustainability and secondary school students: Aspects and prospects in selected cities of Punjab, Pakistan.
- Khanum, A. (2019). Environmentally conscious global citizens: an evolution from environmental education to education for sustainable development in Pakistan. PhD thesis, University of Glasgow.
- Kozikoglu, I. and Senemoglu, N. (2015). The content analysis of dissertations completed in the field of curriculum and instruction (2009-2014).
- Leeming, F. C., Dwyer, W. O., Porter, B. E., and Cobern, M. K. (1993a). Outcome research in environmental education: A critical review. *The Journal of Environmental Education*, 24(4):8-21.
- Leeming, F. C., Dwyer, W. O., Porter, B. E., and Cobern, M. K. (1993b). Outcome research in environmental education: A critical review. *The Journal of Environmental Education*, 24(4):8-21.
- Lucas, A. M. (1980). The role of science education in education for the environment. *The Journal of Environmental Education*, 12(2):33-37.
- Malik, K. (2013). Human development report 2013. The rise of the south: Human progress in a diverse world. The Rise of the South: Human Progress in a Diverse World (March 15, 2013). UNDP-HDRO Human Development Reports.
- Montgomery, J. K. and Herer, G. R. (1994). Future watch: Our schools in the 21st century. *Language, Speech, and Hearing Services in Schools*, 25(3):130 - 135.
- Mumtaz, M. (2018). The national climate change policy of Pakistan: an evaluation of its impact on institutional change. *Earth Systems and Environment*, 2(3):525-535.
- Mumtaz, M., de Oliveira, J. A. P., and Ali, S. H. (2019). Climate change impacts and adaptation in agricultural sector: The case of local responses in Punjab, Pakistan. In *Climate Change and Agriculture*. IntechOpen.
- Mustafa, M., Batool, A., and Raza, A. A. (2019). Designing ICT interventions for women in Pakistan. *Communications of the ACM*, 62(11):46-47.
- Norris, R., Webb, J., Nichols, S., Stewardson, M., and Harrison, E. (2012). Analyzing cause and effect in environmental assessments: using weighted evidence from the literature. *Freshwater Science*, 31(1):5-21.
- Ntanos, S., Kyriakopoulos, G. L., Arabatzis, G., Palios, V., and Chalikias, M. (2018). Environmental behavior of secondary education students: A case study at central Greece. *Sustainability*, 10(5):1663.
- 4714** | Hafiz Muhammad Naseer Education Policy Coherence With Environmental Governance Mechanism After 18th Constitutional Amendment In Pakistan



- Otto, S. and Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global Environmental Change*, 47:88–94.
- Palmer, J. (2002). *Environmental education in the 21st century: Theory, practice, progress and promise*. Routledge.
- Payne, P. G. (2006). Environmental education and curriculum theory. *The Journal of Environmental Education*, 37(2):25–35.
- Pe'er, S., Goldman, D., and Yavetz, B. (2007). Environmental literacy in teacher training: Attitudes, knowledge, and environmental behavior of beginning students. *The Journal of Environmental Education*, 39(1):45–59.
- Prihantoro, C. R. (2015). The perspective of curriculum in Indonesia on environmental education. *International Journal of research studies in Education*, 4(1):77–83.
- Ramsarup, P., Ward, M., Rosenberg, E., and Jenkin, N. (2017). Enabling green skills: Pathways to sustainable development. SEMTA. URL: <https://semta.Org.uk/services/apprenticeships/> (date of access: 16.12. 2020).
- Rees, W. (2010). What's blocking sustainability? Human nature, cognition, and denial. *Sustainability: Science, Practice and Policy*, 6(2):13–25.
- Rehman, A., Jingdong, L., and Hussain, I. (2015). The province-wise literacy rate in Pakistan and its impact on the economy. *Pacific Science Review B: Humanities and Social Sciences*, 1(3):140–144.
- Sachs, J. D. (2012). From millennium development goals to sustainable development goals. *The lancet*, 379(9832):2206–2211.
- Sagala, R., NUANGCHALERM, P., SAREGAR, A., and EL ISLAMI, R. A. Z. (2019). Environment-friendly education as a solution to against global warming: A case study at Sekolah Aam Lampung, Indonesia. *Journal for the Education of Gifted Young Scientists*, 7(2):87–97.
- Sandell, K. and Ohman, J. (2013). An educational tool for outdoor education and environmental concern. *Journal of Adventure Education & Outdoor Learning*, 13(1):36–55.
- Siddiqui, S. (2010). 18th amendment and education. Retrieved January, 4:2013.
- Smyth, J. C. (2006). Environment and education: a view of a changing scene: Reprinted from environmental education on research (2005) 1 (1), pp. 3–20. *Environmental Education Research*, 12(3-4):247–264.
- Stevenson, R. B. (2007). Schooling and environmental/sustainability education: From discourses of policy and practice to discourses of professional learning. *Environmental education research*, 13(2):265–285.
- Storksdieck, M., Ellenbogen, K., and Heimlich, J. E. (2005). Changing minds? Reassessing outcomes in free-choice environmental education. *Environmental Education Research*, 11(3):353–369.
- Strayer, J. (2007). The effects of the classroom flip on the learning environment: A comparison of learning activity in a traditional classroom and a flip classroom that used an intelligent tutoring system. PhD thesis, The Ohio State University.
- Tahir, P. (2012). Does amended 1973 constitution provide a mechanism to end corruption and ensure economic security of Pakistan? Eighteenth amendment revisited, pages 110–128.
- Taylor, N., Nathan, S., and Coll, R. K. (2003). Education for sustainability in regional new south wales, Australia: An exploratory study of some teachers' perceptions. *International Research in Geographical and Environmental Education*, 12(4):291–311.



- Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of environmental education in the 1990s. *Environmental education research*, 1(2):195–212.
- Troxel, C. F. (2013). Life cycle analysis of sediment control devices. PhD thesis, Georgia Institute of Technology.
- Varela-Candamio, L., Novo-Corti, I., and Garc'ia-Alvarez, M. T. (2018). The importance of environmental education in the determinants of green behavior: A meta-analysis approach. *Journal of cleaner production*, 170:1565–1578.
- Vincent, S. and Focht, W. (2011). Interdisciplinary environmental education: elements of field identity and curriculum design. *Journal of Environmental Studies and Sciences*, 1(1):14–35.
- Waheed, A., Fischer, T.B. and Khan, M.I. (2021) Climate change policy coherence across policies, Plans, and Strategies in Pakistan—Implications for the China–Pakistan Economic Corridor Plan. *Environmental Management*67(5): pp19,
- Yousuf, A. and Bhutta, S. (2012). Secondary school students' attitude towards environmental issues in Karachi Pakistan. *Journal of Educational and Social Research*, 2(10):154–154.
- Yu, X. (2014). Is environment 'a city thing'in china? Rural–urban differences in environmental attitudes. *Journal of Environmental Psychology*, 38:39–48.
- Yunmei, Q. (2003). Environment-friendly schools and their functions [j]. *Journal of Lishui Teachers College*, 3.
- Zs'oka, A., Szer'enyi, Z. M., Sz'echy, A., and Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, 48:126–138.
- Zubair, D. S. S., Jabeen, N., Salman, D. Y., Zahid, M., and Irfan, D. S. (2019). Governance context of higher education sector of Pakistan. *Pakistan Vision* (2019) Vol, 20(1).



CHALLENGES OF ENVIRONMENTAL GOVERNANCE FOR PROTECTION OF WORLD CULTURAL AND NATURAL HERITAGE SITES

Hafiz Muhammad Naseer¹, Kanwar Muhammad Javed Iqbal², Muhammad Irfan Khan³

^{1,2,3}Department of Environmental Science, International Islamic University, Islamabad, Pakistan

²National Institute of Maritime Affairs, Bahria University, Islamabad, Pakistan

Email: mnaseer@iiu.edu.pk

Hafiz Muhammad Naseer, Kanwar Muhammad Javed Iqbal, Muhammad Irfan Khan Challenges of Environmental Governance for Protection of World Cultural and Natural Heritage Sites-- Palarch's Journal of Archaeology of Egypt/Egyptology 17(9), 10436-10444. ISSN 1567-214x

Keywords: Heritage, Unesco Convention, Environmental Governance, Meas

ABSTRACT

Governance for protection of environment, cultural and natural heritage got attention after World Heritage Convention followed by World Heritage Programme of UNESCO. The convention of protection of cultural and natural heritage requires states parties should review and reinforce governance frameworks within management systems of World Heritage properties. The protection of world cultural and natural heritage is also provided under environmental protection laws worldwide including Pakistan, which forms a nexus between environmental governance and heritage governance. In the context, this qualitative research paper aimed to analyze the state of knowledge about environmental governance of heritage sites by reviewing the global dynamics and the case of Pakistan. It attempts to explain the important aspect of governance for the protection of environment and the cultural and natural heritage considering the case of Pakistan, where environmental protection laws of two sub-national units cover such sites and other do not even, where UNESCO Heritage sites are located. It has identified that the case of Pakistan became critical after the 18th amendment in national constitution of Pakistan.

INTRODUCTION

The natural catastrophes waves the environment including all types of generally built and particularly the heritage sites which are culturally cherished by communities and represented as their historical achievements (Spennemann & Graham, 2007). Although these damages are inevitable but

the detrimental impacts can be mitigated if the community takes appropriate actions at right time (Stone, 2015). There are several gaps revealed by state of the art research of modern world in the regulatory institutions particularly in social field as to govern the global scale challenges (Kotzé, 2020). The fast changing worldwide characteristic need necessary adaptive governance which should be operationalized with a consideration of environment and heritage together because of mutual linkage and co-evolutionary interdependence of social and ecological systems based on feedback(Phillips, 2015).

Following themes of environment and environmental governance after the 'World Heritage Programmed' of UNESCO, the topic of heritage got attention of academia and has become a fashion too. But, it is a bitter fact that the World Heritage Governance at global level has not been studied in terms of social aspects which can be presented as global cultural governance (Kreft & Eckstein, 2013). However, the environmental governance instruments and structures also change from time to time and may affect the efforts for protection of world cultural and natural heritage sites. The World Heritage Convention for Protection of World Cultural and Natural Heritage was adopted by the UN General Assembly on 16 November 1972. UNESCO adopted a policy for the integration of a sustainable development perspective into the processes of the World Heritage Convention, during the General Assembly of States Parties to the World Heritage Convention at its 20th session. This policy requires that States Parties to convention should review and reinforce governance frameworks within management systems of World Heritage properties in order to achieve the appropriate balance, integration and harmonization between the protection of outstanding universal values (OUV) and the pursuit of sustainable development objectives. The World Heritage Convention in Article 5 calls upon States Parties to "adopt a general policy which aims to give the cultural and natural heritage a function in the life of the community". States Parties should recognize that inclusive social development is at the heart of the implementation of this provision of the Convention. States Parties should further recognize that full inclusion, respect and equity of all stakeholders, including local and concerned communities and indigenous peoples, together with a commitment to gender equality, are fundamental premise for inclusive social development. Enhancing quality of life and well-being in and around World Heritage properties is essential, taking into account the communities who might not visit or reside in or near properties but are still stakeholders (Parthesius, 2011).

Inclusive governance must underpin a comprehensive social development. It needs to be coherent with UN's sustainable development agenda as enshrined in the document "Transforming Our World: the 2030 Agenda for Sustainable Development", existing international humanitarian standards and other multilateral environmental agreements (MEAs). States Parties should ensure an appropriate and equitable balance between conservation, sustainability and development, so that World Heritage properties can be protected through appropriate activities contributing to the social and economic development and the quality of life of our communities.

The institutional dimensions of environmental governance are although easy to understand but yet not easy to understand the role of national and sub-national institutions in protection of cultural and natural heritage sites (Young, 2008). The foreign policy of a nation also does not ignore the perspective of its culture and heritage (Leshikar-Denton, 2010). In the modern world, there are no exceptions of being affected by the dreadful waves of global influential forces. The culture and heritage aspire the aesthetics and affections of the nation and the cultural communication works across the globe between the relationships of the different countries (AtKisson, 2009). Despite other perspectives the need of cultural exchanges among the nations has been much increased (Manglis et al., 2021).

In the context, this article reviews, analyze and tries to explain the important aspect of governance for the protection of environment and the cultural and natural heritage considering the case of Pakistan, where environmental protection laws of two sub-national units cover such sites and other do not even, where UNESCO Heritage sites are located.

METHODOLOGY

Primarily, this is a qualitative research paper aimed at analyzing the state of knowledge about environmental governance of heritage sites by reviewing the global dynamics and the case of Pakistan through scrutinizing the stock of existing literature. An interpretative approach with content analysis technique was adopted for the purpose of this study (Crowther & Lancaster, 2012) that enabled to explore and examine the earlier studies on heritage governance (Conejós et al., 2016). The leading phase of investigation was to build an academic discourse based on the progression of the concept on heritage, governance arrangements and functional aspects. The preliminary level of study was brought up on exploratory research strategy (Yin, 2015). For developing case study of Pakistan and the global dynamics, the situational analysis technique (Hassan et al., 2014) was employed (Śladowski & Paruch, 2017) to decipher about the state of affairs regarding the prerequisites of the environmental governance (Klein & Müller, 2012; Morkūnaitė et al., 2019).

ANALYSIS AND DISCUSSION

In south Asian region, the legislation has been initiated on different issues of environmental management concerns including conservation of heritage (Khayam & Ahmad, 2020). The state of knowledge about environmental governance of heritage sites was analyzed by reviewing the global dynamics and the case of Pakistan through scrutinizing the stock of existing literature. Pakistan became party to UN Convention for protection of cultural and natural heritage sites by ratification of the convention on 23 July 1976, making its historical sites eligible for inclusion on the list. Since then, UNESCO has designated six sites in Pakistan as World Heritage Sites and twenty-six sites are on the tentative list. All these heritage sites are located in provinces. The protection of world cultural and natural heritage is also provided under environmental protection laws, worldwide. The section 31 of Pakistan Environmental Protection Act of 1997 provides powers to Federal Government to make rules for implementation of international environmental agreements included in the Schedule of the Pakistan Environmental Protection

Act, 1997. The World Heritage Convention for protection of World Cultural and Natural Heritage is listed in the Schedule of Environmental Protection Act of 1997.

The 18th amendment in the constitution of Pakistan posed a challenge to governance for protection of World Cultural and Natural Heritage Sites as all provinces have made their own environmental laws. Whereas, international assistance under the “World Heritage Convention” is a financial assistance granted to the States Parties to the World Heritage Convention in order to help them protect the cultural or natural heritage sites inscribed on the “World Heritage List” or on the “List of World Heritage in Danger”. The national and sub-national laws are not clear about to fix the responsible for protection of such heritage sites on national government or sub-national government. The change in multilevel composite classifications dealt with the flexibility approach resulted in the stimulation of adaptive governance literature addressing the uncertainty and revision to unanticipated upcoming fluctuations. Moreover, collaborative styles to expand the societal based institutional wisdom like in adaptive management is in dire need to be fostered with further research at all levels (Naelul & Ridwan, 2018).

The international, national and sub-national level governance frameworks are in dire need to be revisited with respect to the protection of cultural heritage across globe and Pakistan is not an exception. The shielding and safeguarding of cultural heritage sites, on the other hand, remained at very low priority list of disaster managers (Ferreira et al., 2021). The resilience style to governance questions demonstrates a prodigious transaction of capacity as it empowers a further polished considerate of the dynamics of faster, interwoven and multi-scale variation and this potential may not be underestimated (Duit et al., 2010). The studies revealed empathies of the anthropological dimensions of environmental modification be able to be empirically, conceptually and theoretically enriched through different knowledge domains including social, natural, human development sciences, comfort and growth and adversities and natural threats (LÓPEZ-MARRERO, 2010). The implication of anthropoid agency although recognized by environmental variation investigation tending to aggregate psycho-social factors and seldom take out the manifold and diverse scopes of agency and capacity (Campos-Guzmán et al., 2019).

It has been a matter of recent discussions that at which grade the World Heritage List imitates the multiplicity of heritage types. Although geographic, environmental and typological inequities for over a decade have been identified by the World heritage Committee but their comprehensive policy and present reviews of its application miss the mark to address a diverse kind of gap that is the comparative lack of heritage spots by negative association. The sites may be understood by a cluster as observing conflict and distress are referred to as negative heritage (Young, 2008).

The list may be unsuccessful to reflect the disputed nature of heritage in the essence of upholding a diversified relationship to the past which promotes questioning about its educational worth as an archive, the world Heritage Convention’s upkeep of alternate memoirs and several previous and historical

explanations (Young, 2008). Tending to be interconnected and at time in unanticipated ways, global environmental problems do not happen in remoteness (Polasky, 2001). So, conceptualizing the universal environmental system as a multifaceted adaptive arrangement is comparatively a useful approach than to be considered in simple system (Norberg & Cumming, 2008).

Sustainable management and conservation along with the development of vacation industry has caught attention to be a dominant plans in the arena of heritage managing in contemporary world together with the diverse ideals of heritages and the safeguard of which are rationale (Genet & Kebede, 2021). The concerning, composite and devoted global concepts of World Heritage and Sustainable Development are operating interconnected and at rising phase of the development at sub-national levels of World Heritage Sites across the world (Taruvinga & Taruvinga, 2020). The natural and cultural sites of outstanding universal values (OUV) are defined as World Heritage and are liable to be protected legally by multinational treaties. The criteria for including and keeping these sites in World Heritage List has been provided by the World Heritage Convention of 1972 (Meskell, 2013).

The conservation of such listed sites aimed at the benefits of human society (Pendlebury et al., 2004). Sustainable Development, on the other hand, referred as the development for meeting the essentials of existing but with no compromise on the capability of future age groups for meeting their own needs (Appendino, 2017). The conservation of heritage sites and sustainable development both can be implemented following strategies, principles and guidelines recognized by a wider range of stakeholders. Both notions i.e. World Heritage and Sustainable Development have recent and advanced functionalities but the earlier seems to be given extra emphasis than the later in their solicitation to heritage management (Job et al., 2017).

Both make a strong relationship which is continuously growing and can deeply be understood further by empirical analysis of their concerned applications at local and sub-national levels (Norberg & Cumming, 2008). Dogmatic undercurrents are over and over again unnoticed in assessment of environmental governance but new evidences explain that the interactions among global establishments and national governments result in shaping the environmental governance with upshot of 238 World heritage ecosystems under the world heritage convention between 1972 and 2019 (Morrison et al., 2020). Analysis of political dynamics in the governance of environmental issues including heritage sites delivers outlines of fruitful and counterproductive subtleties which may yield lessons to improve the environmental governance of heritage across the globe (Nurse-Bray & Rist, 2009).

To ease assignation through various theoretical philosophies, opinions of coalition between the 'ecosophical' viewpoints shared by Deleuzo-Guattarian post-humanism and by original thought, now represented by the expressivity thinking of Ngarrindjeri Yannarumi or 'Speaking as Country' are expanded. Homegrown ideas of existential interconnectivity fight modest combination

into the Western 'post'-humanism that they indeed lead by epochs; in its place they underwrite renewed substantial for an additional multiethnic or internationally eco-sophical (and so not as much of Eurocentric), non-humanist conceptualization of humanity and about its civilization. Debating the humanist dogmatic ontology subtending the neoliberal-capitalist view of 'service benefit', which notifies ample fashionable strategy for environmental governance, bearing in mind in what way the 'three ecologies' labelled by F'elix Guattari outline an interactive ontology of multifaceted co-implication that is Spinozist in its stimulus and is distinguishing of current Mainland post-humanism. The Native Ngarrindjeri Realm in Southern Australia take initiated a procedure of eco-friendly policy reform by collaborating an old-style thinking of environmental comfort and prioritizing this in contemporary governmental discussions regarding the liable administration of the Nation. An empathetic of humanoid accountability for deed understanding and unified advantage is obvious in the Ngarrindjeri Nation's determined for self-governance of their societal, financial and environmental businesses, and is work out transversally in the three collaborating ecologies of self, society and nature (Bignall et al., 2016).

The challenge of global environmental stewardship in 21st century can be addressed by key of environmental governance in perspective of sustainability using philosophies and concepts from the larger extent of commons. Multilevel governance can be enabled by common institutions which also play a key role in local participation in policy viz-a-viz decision making. The mixture of different regimes including sub-national, national, regional and global commons cannot be merely stated as the state-owned assets and the private property management (Dietz et al., 2003). The question is to bringing the governance closer to commons whose means of support are being affected by the conclusions (Martin, 2021). The public and local institutions should be given a heard in decision making process and opportunity to utilize their traditional and local wisdom to speed up the adaptive governance (Dietz et al., 2003; Job et al., 2017)). Further and advanced discussions concerning the homogenization of the understandings of heritage and of the relevancy of the list for local individualities and plans, with a mechanism of theoretical and geographic boundary making will help out in the development of site nomination (Young, 2008).

CONCLUSION

The natural catastrophe and damages to cultural and natural heritage are inevitable but the detrimental impacts can be mitigated if appropriate institutional arrangements are made. There are several gaps revealed in the regulatory institutions particularly governing the cultural heritage. The fast-changing worldwide characteristics need necessary adaptive governance which should be operationalized with a consideration of environment and heritage together because of mutual linkage and co-evolutionary interdependence of social and ecological systems. Governance for protection of environment, cultural and natural heritage got attention after World Heritage Convention followed by World Heritage Programme of UNESCO. The convention of protection of cultural and natural heritage requires states parties should review and reinforce governance frameworks within

management systems of World Heritage properties taking into account the environmental aspects. The protection of world cultural and natural heritage is also provided under environmental protection laws worldwide including Pakistan, which forms a nexus between environmental governance and heritage governance. It is a matter of grave concern that the World Heritage Governance at global level has not been studied in terms of socio-environmental and policy safeguards. While, relevant policy instruments changed from time to time thus acting as limiting factors for the protection and preservation of world cultural and natural heritage sites. Environmental protection laws of two sub-national units in Pakistan cover such sites and other do not even, where UNESCO Heritage sites are located. The environmental governance for protection of cultural and natural heritage in Pakistan became critical after 18th amendment in national constitution of Pakistan in 2010.

REFERENCES

- Appendino, F. (2017). Balancing Heritage Conservation and Sustainable Development - The Case of Bordeaux. *IOP Conference Series: Materials Science and Engineering*, 245(6), 062002. <https://doi.org/10.1088/1757-899X/245/6/062002>
- AtKisson, A. (2009). *A Global Green New Deal for Climate, Energy, and Development*.
- Bignall, S., Hemming, S., & Rigney, D. (2016). Three Ecosophies for the Anthropocene: Environmental Governance, Continental Posthumanism and Indigenous Expressivism. *Deleuze Studies*, 10(4), 455–478. <https://doi.org/10.3366/dls.2016.0239>
- Campos-Guzmán, V., García-Cáscales, M. S., Espinosa, N., & Urbina, A. (2019). Life Cycle Analysis with Multi-Criteria Decision Making: A review of approaches for the sustainability evaluation of renewable energy technologies. In *Renewable and Sustainable Energy Reviews* (Vol. 104, pp. 343–366). Elsevier Ltd. <https://doi.org/10.1016/j.rser.2019.01.031>
- Conejos, S., Langston, C., Chan, E. H. W., & Chew, M. Y. L. (2016). Governance of heritage buildings: Australian regulatory barriers to adaptive reuse. *Building Research and Information*, 44(5–6), 507–519. <https://doi.org/10.1080/09613218.2016.1156951>
- Crowther, & Lancaster. (2012). *Research Methods* (2nd ed.).
- Dietz, T., Ostrom, E., & Stern, P. C. (2003). The Struggle to Govern the Commons. In *Science* (Vol. 302, Issue 5652, pp. 1907–1912). American Association for the Advancement of Science. <https://doi.org/10.1126/science.1091015>
- Duit, A., Galaz, V., Eckerberg, K., & Ebbesson, J. (2010). Governance, complexity, and resilience. In *Global Environmental Change* (Vol. 20, Issue 3, pp. 363–368). Pergamon. <https://doi.org/10.1016/j.gloenvcha.2010.04.006>
- Ferreira, J. C., Vasconcelos, L., Monteiro, R., Silva, F. Z., Duarte, C. M., & Ferreira, F. (2021). Ocean Literacy to Promote Sustainable Development Goals and Agenda 2030 in Coastal Communities. *Education Sciences*, 11(2), 62. <https://doi.org/10.3390/educsci11020062>
- Genet, A., & Kebede, M. (2021). Collections, local interactions, conservation

- and tourism aspects of monastic heritage sites in the Lake Tana region of Ethiopia: the case of Mandeba Medahinealem Monastery. *Journal of Cultural Heritage Management and Sustainable Development*. <https://doi.org/10.1108/JCHMSD-02-2020-0026>
- Hassan, Z. binti A., Jailani, M. A. K. bin, & Rahim, F. A. (2014). Assessing the Situational Analysis of Heritage Tourism Industry in Melaka. *Procedia - Social and Behavioral Sciences*, 130, 28–36. <https://doi.org/10.1016/j.sbspro.2014.04.004>
- Job, H., Becken, S., & Lane, B. (2017). Protected Areas in a neoliberal world and the role of tourism in supporting conservation and sustainable development: an assessment of strategic planning, zoning, impact monitoring, and tourism management at natural World Heritage Sites. *Journal of Sustainable Tourism*, 25(12), 1697–1718. <https://doi.org/10.1080/09669582.2017.1377432>
- Khayam, & Ahmad. (2020). Decentralization of Environment in Pakistan: Issues in Governance. *Policy Perspectives*, 17(2), 101. <https://doi.org/10.13169/polipers.17.2.0101>
- Klein, U., & Müller, H. (2012). Humans and environment: cause and effect analysis supported by spatial data infrastructures. *FIG Working Week, Rome*.
- Kotzé, L. J. (2020). Earth system law for the Anthropocene: rethinking environmental law alongside the Earth system metaphor. *Transnational Legal Theory*, 11(1–2), 75–104. <https://doi.org/10.1080/20414005.2020.1776556>
- Kreft, S., & Eckstein, D. (2013). Global Climate Risk Index 2014. *Germanwatch*, 28.
- Leshikar-Denton, M. E. (2010). Cooperation is the Key: We Can Protect the Underwater Cultural Heritage. *Journal of Maritime Archaeology*, 5(2), 85–95. <https://doi.org/10.1007/s11457-010-9068-8>
- LÓPEZ-MARRERO, T. (2010). An integrative approach to study and promote natural hazards adaptive capacity: a case study of two flood-prone communities in Puerto Rico. *Geographical Journal*, 176(2), 150–163. <https://doi.org/10.1111/j.1475-4959.2010.00353.x>
- Manglis, A., Fourkiotou, A., & Papadopoulou, D. (2021). The accessible underwater cultural heritage sites (AUCHS) as a sustainable tourism development opportunity in the Mediterranean region. *Tourism*, 68(4), 499–503. <https://doi.org/10.37741/T.68.4.9>
- Martin, J. B. (2021). Harnessing Local and Transnational Communities in the Global Protection of Underwater Cultural Heritage. *Transnational Environmental Law*, 10(1), 85–108. <https://doi.org/10.1017/S2047102520000369>
- Meskill, L. (2013). UNESCO's World Heritage Convention at 40. *Current Anthropology*, 54(4), 483–494. <https://doi.org/10.1086/671136>
- Morkūnaitė, Ž., Kalibatas, D., & Kalibatiene, D. (2019). A bibliometric data analysis of multi-criteria decision making methods in heritage buildings. *Journal of Civil Engineering and Management*, 25(2), 76–99. <https://doi.org/10.3846/jcem.2019.8315>
- Morrison, T. H., Adger, W. N., Brown, K., Hettiarachchi, M., Huchery, C., Lemos, M. C., & Hughes, T. P. (2020). Political dynamics and

- governance of World Heritage ecosystems. *Nature Sustainability*, 3(11), 947–955. <https://doi.org/10.1038/s41893-020-0568-8>
- Naelul, N., & Ridwan, H. (2018). *The Importance of Empowering Local Community in Preserving Underwater Cultural Heritage in Indonesia: Case Study in Tulamben, Bali and in Taka Kappala, Selayar-South Sulawesi I*.
- Norberg, J., & Cumming, G. (2008). *Complexity Theory for a Sustainable Future Jon Norberg, Graeme Cumming - Google Books*.
- Nurse-Bray, M., & Rist, P. (2009). Co-management and protected area management: Achieving effective management of a contested site, lessons from the Great Barrier Reef World Heritage Area (GBRWA). *Marine Policy*, 33(1), 118–127. <https://doi.org/10.1016/j.marpol.2008.05.002>
- Parthesius, R. (2011). Shared Heritage? Shared Responsibility? Reflections of the role of “sahred” colonial heritage within capacity building programs in the postcolonial world. *The 2011 Asia-Pacific Regional Conference on Underwater Cultural Heritage Proceedings*.
- Pendlebury, J., Townshend, T., & Gilroy, R. (2004). The conservation of english cultural built heritage: A force for social inclusion? *International Journal of Heritage Studies*, 10(1), 11–31. <https://doi.org/10.1080/1352725032000194222>
- Phillips, H. (2015). The capacity to adapt to climate change at heritage sites- The development of a conceptual framework. *Environmental Science and Policy*, 47, 118–125. <https://doi.org/10.1016/j.envsci.2014.11.003>
- Polasky, S. (2001). Fragile Dominion: Complexity and the Commons. *American Journal of Agricultural Economics*, 83(1), 246–247. <https://doi.org/10.1111/1467-8276.t01-1-00151>
- Śladowski, G., & Paruch, R. (2017). Expert Cause and Effect Analysis of the Failure of Historical Structures Taking into Account Factors That are Difficult to Measure. In *Archives of Civil Engineering* (Vol. 63, Issue 2, pp. 165–186). De Gruyter Open Ltd. <https://doi.org/10.1515/ace-2017-0023>
- Spennemann, D. H. R., & Graham, K. (2007). The importance of heritage preservation in natural disaster situations. *International Journal of Risk Assessment and Management*, 7(6–7), 993–1001. <https://doi.org/10.1504/IJRAM.2007.014670>
- Stone, P. G. (2015). The Challenge of Protecting Heritage in Times of Armed Conflict. *Museum International*, 67(1–4), 40–54. <https://doi.org/10.1111/muse.12079>
- Taruvinga, P., & Taruvinga, P. (2020). World Heritage, Sustainable Development, and Africa. In *Oxford Research Encyclopedia of Anthropology*. Oxford University Press. <https://doi.org/10.1093/acrefore/9780190854584.013.240>
- Yin, R. (2015). *Qualitative Research from Start to Finish: Second Edition*.
- Young, O. (2008). *The Institutional Dimensions of Environmental Change | The MIT Press*.