



Environmental and Social Management Framework (ESMF)



Pakistan Hydro-Meteorological and DRM Services Project

Pakistan Meteorological Department
National Disaster Management Authority

Executive Summary

Background

Climate change is expected to have an adverse impact on Pakistan, as it ranks 7th on the climate risk index. It continues to be one of the most flood-prone countries in the South Asia Region (SAR); suffering US\$18 billion in losses between 2005 and 2014 (US\$10.5 billion from the 2010 floods alone), equivalent to around 6% of the federal budget. Hydromet hazards have been coupled with rapid population growth and uncontrolled urbanization, leading to a disproportionate and growing impact on the poor.

To build on recent development gains, increase economic productivity, and improve climate resilience, it will be critical to improve the quality and accessibility of weather, water, and climate information services. Climate-resilient development requires stronger institutions and a higher level of observation, forecasting, and service delivery capacity; these could make a significant contribution to safety, security, and economic well-being. The Pakistan Hydro-Meteorological and DRM Services Project (PHDSP) expects to improve hydro-meteorological information and services, strengthen forecasting and early warning systems, and improve dissemination of meteorological and hydrological forecasts, warnings and advisory information to stakeholders and end-users and strengthen the existing disaster risk management (DRM) capacity and services of the National Disaster Management Authority (NDMA).

Project Description

The project has three main components and will be implemented over a period of five years.

Component 1: Hydro-Meteorological and Climate Services

The objective of this component is to improve the capability and thereby performance of the PMD to understand and make use of meteorological and hydrological information for decision making. This objective will be achieved, in line with international best practices, through investment in strengthening institutional setup and building capacity of human resources at the PMD. The Concept of Operations (CONOPS) is an important tool for PMD which will provide a conceptual overview of the proposed system and sub-systems.

Component 2: Disaster Risk Management

This project component will support implementation of the priorities identified in the National Disaster Management Plan, NDMP Road-Map 2016-2030 and the Sendai Framework for Disaster Risk Reduction. Under this component, capacity enhancement of NDMA will be prioritized. NDMA will be responsible for implementation of the project and coordination with the key stakeholders, for project initiation and implementation of activities. Key stakeholder will be involved from the initial phase. The main activities of this component will focus on strengthening capacity of NDMA through increased emergency response capacity, construction of DM complex that will house offices, NEOC, NIDM and the NDRF, reviewing the existing DRM system in the country and conducting hazard assessments in priority district.

Component 3: Contingency Emergency Response Component

This component will support preparedness and rapid response to a natural disaster, emergency, and/or catastrophic event as needed. The provisional zero cost for this component will allow for rapid reallocation of credit proceeds from other components under streamlined procurement and disbursement procedures. Following an adverse natural event that causes a major natural disaster, the Government of Pakistan may request the Bank to re-allocate project funds to this

component to support response and reconstruction. This component could also be used to channel additional funds should they become available as a result of the emergency.

Need for the Environmental and Social Management Framework (ESMF)

In line with the environmental legislation of Pakistan as well as World Bank (WB) Operational Policies, an Environmental and Social Management Framework (ESMF) for the project has been prepared. This ESMF assesses environmental and social impacts related to the physical interventions to expand facilities at PMD offices, build NDMA Headquarters, and install Automatic Weather Stations (AWS) across Pakistan. The ESMF outlines an Environmental and Social Management and Monitoring Plan (ESMMP) as well as a Resettlement Policy Framework (RPF) to address any adverse potential impacts as a result of this Project. The ESMF includes institutional arrangements required to implement environmental and social aspects and presents monitoring requirements for effective implementation of mitigation measures; describes training needs and specific reporting and documentation requirements; and proposes a third-party validation mechanism. The national regulatory laws and World Bank Operational Policies applicable to this project are detailed in this ESMF.

Assessment of Environmental and Social Baseline

Physical Location and Land Use

The project will be implemented in Islamabad Capital Territory, and Punjab, Sindh, Balochistan and KPK provinces of Pakistan. The project infrastructure development includes the establishment of a Monsoon Monitoring Center (MMC) in Islamabad as well as upgradation of PMD facilities in Lahore by constructing a Weather Surveillance Radar (WSR). 5 Regional Flood Forecasting Centers (RFFC) will also be established, as well as a Disaster Management Complex including construction of NDMA headquarters that will host National Institute of Disaster Management (NIDM), National Emergency Operations Center (NEOC) and NDRF Facility. The exact locations of these facilities as well locations of additional infrastructure development related to the installations of Automatic Weather Stations (AWS) and SWR will be finalized in the second phase of the project.

The MMC and WSR in Islamabad and Lahore will be built within the premises of the Pakistan Meteorological Department (PMD) office complexes. Environmental and Social Management Plans (ESMPs) for these have been prepared by PMD. ESMPs for the other sub-projects will be prepared when locations have been identified.

Surface and Ground Water Hydrology

Pakistan can be divided into three main units in terms of hydrology, Indus Basin, closed basin of Kharan desert and the Makran coastal basin. Groundwater availability is limited in Pakistan and poses a severe problem for water supply. Worst affected are the most arid regions of Balochistan and the southeast of Pakistan.

Natural Hazard Vulnerability

National Seismic Monitoring Centre of Pakistan issued the seismic zone map for Pakistan. Parts of KPK Province, Federally Administered Areas, Balochistan and Sindh fall in Zones 3 and 4 which indicate moderate to severe damage to infrastructure and topography from earthquakes.¹

¹ National Seismic Monitoring Center, Pakistan Meteorological Department (PMD)

The entire country is prone to floods, particularly along the Indus River Basin, with major flooding experienced in 2010 and 2015. Sub-projects may be installed in areas that are prone to flooding.

Ecological Environment

Pakistan has a rich natural heritage of biodiversity due to diverse physiography, soil types, and climate. Terrestrial biomes of Pakistan range from deserts in the south to the mountain ranges of the Himalayas, Karakorum, and Hindu Kush in the north and west. Pakistan can be divided into eleven ecological zones and nine main agro-ecological zones according to distribution of flora and fauna. More than 6,000 flowering species have been recorded in Flora of Pakistan, of which 465 are thought to be endemic and 50 species are on the verge of extinction.²

There are 174 species of mammals, 668 species of birds, 177 species of reptiles, 22 amphibians, 198 freshwater fish species, 788 marine fish species found in Pakistan.³ There are six endemic mammal species in Pakistan. Among them two — the little known woolly flying squirrel (*Eupetaurus cinereus*), found in the northern mountain areas, and the Indus dolphin — are endangered. In birds, two species of pheasants, the western tragopan (*Tragopan melanocephalus*), and the cheer pheasant (*Catreus wallichii*), together with the great Indian bustard (*Ardeotis nigricaps*) are listed as endangered. Of the 177 species of reptiles recorded in Pakistan, 18 are endemic. The IUCN Red List of threatened species lists 45 species of internationally threatened animals occurring in Pakistan. Of these, 4 are critically endangered, twelve are endangered and twenty nine vulnerable. Out of these 45 species, 18 are mammals, 17 birds 9 reptiles, and one fish.⁴

Pakistan has a total of 334 Protected Areas which include 28 National Parks, 102 Game Reserves and 99 Wildlife Sanctuaries, with the remaining falling into other categories such as Wildlife Parks and Wildlife Refuges and unclassified.

The Land Use Atlas of Pakistan puts the official estimates of forest cover in Pakistan at 5.4%.⁵ The forests of Pakistan are grouped into five physiognomic classes, conifers (40%), scrub (28%), riverine (7%), mangroves (8%), and plantations (11%).⁶

Socioeconomic Profile

According to 2017 population census reports, the total population of Pakistan is approximately 207 million, with the province of Punjab having the highest population with 110 million, followed by Sindh 48 million, Khyber Pakhtunkhwa 30 million and Balochistan 12 million. Pakistan has one of the lowest literacy rates in the world, and stands 160th among world nations. Overall 55% population including 69% male and 45% female is literate. Agriculture is the main source of income and employment in Pakistan with 42% of the population working in the agriculture, fisheries and forestry sectors. This is followed by 35% employment in services (including government) and 22% in industry and associated jobs.

In Pakistan, the only recognized Indigenous Peoples are the Kailasha, residing in the valleys of Bamburet, Birir and Rambur)of the Ayun Union Council of Chitral district of the province of Khyber Pakhtunkhwa. The Project is anticipated to install an Automatic Weather Station

² Flora of Pakistan; Missouri Botanical Garden and Karachi University

³ Biodiversity in Pakistan: Key issues, 2011

⁴ www.iucnredlist.org

⁵ Government of Pakistan, 2009. Land use Atlas of Pakistan.

⁶ Forestry Sector Master Plan (FSMP) Estimates of Land Use Based on Satellite Imagery Interpretation database

(AWS) at Chitral Airport, which is at a distance of 30-40km via jeepable road from the valleys of the Kailasha. Hence no impacts are anticipated on the Indigenous People of Kailasha.

Stakeholder Consultations

Consultations were carried out at the national level with the Pakistan Meteorological Department. The general feedback from the stakeholders is positive, expressing support for the project. The ESMF also proposes a strategy for keeping the stakeholders' informed and receiving their feedback at various stages of the project through public consultations at the design, construction and operations stage. This will improve the acceptability of the Project by the local community and also ensure their participation in the process of project development. Site specific community level consultations will be carried out during the development of ESMPs for each sub-project.

Impacts Assessment and Mitigation

A detailed assessment has been carried out for potential impacts associated with the project, including those with environmental and social dimensions. The assessment has been done for design, construction and operation phase, and accordingly mitigation measures have been proposed. A detailed Environmental Management and Monitoring Plan (ESMMP) has been proposed which suggests mitigation measures, monitoring parameters and responsibilities.

Impacts associated with biodiversity, air quality, soil, solid waste, electromagnetic fields, labor health and safety, resource use and land acquisition were assessed for design, construction and operations phase. The impacts were found to be moderate to low in nature for Sub-Component 1.2 and Sub-Component 2.2. For these components, most of the impacts are expected during construction phase of the sub-projects. The anticipated impacts are mostly temporary, localized, and reversible in nature, and with the help of appropriate mitigation measures, these potential impacts can be adequately addressed.

The major potential adverse impacts associated with construction to expand PMD facilities and construct the NDMA Headquarters are temporary in nature and related to the soil, noise, air quality, solid waste, increased resource consumption, labor health and safety. Soil erosion and contamination by run-off from construction activities will be avoided through, proper storage of construction materials and proper disposal of contaminated soil. There may also be an impact on air quality from dust and exhaust emissions from soil excavation and movement of heavy vehicles, which will be mitigated by following an Emissions Monitoring Plan. Debris and waste from construction activities may increase the sediment loads into the drainage channels, while accidental leaks/spills of oil/fuel from storage tanks or maintenance vehicles can also pollute surface waters. A Debris Management Plan and proper storage and disposal of construction materials will manage these impacts. Improper waste disposal from the construction site as well as labor camps can lead to various public health concerns including worsened air quality due to waste burning, breeding grounds for vectors, and/or clogging of drains and pollution of subsurface water. A robust solid waste management plan will need to be put in place for construction material as well as for the domestic waste produced by labor camps. Workers' health and safety plan will be prepared for labor, in order to safeguard them from any adverse impacts while handling heavy machinery and toxic material (if any). Construction activities and increased traffic of heavy vehicles may impact public safety of surrounding communities. Proper signage for construction phase, training of construction staff and alternative routes are some of the mitigation measures. Increased consumption of energy and water during construction and operation phase will be managed by including resource efficient building designs and training construction staff on efficient use of water. The MMC and NDMA Headquarters in Islamabad are located in an earthquake prone area. Designs of these facilities

will be made according to the Building Codes of Pakistan with Seismic provision and international best practices to avoid damage caused by earthquakes.

The Environmental and Social Monitoring and Management Plan (ESMMP) provides details on implementing mitigation measures, defines responsibilities and establishes monitoring mechanisms to ensure all environmental and social impacts are dealt with efficiently and in a timely manner.

Resettlement Planning Framework

Involuntary Resettlement may occur if private land acquisition is required or encroachments are to be removed for expansion of PMD facilities, construction of the NDMA Headquarters, and for the installation of Automatic Weather Stations (AWS) in various parts of the country (as a priority, these facilities will be constructed/installed on government owned land). To address the impacts of this, a Resettlement Planning Framework (RPF) has been prepared in accordance with the World Bank Operational Policy on Involuntary Resettlement (OP 4.12). The RPF guides the preparation of Resettlement Action Plans (RAP) in case land acquisition or resettlement may occur. RPF includes measures to inform, consult and provide prompt and effective compensation to all Project Affected Persons (PAPs) for losses of assets attributable directly to the project. The RPF includes details of entitlements as applicable for PAPs losing land, structures, other assets and incurring income/livelihood losses and support through the transition period, and development assistance. These affected persons are eligible for rehabilitation subsidies and for the compensation of lost land, structures and utilities along with loss of livelihood. There will also be special provisions for vulnerable displaced persons.

Institutional Arrangements

The implementation of the ESMF will fall under the overall supervision of the Project Directors of the Project Implementation Units (PIU), housed in the PMD and NDMA. The Project Directors will be responsible for the implementation, monitoring and reporting of the ESMMP through the Environment Safeguards Specialist. The Social Safeguards Specialist will ensure implementation of the RPF and any other social safeguards related measures. They will be assisted by Environment and Social Officers for sub-components and Database/MIS Officers. Detailed roles and responsibilities of the project team are provided in the ESMF.

Monitoring and Reporting

A robust system of internal and external monitoring of the ESMMP and RAP will be required throughout the life of the project. In addition to monitoring by the Environment and Social Safeguards Specialists, the Project Coordinator will play a pivotal role in monitoring implementation of the ESMF especially where technical designs and construction related impacts are involved. In addition, Monitoring and Evaluation Officer can also be requested to conduct random monitoring of construction sites in the project areas, both during construction and operation. Reports of these monitoring visits will be submitted to the Environment Specialist in the PIU.

External Monitoring will be used to ensure that both construction and the operation phase activities have been undertaken in line with the ESMF. Third Party Validation (TPV) exercises, conducted through an independent monitoring agency will be carried out on annual basis to evaluate the overall ESMMP compliance and implementation progress, and to ensure that the mitigation measures are implemented as per the mitigation plan. For the RAP (if required for any sub-project), external monitoring will be carried out twice a year, and its results will be communicated to all concerned PAPs, the PIUs and World Bank through semi-annual reports. Bi-Annual will be compiled by the Environment and Social Safeguards Specialists, and shared

with the Project Directors and World Bank. These reports will provide progress on implementation of mitigation measures, safeguard monitoring, capacity building, and any other Environmental and Social Management and Monitoring Plan (ESMMP) implementation activity carried out during the reporting period, and will propose mid-course correction actions. The Social Safeguards Specialist will prepare monthly reports on social aspects and RAP implementation activities and submit to the Project Director. Quarterly/bi-annual progress reports on RAP progress will be shared with the World Bank.

Capacity Development and Trainings

Capacity building and training of the staff associated with ESMF and RAP implementation will be required for effective environmental and social management. Specific trainings on environmental impacts and mitigation will be arranged for the relevant PIU staff to deliver their monitoring responsibilities in an organized and effective manner as per requirement of the monitoring plan. Trainings will also be held for contractors, sub-contractors, architects, supervision consultants and local authorities.

Budget for ESMF Implementation

A budget for implementation of the ESMF has been proposed. This includes human resources, capacity development and training costs over the course of the project, PPE and maintenance, consultants, environmental testing, preparation of additional environmental management instruments, and budget for External Monitoring/Third Party Validations. The total budget for these activities set in the ESMF is **PKR 139 Million** over the course of the project. The budget for resettlement and financing will be calculated when detailed RAPs are prepared in line with this ESMF.

Grievance Redress Mechanism

The Grievance Redress Mechanism spans the entire project implementation and will cater to both directly and indirectly affected population/beneficiaries. The GRM has been designed to address environmental and social problems identified during implementation, it will also cater to manage any disconnects that emerge from the field level and that has significant implications for effective implementation of the sub-project interventions. The Project Implementation Unit (PIU) office will serve as the secretariat for the Grievance Redress Committee (GRC-Project) that will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring of complaints management. The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the local level. The GRM will be accessible to diverse members of the community, including women, senior citizens and other vulnerable groups. Culturally appropriate communication mechanisms will be used at all sub-project sites both to spread awareness regarding the GRM process as well as complaints management.

Disclosure

The ESMF and RPF will be disclosed on the websites of PMD and NDMA, and on the World Bank Info Shop. Hard copies of this ESMF and RPF will also be shared with the Federal and Provincial Environmental Protection Agencies (EPA), project stakeholders, contractors, Civil Society Organizations etc. A copy of the ESMF and RPF will be placed in the Project Implementation Units, PMD and NDMA for public access. The Urdu translation of the Executive Summary of the ESMF will also be distributed to all relevant stakeholders, especially to the communities in the project areas.

List of Acronyms

AWS	Automatic Weather Station
CC	Construction Contractor
DRM	Disaster Risk Management
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FFD	Flood Forecasting Division
GDP	Gross Domestic Product
HSE	Health, Safety and Environment
IEE	Initial Environmental Examination
IEE	Initial Environmental Assessment
IFC	International Finance Corporation
MHVRA	Multi Hazard Vulnerability Risk Assessment
MMC	Monsoon Monitoring Center
NCS	National Conservation Strategy
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NEAP	National Environmental Action Plan
NEOC	National Emergency Operations Cell
NEP	National Environmental Policy
NEQS	National Environment Quality Standards
NGO	Non-Government Organization
NIDM	National Institute of Disaster Management
NIHL	Noise Induced Hearing Loss
NOC	No Objection Certificate
PDMA s	Provincial Disaster Management Authorities
PEPA 97	Pakistan Environmental Protection Act, 1997
PEPC	Pakistan Environmental Protection Council
PID	Provincial Irrigation Departments
PIU	Project Implementation Unit
PMD	Pakistan Meteorological Department
PNS	Pakistan National Committee
Pvt	Private
Radar	Radio Detection and Ranging
RAP	Resettlement Action Plan
RF	Radio Frequencies
SAR	Specific Absorption Rate
USAR	Urban Search & Rescue Teams
WAPDA	Water and Power Development Authority
WSR	Weather Surveillance Radar

List of Units

°C	Degree Celsius
cm	Centimetre
db	Decibels
Kg	Kilogram
Km	Kilometer
m	Meter
µg/m³	Microgram per cubic meter
%	Percent
W/kg	watts per kilogram
mW/m²	milliwatts per square metre

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Chapter 1. Introduction

1.1. Background

Over the last two decades Pakistan has made considerable progress in reducing absolute poverty and improving shared prosperity, but most of the population remains poor or vulnerable. Between 1991 and 2011 the number of people with an income below \$1.25 per day was more than halved;⁷ and between 2002 and 2011 the percentage of the population below the national poverty level fell from 34.7 to 13.6 percent.⁸ Nonetheless, nearly three-quarters of the population remain poor or vulnerable.

A key dimension of social vulnerability in South Asia is exposure to hydrological and meteorological (hydromet) hazards including storms, floods, and droughts. Across South Asia, the number of disasters has quadrupled over the past four decades, causing over 800,000 deaths and US\$80 billion in damages⁹—equivalent to an estimated 2–6 percent of GDP—and slowing economic growth and poverty reduction.¹⁰ Climate change is expected to have an adverse impact on Pakistan, as it ranks 7th on the climate risk index¹¹. It continues to be one of the most flood-prone countries in the South Asia Region (SAR); it suffered US\$18 billion in losses between 2005 and 2014 (US\$10.5 billion from the 2010 floods alone), equivalent to around 6 percent of the federal budget.¹² Hydromet hazards have been coupled with rapid population growth and uncontrolled urbanization, leading to a disproportionate and growing impact on the poor. The frequency and quantity of precipitation in Pakistan is becoming increasingly unpredictable. The severity of these hazards is likely to be exacerbated due to climate change. By 2030, annual average flood damages are projected to increase five-fold relative to 2010.¹³ In addition, these extreme weather events create vulnerabilities in major natural asset-based sectors.

To build on recent development gains, increase economic productivity, and improve climate resilience, it will be critical to improve the quality and accessibility of weather, water, and climate information services. Climate-resilient development requires stronger institutions and a higher level of observation, forecasting, and service delivery capacity; these could make a significant contribution to safety, security, and economic well-being.¹⁴ The Pakistan Hydro-Meteorological and DRM Services Project (PHDSP) expects to improve hydro-meteorological information and services, strengthen forecasting and early warning systems, and improve dissemination of meteorological and hydrological forecasts, warnings and advisory information to stakeholders and end-users and strengthen the existing disaster risk management (DRM) capacity and services of the National Disaster Management Authority (NDMA). The project has three main components and will be implemented over a period of five years.

⁷<http://documents.worldbank.org/curated/en/886791468083329310/Pakistan-Country-partnership-strategy-for-the-period-FY2015-19>

⁸ Ibid.

⁹ Not including indirect losses.

¹⁰ World Bank Program Brief: South Asia Regional Program on Hydromet, Climate Services and Resilience (2017).

<http://www.worldbank.org/en/region/sar/brief/south-asia-hydrological-and-meteorological-hydromet-resilience-program>

¹¹ Global Climate Risk Index 2017 <https://germanwatch.org/en/download/16411.pdf>

¹² World Bank (2015) *Fiscal Disaster Risk Assessment Options for Consideration: Pakistan*. Chapter 1, page 2.

<https://openknowledge.worldbank.org/handle/10986/21920>

¹³ <http://floods.wri.org/#/country/170/Pakistan>

¹⁴ Upgrading all hydro-meteorological information and early-warning systems in developing countries has been estimated to have the potential to save 23,000 lives annually and provide US\$3–30 billion per year in economic benefits—see Hallegatte (2012). “A Cost Effective Solution to Reduce Disaster Losses in Developing Countries: Hydro-meteorological Services, Early Warning, and Evacuation.” Policy Research Working Paper 6058, World Bank, Washington, DC.

In support of climate change adaptation, the project will improve PMD's capacity to collect and analyze data and inform stakeholders so they can more efficiently use this information in planning and decision-making. While this project will focus its support on DRM, agriculture, and water as its main beneficiaries, many other sectors—including energy, transport, and health—can benefit from improved hydro-meteorological services to promote adaptation to climate change.

1.2. Need for the ESMF/RPF

The project focuses on the improvement of weather and hydrological forecasting processes and numerical prediction systems, and refurbishment of PMD and NDMA offices and facilities. Components 1 and 2 of the project (detailed in Chapter 2) envisage some physical low-scale interventions for the establishment and refurbishment of PMD in Punjab, Sindh, Balochistan and KPK province, establishment of a Disaster Management Complex, and installation of Automatic Weather Stations (AWS) across Pakistan.

The project is assigned as *Category B*, due to the limited environmental and social impacts that could be linked to temporary and localized environmental degradation and social disturbance during civil works. In line with the environmental legislation of Pakistan as well as the World Bank (WB) safeguard policies, an Environmental and Social Management Framework (ESMF) for the project including environmental and social impact studies is prepared for the project sites to mitigate any negative impact. This ESMF assesses environmental and social impacts related to the Project, and outlines an Environmental and Social Management and Monitoring Plan (ESMMP). The ESMF includes institutional arrangements required to implement the environmental actions and presents monitoring requirements for effective implementation of mitigation measures; describes training needs and specific reporting and documentation requirements; and proposes a third-party validation mechanism. The ESMF includes a Resettlement Policy Framework to address any land acquisition and involuntary resettlement that may occur due to the Project.

1.3. Structure of the ESMF

This Environmental and Social Management Framework consists of 12 chapters. Chapter 1 introduces to the project and ESMF, including project background and need for the project. Chapter 2 provides a detailed description of the project, its sub components and analysis of project alternatives. Chapter 3 presents a review of national regulatory frameworks, World Bank Safeguard Policies, environmental codes of practice and international covenants and agreements. Chapter 4 is an assessment of national environmental and social baselines. Chapter 5 provides information on stakeholder consultations conducted for the project, and Stakeholders Consultation Framework. Chapter 6 presents an assessment of potential environmental and social impacts, proposed mitigation measures, and environmental and social management and monitoring plan. Environmental and social screening for sub-projects are included in Chapter 7. Chapter 8 is the Resettlement Policy Framework for possible land acquisition or involuntary resettlement caused by sub-project activities. Chapter 9 presents institutional arrangements including roles and responsibilities for ESMF implementation, monitoring of ESMF and capacity development and training of project team and contractors. Chapter 10 presents the ESMF implementation budget. Chapter 11 is the Grievance Redress Mechanism for stakeholders and general public and Chapter 12 presents Disclosure requirements.

Chapter 2. Project Description

This chapter provides a description of project components and location of the project.

2.1. Project Components

The Pakistan Hydro-Meteorological and DRM Services Project has three main components and will be implemented over a period of five years. The proposed investments are expected to improve the DRM system in Pakistan; enhance capacities of NDMA to respond to disasters and mainstream DRR; improve hydro-meteorological information and services; strengthen forecasting and early warning systems; and improve dissemination of meteorological and hydrological forecasts, warnings, and advisory information to stakeholders and end-users. In support of climate change adaptation, sub components 1.1, 1.2, and 1.3 below will improve PMD's capacity to collect and analyze data and inform stakeholders so they can more efficiently use this information in planning and decision-making. The project components and sub-components are detailed below:¹⁵

2.1.1. Component 1: Hydro-Meteorological and Climate Services

The objective of this component is to improve the capability and thereby performance of the PMD to understand and make use of meteorological and hydrological information for decision making. This objective will be achieved, in line with international best practices, through investment in strengthening institutional setup and building capacity of human resources at the PMD. The Concept of Operations (CONOPS) is an important tool for PMD which will provides a conceptual overview of the proposed system and sub-systems. The component will include following 3 sub-components:

Sub-Component 1.1: Institutional Strengthening, Capacity Building

1.1.A: Institutional strengthening and development of a legal and regulatory framework

1.1.B: Capacity building and training of PMD and main stakeholders

1.1.C: Outreach and public education, awareness raising, marketing

Sub-Component 1.2: Modernization of the Observation Infrastructure, Data Management and Forecasting Systems

This component aims to upgrade and expand the meteorological, agro-meteorological and hydrological observations networks and ensuring that these networks are well functioning and interoperable; modernize data management, communication and information and communication technology (ICT) systems; improve weather and hydrological forecasting processes and numerical prediction systems and refurbish PMD offices and facilities. The bulk of the activities in this component include procurement and installation of goods such as monitoring equipment and ICT. This component will include some physical works that may have environmental and social impacts. The component will include following 5 sub-components:

1.2.A: Technical modernization of the observation networks

¹⁵ For additional details, please refer to the Project Document.

1.2.B: Modernization of PMD data management, communication, and ICT system

1.2.C: Improvement of the weather forecasting process, including numerical weather prediction system

1.2.D: Improvement of hydrological forecasting system, including flood modeling system

1.2.E: Expansion and refurbishment of PMD facilities and offices

Sub-component 1.2A will support the expansion and upgrade of the prioritized stations of the network, expansion of Doppler radar network, restoration of upper air observations, installation of wind profilers, improvement of hydrological stations and systems, and expansion and re-equipment of agro-meteorological network.

Sub-component 1.2E will establish the Monsoon Monitoring Centre in Islamabad, as well as up gradation of Flood Forecasting Division (FFD) to National Flood Forecasting Center (NFFC) and establishment of 5 Regional Flood Forecasting Centers (RFFC). The activities will also include the refurbishment of PMD offices including IMG and FFD. An engineering design and supervision firm will also be engaged through counterpart financing to support this sub-component.

Sub-Component 1.3: Enhancement of the PMD Service Delivery & Building Partnerships with the Private Sector

The objective of this component is to enhance the service delivery system of PMD by introducing public weather and hydrological services and enhancing end-to-end early warning systems and services, including impact forecast and warning services, development of agriculture and climate advisory services, creation of a National Framework for Climate Services, as well as strengthening services for aviation sector. This component will be essential in improving the credibility and penetration of PMD's services to the public and decision makers and potentially generate new sources of revenues in the future. In addition, improving information customization and dissemination to address the needs of consumers is expected to produce climate change adaptation co-benefits in terms of reducing vulnerability and improving preparedness to adverse hydro-meteorological events. Priority target end-users would initially include: (a) agro-meteorological information services, (b) food security; (c) emergency and disaster risk management; (d) water resource management; and (e) aviation. The component will include following 6 sub-components:

1.3.A: Introduction of Public Weather and Hydrological Services (water resources, disaster risk management (DRM), agriculture, irrigation, media, civil aviation, transport, health, energy, etc.)

1.3.B: Strengthening of end-to-end early warning system (EWS) including a regular post-event review process

1.3.C: Introduction of impact-based forecast and warning services in support of operations of DRM and other stakeholders

1.3.D: Development of Agriculture and Climate Advisory Service (ACAS), including drought monitoring

1.3.E: Creation of the National Framework of Climate Services (NFCS)

1.3.F: Strengthening Services for Aviation

Sub-Component 1.4: Project Management, Systems Integration, Monitoring and Implementation Support of PMD

The objective of this component is to develop detailed designs and integration of the modernization with other stakeholder systems—including donors, such as JICA, China and USAID as well as other government departments including PADs, NDMA, PIDs, WAPDA. In order to achieve this objective, the activities will comprise the hiring of a systems integrator to provide procurement and implementation support, guidance, technical advice and support to PMD operations and the overall modernization program, and support for project management, monitoring, reporting and evaluation of sub-components 1.1, 1.2 and 1.3 described above. There are three sub-components:

1.4.A: Assessment of existing systems and design of an optimum composite observation network, forecasting and service delivery processes (weather, climate, and hydrological)

1.4.B: Project management, monitoring, reporting and evaluation of components A, B, and C

1.4.C: Operations and maintenance (O&M) costs

2.1.2. Component 2: Disaster Risk Management

This project component will support implementation of the priorities identified in the National Disaster Management Plan, NDMP Road-Map 2016-2030 and the Sendai Framework for Disaster Risk Reduction. Under this component, capacity enhancement of NDMA will be prioritized. NDMA will be responsible for implementation of the project and coordination with the key stakeholders, for project initiation and implementation of activities. Key stakeholder will be involved from the initial phase. The main activities of this component will focus on strengthening capacity of NDMA through increased emergency response capacity, construction of DM complex that will house offices, NEOC, NIDM and the NDRF, reviewing the existing DRM system in the country and conducting hazard assessments in priority district. The component will consist of the following sub-components:

Sub-Component 2.1: Legal Policy and Institutional Strengthening

This component will primarily focus on strengthening the existing DRM system at the country level through a consultative process led review of the National Disaster Risk Management Framework and the National DRR Policy. This component aims to enhance the capacity of NDMA and the key stakeholders in improved availability of risk information based on quantitative and scientific evidence, DRM capacity building of government officials and increased capacity of NDMA in timely and efficient emergency response. It has seven sub-components:

2.1.A: Review the existing legal disaster risk management framework and policy

2.1.B: Institutional Strengthening for DRM

2.1.C: Strengthening of Disaster Risk Financing Mechanisms

2.1.D: National Disaster Response Force (NDRF)

2.1.E: Strengthening of Urban Search & Rescue Teams (USAR)

2.1.F: Multi Hazard-Vulnerability & Risk Assessment

2.1.G: Analytics and Research on Hazard Impacts

Sub-Component 2.2: Infrastructure for Resilience

This component has the following four sub-components.

2.2.A: Disaster Management Complex including NDMA HQs, NIDM, NEOC & NDRF Accommodation networks :

2.2.B: Establishment of DM Complex

2.2.C: Development of Disaster Management Information System (DMIS)

2.2.D: Investment Framework and pilot activities for resilience infrastructure in the Federal Capital

Sub-component 2.2A involves developing institutional set-up and operational capacity of NDMA through construction of NDMA headquarters that will host National Institute of Disaster Management (NIDM), National Emergency Operations Center (NEOC) and NDRF Facility. The NDMA HQs will be constructed to be disaster and climate resilient, meeting some of its energy needs by alternative energy sources. Consulting services will be involved in undertaking the review and finalization of complex design and supervision of construction. The component will support revamping, strengthening and establishment of Emergency Operations Centers (NEOCs) at federal level. The strengthening of National Emergency Operations Centre (NEOC) at NDMA will be line with the global best practices and lessons learnt tailoring them to fit into the Pakistan context. To ensure coordination and pooling of resources and capacities, the NEOC would be linked with the provinces and districts to provide real time data sharing capabilities. In order to determine and generate early warnings and alerts, the NEOC will be connected to the PMD's joint working desk (as provided under component 1). A training and capacity enhancement plan specifically designed for NEOC staff will also be part of this component. This will further focus on strengthening the capacity of the Government to manage disaster events through: a) an improved system for collecting and processing information related to disaster events for generation and dissemination of early warnings and instructions to communities at risk; and, b) better integrating SOPs and resources at emergency response agencies, fire services personnel, and District governments. Envisaged improvements to early warning systems include enhancing the capacity of NDMA to disseminate information efficiently and timely to the key stakeholders.

Sub-Component 2.3: Project Management

The sub component includes formulation and implementation of awareness and communications strategy which will be undertaken through consulting services. The project will be managed through a Project Implementation Unit (PIU) which will support the NDMA in implementing the project, encompassing: (i) incremental operating costs, including recruitment of additional short- term resources not readily available within the Department; (ii) consultancy costs – including engagement of Project Implementation Support and Supervision Consultant (PISSC); and (iii) expenditures on fiduciary systems, safeguards requirements, and GRM.

2.1.3. Component 3: Contingency Emergency Response Component

This component will support preparedness and rapid response to a natural disaster, emergency, and/or catastrophic event as needed. The provisional zero cost for this component will allow for rapid reallocation of credit proceeds from other components under streamlined procurement and disbursement procedures. Following an adverse natural event that causes a major natural disaster, the Government of Pakistan may request the Bank to re-allocate project funds to this

component (which presently carries a zero allocation of credit proceeds) to support response and reconstruction. The component would hence allow the GoP to request the Bank to re-categorize and reallocate financing from other project components (1 and 2) to partially cover emergency response and recovery costs. This component could also be used to channel additional funds should they become available as a result of the emergency.

2.1.4. Project Area

The project will be implemented in Islamabad Capital Territory, and Punjab, Sindh, Balochistan and KPK provinces of Pakistan. The map of the project area is provided as **Figure 2.1**. Initially the project infrastructure development includes the establishment of Monsoon Monitoring Center Islamabad and Weather Surveillance Radar (WSR) in Lahore, which will be built on existing PMD owned offices. Expansion of other PMD facilities and installation of AWS will most likely be at existing PMD stations and offices or government owned land in Pakistan. NDMA Headquarters in Islamabad will also be constructed, however, this is not anticipated to be in the first phase of the project. The locations of additional infrastructure development will be finalized in the second phase of the project.

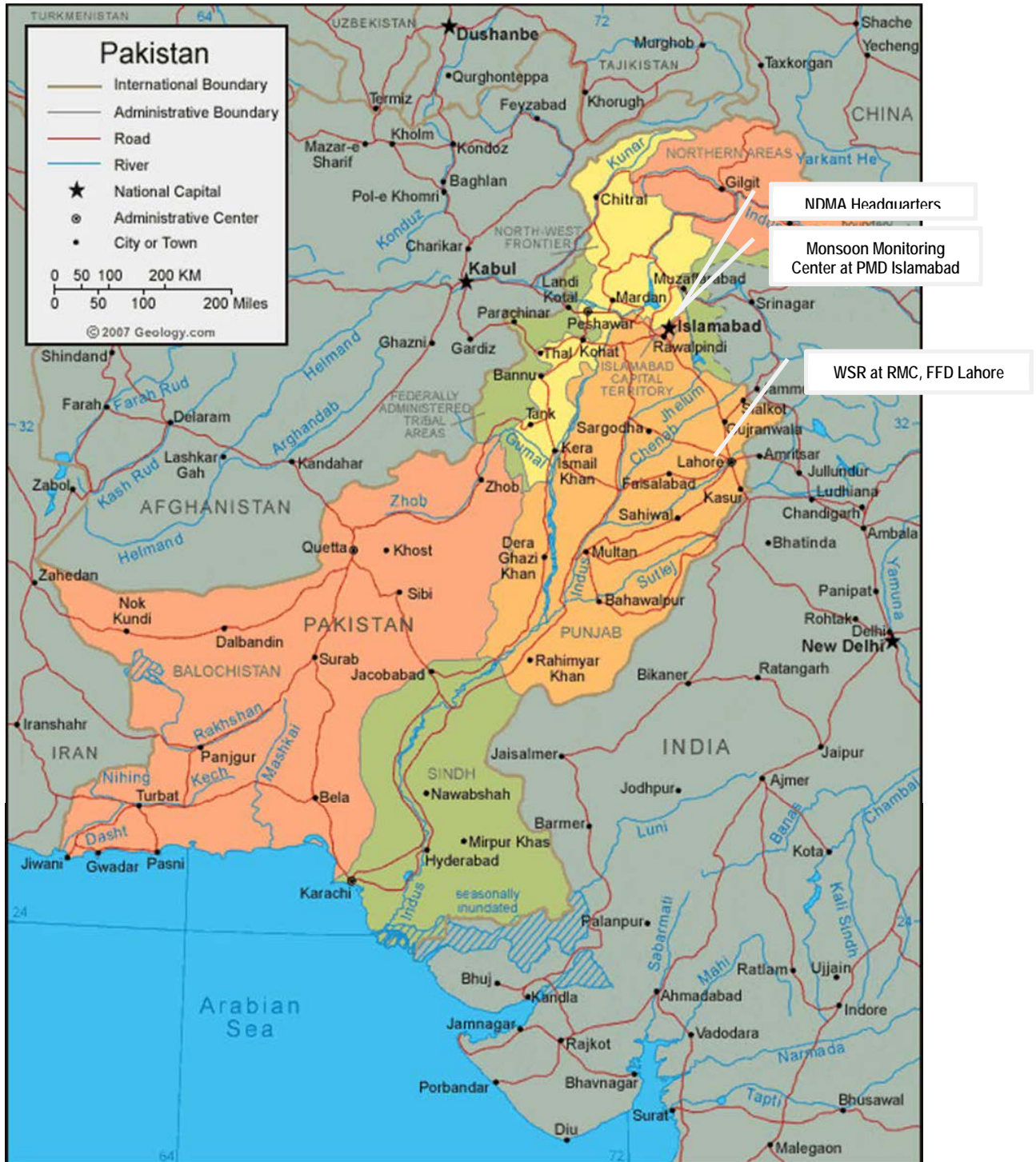


Figure 2.1: Project Area

2.2. Analysis of Project Alternatives

2.2.1. No Project Option

Pakistan continues to be one of the most flood-prone countries in the South Asia Region (SAR); having suffered US\$18 billion in losses between 2005 and 2014 (US\$10.5 billion from the 2010 floods alone), equivalent to around 6 percent of the federal budget.¹⁶ Hydromet hazards have been coupled with rapid population growth and uncontrolled urbanization, leading to a disproportionate and growing impact on the poor. The frequency and quantity of precipitation in Pakistan is becoming increasingly unpredictable. The severity of these hazards is likely to be exacerbated due to climate change. By 2030, annual average flood damages are projected to increase five-fold relative to 2010.¹⁷ In addition, these extreme weather events create vulnerabilities in major natural asset-based sectors.

In view of the vulnerability of the country to multiple disasters and climate-related risks, strengthening of Disaster Risk Management system in Pakistan is considered strategic in assisting the Government to achieve its national and global commitments, especially the Five-Year Development Plan of the Government of Pakistan (GoP), SDGs, Nationally Determined Contributions (NDCs) and the Sendai Framework for Disaster Risk Reduction (SFDRR) which among many other things, emphasize upon disaster-specific resilience in light of risk-informed development. The Project, by enhancing the capacity of PMD and NDMA is likely to contribute to a reduction in economic losses caused by floods and droughts, increase agricultural productivity, and increase efficiency of disaster risk management and food security interventions due to enhanced preparedness of targeted vulnerable communities. It will also provide an opportunity to substantially improve services to the following key sectors of the economy:

Disaster Management

National Disaster Management Authority and Provincial Disaster Management Authorities (PDMAs), the country's early warning system will be enhanced with reliable information. At present manual and rudimentary support is available that leaves enormous scope for diminishing the loss of lives, livelihoods and assets.

Agriculture

The Provincial Agriculture Departments (PADs) will benefit by improved information flow. Different forecast timescales from short-range to seasonal forecasts and agro-meteorological advisories are expected to enhance the productivity of farmers (more optimal planting and harvesting dates, reduced crop failure and post-harvest losses, more optimal use of inputs) leading to significant improvement in food security system;

Energy

Water and Power Development Authority (WAPDA)/Ministry of Water and Power and Provincial Irrigation Departments (PIDs) will gain benefits from installation of Hydrological models applied for data analysis result in more efficient use of hydropower potential.

¹⁶ World Bank (2015) Fiscal Disaster Risk Assessment Options for Consideration: Pakistan. Chapter 1, page 2.

<https://openknowledge.worldbank.org/handle/10986/21920>

¹⁷ <http://floods.wri.org/#/country/170/Pakistan>

Aviation

Improved services will enhance safety and optimize use of fossil fuels for Aviation Division.

Given the project development objective, it should result in strengthening institutional capacity, contribute to a reduction in economic losses and decrease vulnerability through more efficient disaster risk management, increased food security and enhanced preparedness. In case there is no project, the objective of strengthening Disaster Risk Management system in Pakistan to assist the Government to achieve its national and global commitments will not be accelerated, which will result in continued vulnerability and economic losses for the country. Hence no project option sustains the status quo which is not beneficial for the economy, vulnerable communities, and the state.

2.2.2. Project Site Alternatives

Alternative project sites are considered when the project location is sensitive to environmental and/or social impacts associated either to the construction works or due to the operation of the facility constructed. This project currently suggests physical works to install new Weather Surveillance Radar (WSR) in Lahore and construct a Monsoon Monitoring Center and NDMA Headquarters in Islamabad; and proposes the installation of Automatic Weather Stations across the country, the locations of which are not confirmed yet. An analysis of alternative locations for sub-projects locations will be provided in the ESMPs prepared for each specific project site.

Chapter 3. Regulatory Framework

This chapter presents a review of national and provincial regulatory frameworks and the World Bank's safeguard policies. These legislations and safeguard policies, and their relevance to the proposed project, are briefly discussed below.

3.1. Constitutional Provision

Before 18th Amendment in the constitution of Pakistan, the legislative powers were with federal parliament and legislative assemblies of four provinces of Pakistan. If a particular legislation passed by the provincial assembly came into conflict with a law enacted by the national assembly, then according to constitution, the federal legislation will prevail over provincial legislation to extend the inconsistency. The subject of environmental pollution and ecology were in Concurrent Legislative List of the constitution thus allowing both federal and provincial government to enact laws on this subject. However only federal government has enacted laws on environment and the provincial environmental institutions derived their power from federal law.

After the 18th amendment in 2010, the concurrent list has been abolished and a limited number of subjects on the list have been included in the federal legislative list, whereas, the provincial governments have been given powers to legislate on the subjects transferred to provinces. The provision of the 18th Amendment which has a direct impact on the subject of 'Environment' is section 101(3), whereby the Concurrent Legislative List and the entries thereto from 1 to 47 (both inclusive) have been omitted from the Fourth Schedule. The power to legislate and decide on the subject of "environmental pollution and ecology" now lies with the provincial government, however, climate change remains under federal jurisdiction.

3.2. National and Provincial Laws

3.2.1. Environmental Protection Acts

The Pakistan Environmental Protection Act (PEPA) is the apex environmental law in the country, and provides for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and for promotion of sustainable development. Section 12 of the Act requires preparation of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) before commencement of projects likely to cause adverse environmental effects. Immediately after 18th amendment the provinces adopted PEPA 1997 with amendments. Environmental protection acts relevant to the project include following:

1. Pakistan Environmental Protection Act (For Islamabad and Federally Administered Tribal Areas)
2. Punjab Environmental Punjab Environmental Protection Act (Amendment 2012) Sindh Environmental Protection Act 2014
3. Balochistan Environmental Protection Act 2013
4. KPK Environmental Protection Act 2014

The relevant sections of IEE and EIA in provincial acts is given in **Table 3.1.**

Table 3.1: Relevant sections covering IEE and EIA in provincial legislations

EPAs	IEE/EIA Section
Punjab Environmental Protection Act (Amendment 2012)	Section 12
Sindh Environmental Protection Act 2014	Section 17
Baluchistan Environmental Protection Act 2013	Section 15
KPK Environmental Protection Act 2014	Section 13
Pakistan Environmental Protection Act (For Islamabad and Federally Administered Tribal Areas)	Section 12

3.2.2. Environmental Protection Agency Review of IEE & EIA Regulations, 2000

These Regulations define procedures for preparation, review and approval of environmental assessments has been adopted by all the provinces. The projects falling under any of the categories listed in Schedule-I require preparation of Initial Environmental Examination (IEE) report, whereas those falling under categories listed in Schedule-II require preparation of detailed study, the Environmental Impact Assessment (EIA).

The sub-project in component 1.2 and 2.2 requires construction and refurbishment of office building in urban area therefore the project falls in urban development category I of IEE/EIA regulation thus requiring an IEE for Monsoon Research Center and NDMA Complex in Islamabad and Radar Station in Lahore. If an IEE is conducted and submitted to the EPAs, it is shared with public by virtue of law. Therefore, disclosure requirements of both bank and local regulatory requirement will be fulfilled. Apart from that information about different projects under progress are monitored by the M&E Directorate and they publish some data on their website. The IEE/EIA Regulation 2000 is attached as Annexure 1.

3.2.3. Environmental Quality Standards, 2000

The National Environmental Quality Standards (NEQS) have been adopted by all the provincial environmental protection departments/agencies; therefore, it will be followed for the project component 1.2 and 2.2. According to the World Bank policy compliance to all local statutory requirements is compulsory during project execution. NEQS first promulgated in 1993 and have been amended in 1995 and 2000. They have been revised and the latest NEQS were issued in 2010. These standards are also stringent with the International NEQs Regulation.

NEQS for Ambient Air – November, 2010 state the Maximum allowable concentration of pollutants (9 parameters) in gaseous emissions from vehicle exhaust.

NEQS for Drinking Water Quality – 2010 describe the drinking water properties by outlining the defined physical and chemical parameters.

NEQS for Noise – November 2010 states the maximum allowable limit of noise arising from vehicles in decibels (dB) separately for day and night times.

NEQS for Waste Effluents –2000 states the Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment facilities, and the sea.

These standards apply to the gaseous emissions and liquid effluents discharged by construction and post construction activities. The standards for vehicles will apply only during the

construction phase of the subproject. Standards for ambient air quality have also been prescribed. The detailed NEQS are included in Annexure 2.

3.2.4. Forest Protection Laws and Rules

Since the project interventions will be carried out in four provinces including capital territories, the laws and rules relevant for the protection and conservation of forest, fisheries and wildlife in the country are listed below. However at present project sites do not fall in designated forest zones. These regulations will only be applicable in circumstances pertaining to the requirement of the laws.

5. The Forest Act 1927 Amended 2016
6. Hazara Forest Act, 1936.
7. KPK Forest Ordinance 2002
8. Sindh forest Act 2012
9. Balochistan Forest and Wildlife Act 2014
10. Punjab Firewood and Charcoal (Restriction) Act 1964
11. Punjab Forest (Sale of Timber) Act 1913
12. Punjab Plantation and Maintenance of Trees Act 1974
13. Punjab Land Preservation Act

3.2.5. The Antiquities Act (1975)

It ensures the protection of Pakistan's cultural resources. The Act defines "antiquities" as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the GOP to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the project proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Department of Archaeology, GOP, any archaeological discovery made during the course of the project.

3.2.6. The Public Health (Emergency Provision) Act 1954 read with West Pakistan Epidemic Control Act 1958

These two laws cover the presentation and spread of human diseases, safeguarding the public health and providing and maintaining adequate medical services and other services essential to the health of the communities in the project area.

3.2.7. Explosives Act 1884

Under the Explosives Act 1884, the project contractors are bound by regulation on properly and securely handling, transporting and using explosive quarrying, blasting and other purposes.

3.2.8. Labour Law Constitutional Provision

The Constitution of Pakistan contains a range of provisions with regards to labour rights found in Part II: Fundamental Rights and Principles of Policy.

- Article 11 of the Constitution prohibits all forms of slavery, forced labour and child labour;
- Article 17 provides for a fundamental right to exercise the freedom of association and the right to form unions;
- Article 18 proscribes the right of its citizens to enter upon any lawful profession or occupation and to conduct any lawful trade or business;
- Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone;
- Article 37(e) makes provision for securing just and humane conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment.

The acts related to labour laws are Factories Act 1934, Employment of Child Act, 1991 are the most relevant to the project.

3.2.9. Employment of Child Act, 1991

Article 11(3) of the constitution of Pakistan prohibits employment of children below the age of 14 years in any factory, mine, or any other hazardous employment. In accordance with this article, the ECA 1991 disallows such child labor in the country. The ECA defines a child to mean a person who has not completed his/her fourteenth year of age. The ECA states that no child shall be employed or permitted to work in any of the occupations set forth in the ECA (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the act is carried out.

3.2.10. Islamabad Capital Territory Zoning Regulation 2005

The main administrative authority of the city is Islamabad Capital Territory Administration (ICT) with some help from Capital Development Authority (CDA) which oversees the planning, development, construction, and administration of the city. Islamabad Capital Territory is divided into eight zones: Administrative Zone, Commercial District, Educational Sector, Industrial Sector, Diplomatic Enclave, Residential Areas, Rural Areas and Green Area. Islamabad city is divided into five major zones: Zone I, Zone II, Zone III, Zone IV, and Zone V. Zone I consists mainly of all the developed residential sectors.

A. Un-acquired Sectoral Areas in these areas of Zone-1,

- land shall be acquired under a phased program and developed by the Authority in accordance with the land use pattern spelled out in the Master plan;
- no sale/ purchase of land which entails change in land use shall be allowed;
- no construction of houses or buildings shall be allowed. However, repair of old houses and expansion of existing houses may be allowed by the Authority to the native residents subject to the conditions that the site is located within the main body of the village. The covered area of such construction shall not exceed 1000 Square feet including expansion and such permission shall not in any way impede the right of the Authority to acquire the property whenever needed and
- no private scheme of any kind whatsoever shall be allowed, except in sector E-11, Schemes in E-11 will regulated according to the provisions applicable to schemes in Zone-2

This does not apply for the proposed project as the land is already under the ownership of PMD. Zone II consists of the under-developed residential sectors. Zone III consists primarily of the Margalla Hills National Park. Rawal Lake is in this zone. Zone IV and V consist of Islamabad Park, and rural areas of the city. The Soan River flows into the city through Zone V.

3.2.11. Motor Vehicles Ordinance, 1965, and Rules, 1969

The Motor Vehicles Ordinance, 1965, was extended in 1978, to the whole of Pakistan. The ordinance deals with the powers of motor vehicle licensing authorities and empowers the Road Transport Corporation to regulate traffic rules, vehicle speed and weight limits, and vehicle use; to erect traffic signs; and to identify the specific duties of drivers in the case of accidents. It also describes the powers of police officers to check and penalize traffic offenders at the provincial level. At the same time, the ordinance also empowers the Regional Transport Authority to operate as a quasi-judicial body at the district level to monitor road transport, licensing requirements, and compensations for death or injury to passengers on public carriers.

3.2.12. Pakistan Penal Code, 1860

The Pakistan Penal Code deals with offences where public or private property and/or human lives are affected due to the intentional or accidental misconduct of an individual or body of people. In the context of environment, the Penal Code empowers the local authorities to control noise, noxious emissions and disposal of effluents. Chapter XIV, Section 268 to 291 of PPC deals with the offences affecting the public health, safety, convenience, decency and morals. A Person may be guilty of public nuisance if his act or omission causes common injury, danger or annoyance to the public or results in spread of diseases dangerous to life. The section also deals with environmental pollution. Provisions under this Act relating to environment are no longer being enforced after promulgation of the Pakistan Environmental Protection Act, 1997. The NEQS enforced by the EPAs supersede the application of this legislation on industries and municipalities. The Penal Code, however, can provide a basis for the client to coordinate its activities with the local authorities to ensure that its construction activities do not become a cause of public nuisance or inconvenience. Pollution offences can still be tried under the relevant sections of Pakistan Penal Code, 1860, as they have not been specifically repealed by a subsequent legislation.

3.2.13. Building Code of Pakistan (Seismic Provisions-2007)

The Pakistan Engineering Council governs the application of Building Code of Pakistan (Seismic Provisions-2007). Prior to the start of construction the proposed sub project will take design approval from PEC. The obligates following;

- The provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.
- Construction of buildings in violation of the Building Code shall be considered as violation of professional engineering work as specified under clause (XXV) of section 2 of the Act.

The project will comply with the seismic provision during building design.

3.2.14. Provincial Local Government Ordinances, 2001

These ordinances, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety.

3.2.15. Factories Act, 1934

The clauses relevant to the project are those that concern the health, safety and welfare of workers, disposal of solid waste and effluent, and damage to private and public property. The Factories Act also provides regulations for handling and disposing of toxic and hazardous materials. Given that construction activity is classified as 'industry', these regulations will be applicable to the project contractors.

3.2.16. Land Acquisition Act 1894

The Land Acquisition Act (LAA) 1894 is a law for the acquisition of land and implemented to fulfil the needs of government and companies for land required by them for their projects, and secondly, to determine and pay compensation to those private persons or bodies whose land is to be acquired. The experience of the power of acquisition has been limited to a cash compensation policy purposes. The LAA is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as, crops, trees and infrastructure. The LAA does not take into account the rehabilitation and settlement of displaced population and restoration of their livelihoods. Presently, the requisite land for the proposed project is already owned by the project proponent, so that no additional private or government land will need to be acquired for the project. The LAA regulates the land acquisition process and enables the provincial governments to acquire private land for public purposes. Land acquisition is a provincial responsibility and provinces have also their own province specific implementation rules. The LAA and its Implementation Rules require that, following an impact identification and valuation exercise, land and crops are compensated in cash at the current market rate to titled landowners. The LAA mandates that land valuation is to be based on the last 3 to 5 years average registered land-sale rates. However, in several recent cases, the median rate over the past 1 year, or even the current rates, have been applied with an added 15% Compulsory Acquisition Surcharge according to the provision of the law. The project affected persons (PAPs), if not satisfied, can go to the Court of Law to contest the compensation award of the Land Acquisition Collector (LAC). The various sections relating to the land acquisition are briefly discussed.

Section 4 refers to the publication of preliminary notification and power for conducting survey. The Section 5 relates to the formal notification of land for a public purpose and 5 (a) covers the need for inquiry.

Section 6 refers to the Government makes a more formal declaration of intent to acquire land.

Section 7 indicates that the Land Commissioner shall direct the LAC to take order for the acquisition of land. The LAC has then to direct that the land required to be physically marked out measured and planned under Section 8.

Section 9 allows the LAC to give notice to all DPs that the Government intends to take possession of the land. If they have any claims for compensation then these claims are to be made to him at an appointed time, while the Section-10 delegates power to the LAC to record statements of DPs in the land to be acquired or any part thereof as co-proprietor, sub-proprietor, mortgagee, and tenant or otherwise.

Section 11 enables the Collector to make inquiries into the measurements, value and claim and issue the final "award". The award includes the land's marked area and the valuation of compensation and the LAC has made an award under Section 11, LAC will then take possession and the land shall thereupon vest absolutely in the Government, free from all encumbrances. The section 18 reveals that in case of dissatisfaction with the award, DPs may request the LAC to refer the case onward to the court for a decision.

Section 23 refers to the award of compensation for the owners for acquired land is determined at its market value plus 15% in view of the compulsory nature of the acquisition for public purposes, while the Section-28 relates to the determination of compensation values and interest premium for land acquisition.

Section 31 provides that the LAC can, instead of awarding cash compensation in respect of any land, make any arrangement with a person having an interest in such land, including the grant of other lands in exchange.

Section 35 refers to the temporary occupation of arable or waste land subject to the provision of Part VII of the Act. The provincial government may direct the Collector to procure the occupation and use of the same for such term as it shall think fit, not exceeding three years from the commencement of such occupation.

Section 36 provides the information relating to the power to enter and take possession, and compensation on restoration. On the payment of such compensation, or on executing such agreement or on making a reference under Section 35, the Collector may enter upon and take possession of the land, and use or permit the use thereof in accordance with the terms of the said notice.

3.3. World Bank Safeguard Policies

The objective of the World Bank's environmental and social safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. These policies provide guidelines for the bank and borrowers in the identification, preparation, and implementation of programs and projects. Safeguard policies have often provided a platform for the participation of stakeholders in project design, and have been an important instrument for building ownership among local populations.

Table 3.2: Safeguard Policies Applicability

Subject	Policy Reference	Triggered	Remarks
Environmental Assessment	OP/BP 4.01	Yes	The project is categorized as Category B for its envisaged impacts. ESMF is prepared accordingly.
Natural Habitats	OP/BP 4.04	No	This OP is not triggered as project interventions are not likely to be carried out within or near sensitive habitats.
Pest Management	OP 4.09	No	This OP is not triggered as project interventions are not likely to be carried out that require pest management
Forestry	OP 4.36	No	This OP is not triggered since the sub-projects will not be located near or inside the protected forest.
Safety of Dams	OP 4.37	No	This OP is not relevant since the proposed project does not involve construction of dams.
Physical and Cultural Resources	OP/BP 4.11	No	This OP is not triggered as there are no physical or cultural heritage sites within or near the project area.

Subject	Policy Reference	Triggered	Remarks
			However a grave yard is present at a reasonable distance from the project site.
Involuntary Resettlement	OP/BP 4.12	Yes	This OP is triggered as project sites for PMD expansion, NDMA Headquarters and Automatic Weather Stations may require removal of encroachments or acquisition of land from public or private land holders.
Indigenous Peoples	OP 4.10	No	There are no known indigenous people in the project area.
Disputed Areas	OP 7.60	No	Project does not fall in disputed areas
International Waterways	OP 7.50	No	Project does not fall in cross boundary waters
Bank Disclosure Policy	BP 17.50	Yes	Under the policy, the Bank would provide access to more information about projects under preparation, projects under implementation, analytic and advisory activities and Board proceedings

3.3.1. OP /BP4.01 Environmental Assessment

WB requires environmental assessment (EA) of projects proposed for their financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision-making. The borrower is responsible for carrying out the EA. According to World Bank safeguards policies, projects shall be classified as one of the following three categories, depending on the nature and extent of potential environmental and social impacts:

Category A: Projects of this type would have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the physical works.

Category B: A proposed project may have some adverse environmental impacts, but less adverse than those of Category A projects. These impacts are typically site-specific, few if any have irreversible impacts, and in most cases mitigation measures can be readily designed.

Category C: Projects of this type are likely to have minimal or no adverse environmental impacts.

This project is classified as “Category B” as per the WB safeguards category. Under OP 4.01 this ESMF has been prepared which is defined in the OP as “An instrument that examines the issues and impacts associated when a project consists of a program and/or series of sub-projects, and the impacts cannot be determined until the program or sub-project details have been identified.”

Component 2.1 and 2.3 deals with the improvement and construction of office facilities and radar installation, which may potentially cause negative environmental and social impacts. Most of these impacts are likely to be small scale, localized, and reversible in nature. This ESMF has been prepared in accordance with this policy. ESMPs for activities taking place in the first phase of the project have been prepared as separate documents. The World Bank Safeguard Policies are included as **Annexure 3**.

3.3.2. WB OP 4.12 (Involuntary Resettlement)

The WB's experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks. This policy includes safeguards to address and mitigate these risks. The overall objectives of the Policy include:

1. Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs;
2. Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs; and
3. Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The OP has been triggered to guide any land acquisition within the project, as well as to assist in removal of encroachments using entitlements and eligibility. Major resettlement is not anticipated within the Project, however encroachments on public lands are a possibility.

3.3.3. BP 17.50 World Bank Disclosure Policy

The World Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. Accordingly, it is the Bank's policy to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. The WB Disclosure Policy will be applicable for this project. Under the policy, the Bank would provide access to more information about projects under preparation, projects under implementation, analytic and advisory activities and Board proceedings

3.4. Environmental Code of Practices

Environmental Code of Practices (ECoPs) is to address less significant environmental impacts and all general construction related impacts of the proposed project implementation. The ECoPs provide guidelines for best operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues. The list of ECoPs is provided below. Detailed ECoPs can be found in **Annexure 5**.

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Substances Management
- ECP 3: Water Resources Management
- ECP 4: Drainage Management
- ECP 5: Soil Quality Management
- ECP 6: Erosion and Sediment Control
- ECP 7: Borrow Areas Development & Operation
- ECP 8: Air Quality Management
- ECP 9: Noise and Vibration Management
- ECP 10: Protection of Flora

- ECP 11: Protection of Fauna
- ECP 12: Protection of Fisheries
- ECP 13: Road Transport and Road Traffic Management
- ECP 14: Construction Camp Management
- ECP 15: Cultural and Religious Issues
- ECP 16: Workers Health and Safety

3.5. World Bank Guidelines

The principal World Bank publications that contain environmental and social guidelines are listed below.

- Environment, Health, and Safety (EHS) Guidelines prepared by International Finance Corporation and World Bank in 2007
- Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues.
- Social Analysis Sourcebook.

3.5.1. Environmental, Health, and Safety (EHS) IFC General Guidelines

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. The proposed sub project does not fall in the category of sector specific guidelines, therefore; only EHS guidelines will be applicable to the pre-construction, construction and post construction activities. The construction contractor will follow the applicable guidelines.

3.6. International Conventions/Agreements

The following international conventions to which Pakistan is a signatory are relevant to project interventions:

Table 3.3: International Conventions

Category	Convention/convention	Came into force
Chemicals and hazardous wastes conventions	Stockholm Convention on Persistent Organic Pollutants	April 2008
	Rotterdam Convention on the Prior Informed Consent procedures for Certain Hazardous Chemicals and Pesticides in International Trade.	July 2005
	Basel Convention on the control of Trans-boundary Movement of Hazardous Wastes and their Disposal.	July 1994
Atmosphere conventions/protocols	United Nations Framework Convention on Climate Change (UNFCCC)	June 1994
	Kyoto Protocol to UNFCCC	Jan 2005
	Vienna Convention for the protection of the Ozone Layer.	Dec 1992

Category	Convention/convention	Came into force
	Montreal Protocol on Substances that Deplete the Ozone Layer.	Dec 1992
Land / environmental cooperation conventions	United Nations Convention to Combat Desertification (UNCCD) in those Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa.	Feb 1997
Cultural and natural heritage	Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention)	July 1976
Biodiversity related conventions/protocols	Convention on Biological Diversity (CBD).	July 1994
	Cartagena Protocol on Bio-safety to the Convention on Biological Diversity.	March 2009
	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)	Nov 1976
	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).	April 1976
	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Dec 1987

3.7. Gap Analysis of Land Acquisition Act & World Bank Policies

3.7.1. Comparison of LAA and WB Operational Policies

The LAA (1894) and the World Bank Involuntary Resettlement policy OP 4.12 principles specifically related to land acquisition and resettlement aspects compares as given in **Table 3.5** below. The objective of this exercise is to identify if and where the two sets of procedures are in conformity with each other and more importantly where there are differences and gaps. The key World Bank Involuntary Resettlement Policy Principles are:

- the need to screen the project early on in the planning stage,
- carry out meaningful consultation,
- at the minimum restore livelihood levels to what they were before the project,
- improve the livelihoods of affected vulnerable groups (iv) prompt compensation at full replacement cost and provide displaced people with adequate assistance,
- ensure that displaced people who have no statutory rights to the land that they are occupying are eligible for resettlement assistance and compensation for the loss of non-land assets and
- disclose of all reports.

Table 3.4: WB OP 4.12 Involuntary Resettlement & Pakistan Land Acquisition Act

World Bank Involuntary Resettlement Policy Principles	Pakistan's Land Acquisition Act	Approaches to Address the GAPS
Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons,	No equivalent requirements	Screened and categorized. Scope defined, social assessment and

World Bank Involuntary Resettlement Policy Principles	Pakistan's Land Acquisition Act	Approaches to Address the GAPS
including a gender analysis, specifically related to resettlement impacts and risks.		gender analysis undertaken.
Carry out meaningful consultations with affected persons, host communities, and concerned nongovernment organizations. Inform all displaced persons of their entitlements and resettlement options. Ensure their participation in planning, implementation, and monitoring and evaluation of settlement programs. Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous peoples, and those without legal title to land, and ensure their participation in consultations. Establish a grievance redress mechanism to receive and facilitate resolution of the affected persons' concerns. Support the social and cultural institutions of displaced persons and their host population. Where involuntary resettlement impacts and risks are highly complex and sensitive, compensation and resettlement decisions should be preceded by a social preparation phase.	LAC or District Judge (in Case of the Telegraph act) Are the final authorities to decide disputes and address complaints regarding quantification and assessment of compensation for the affected lands and other assets?	Complaints and grievances are resolved informally through project grievance redress mechanisms. Consultations conducted, vulnerable groups identified and supported as relevant.
Improve, or at least restore, the livelihoods of all displaced persons through (i) land-based resettlement strategies when affected livelihoods are land based where possible or cash compensation at replacement value for land when the loss of land does not undermine livelihoods,(ii) prompt replacement of assets with access to assets of equal or higher value, (iii) prompt compensation at full replacement cost for assets that cannot be restored, and (iv) additional revenues and services through benefit sharing schemes where possible.	No equivalent requirements.	Livelihoods restoration is required and allowances are provided. Provided as relevant.
Provide physically and economically displaced persons with needed support	No equivalent requirements.	Support provided to be commensurate with impacts

Chapter 4. Assessment of Environmental and Social Baseline

The chapter describes the baseline information related to the physical, biological and socio-economic environment of the project area of the proposed development.

4.1. Project Area

The project area in the document refers to the area where project interventions and components will be executed. The project area for Pakistan Hydro-Meteorological and DRM Services includes districts of Punjab, Sindh, Baluchistan and KPK province and Islamabad Capital Territory. Map showing the provinces and major cities of Pakistan is provided in **Figure 2.1**. Construction and rehabilitation work has been identified for component 1.2 and 2.2 of the project. As project activities will be across Pakistan, national level environmental and social baselines have been provided in this ESMF. Detailed site specific baselines will be included in Environmental and Social Management Plans (ESMPs) developed for each sub-project.

4.2. Physical Environment

The physical environment includes the abiotic component of the environment on which biological life is dependent to survive. The physical environment of the project area is explained below:

4.2.1. Climate

Pakistan's topographical features range from high mountains in the north to the coastal plains in the south. Climatic divisions of Pakistan include Zone A of highland climate prevailing over northern, north-western and western mountains, Zone B of lowland climate, which prevails over the whole of the Indus Plain, Zone C of coastal climate experienced by the Makran Coast, Karachi Coast and Indus Delta till the Rann of Kutch and Zone D of arid climate that prevails the south-eastern desert and south-western part of Balochistan.

4.2.2. Topography

Pakistan can be divided into three major Physiographic units:

1. northern mountains
2. the western highlands and
3. the Indus plain.

In addition to these three, a relatively small physiographic division comprises Potohar plateau and Salt Range in the Punjab occupying the north-western section of the Indus plain. The vast drainage area of the Indus corresponds roughly to the provinces of Punjab and Sindh. The plain in Punjab varies from about 150 to 300 meters and consists of fine alluvium deposited by the Indus, and its five tributaries, i.e. Jhelum, Chenab, Ravi, Sutlej and Beas. At lower altitude towards south in Sindh, the plain differs in characteristics and is formed by the deposit of only one river, i.e. the Indus and the alluvium here is of more recent character. The Indus plain is bounded on the west by highlands which are lower than northern mountain in altitude and are

also comparatively more arid. The aridity increases in these highlands from KPK Province in the north to the Baluchistan province in the south.

4.2.3. Surface Water Hydrology

Pakistan can be divided into three main units in terms of hydrology, Indus Basin, closed basin of Kharan desert and the Makran coastal basin. The Indus basin covering some 360,000 sq. miles is the largest. Besides its five main tributaries including Jhelum, Chenab, Ravi and Sutlej in the Punjab, the Indus River is also drained by Kabul and its main tributaries from Swat, Chitral and Panijkora as well as Kurrum and Gomal rivers of KPK. The rivers of the closed basin such as Mashkel and Zangi Nawar disappear into lakes such as Hamuni- Mashkel and Haimun-i-Lora. The Makran Coast Rivers, the two principal amongst which are Hingol and Dasht drain into the Arabian Sea east of Indus River.

4.2.4. Natural Hazard Vulnerability

Earthquake

National Seismic Monitoring Centre of Pakistan at the PMD issued the seismic zone map for Pakistan, as shown in **Figure 4.1**. Zone 1-minor to no damage, Zone 2-minor to moderate, Zone 3-moderate to severe and Zone 4 indicates severe damage to the infrastructure and topography. The geotectonic movement of the whole region is related to the collision of the Indian tectonic plate with Eurasian plate and subsequent formation process of the Himalayan Ranges. This tectonic process is the origin of the seismicity along the Himalayas and in particular where northern Pakistan and Kashmir are located.

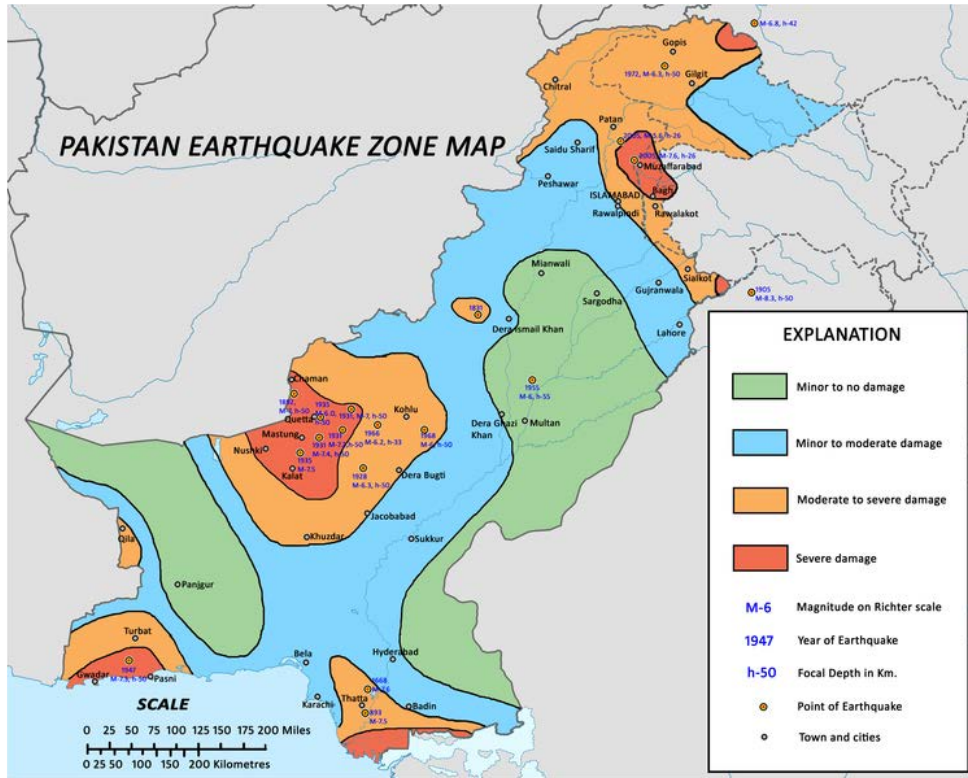


Figure 4.1: Seismic Zones of Pakistan¹⁸

Floods

The project locations for Automatic Weather Stations in various parts of Pakistan will be prone to floods. Floods of 2010 began in late July 2010, resulting from heavy monsoon rains in the KPK, Sindh, Punjab and Baluchistan regions of Pakistan and affected the Indus River basin. Approximately one-fifth of Pakistan's total land area was underwater; the floods directly affected about 20 million people, mostly by destruction of property, livelihood and infrastructure, with a death toll of close to 2,000. Again in 2015 starting from late July, heavy rains continued to fall in northern and eastern Pakistan causing floods. District Chitral in KPK was badly impacted. Over 800,000 people across 2,200 villages in the five affected provinces were displaced¹⁹. **Figure 4.2** is a map indicating the areas of the project most likely to be impacted in case of flood based on the 2010 flooding pattern.

¹⁸ National Seismic Monitoring Center, Pakistan Meteorological Department (PMD)

¹⁹ NDMA Annual Report 2010-www.ndma.gov.pk

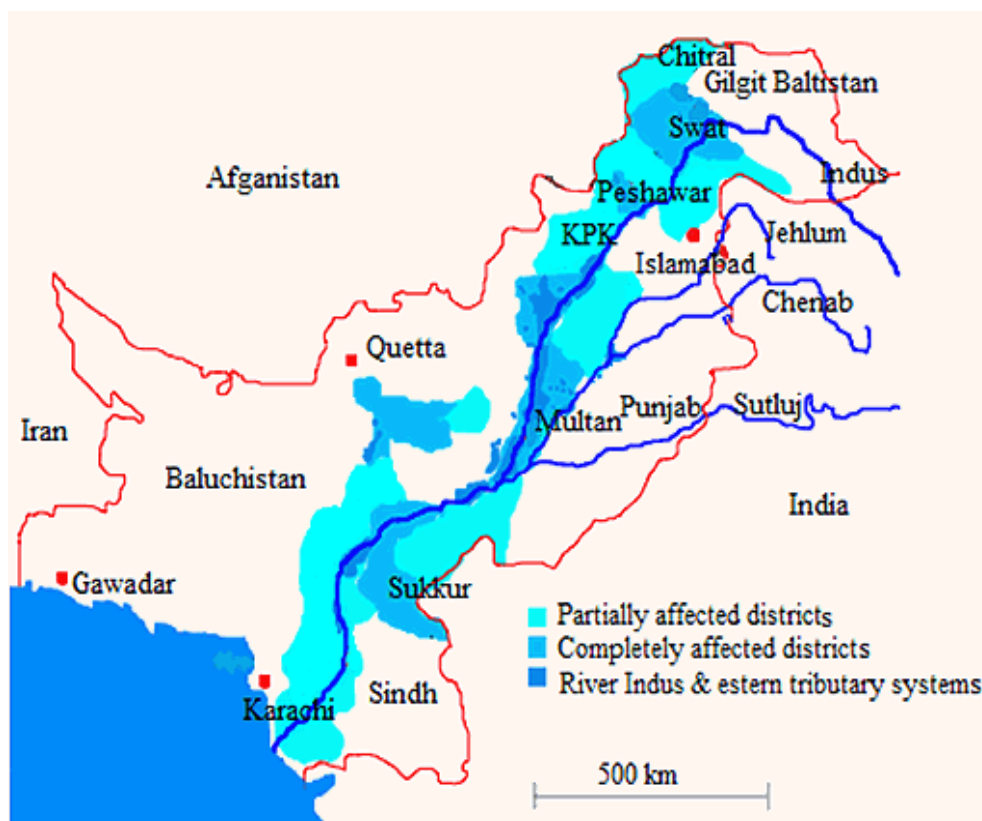


Figure 4.2: Impacted Area of Floods 2010²⁰

4.2.5. Ground Water

Groundwater availability is limited in Pakistan and poses a severe problem for water supply. Worst affected are the most arid regions of Baluchistan and the southeast of Pakistan. Prior to the development of irrigation systems, groundwater tables in the Indus Plain were typically 20-30m below surface, which have now gone down to 30-300m in major cities. The problem is exacerbated by over abstraction of ground water, as quantity has traditionally been a priority over quality in Pakistan. A recent study to investigate groundwater quality and monitoring strategy has indicated a distinct paucity of chemical data²¹. From the limited data available, it appears that the most recognised water quality problem is poor microbial quality within distribution systems which can lead to severe health problems²². High salinity has led to restrictions in resource availability. Excessive fluoride is an additional common problem. Recent well testing of sources within the Indus Plain has also identified some ground waters with unacceptably high concentrations of arsenic, however, the numbers of affected wells recognised is low.

4.2.6. Air Quality and Noise

Air pollution is considered to be a primarily urban problem in Pakistan as the rate of urbanization increases. In rural areas, air quality is considered to have been negatively affected in areas adjacent to industrial estates or isolated industrial plants set up outside city limits.

²⁰ National Disaster Management Authority (NDMA)

²¹ Chilton, P.J., Jamieson, D., Abid, M.S., Milne, C.J., Ince, M.E. and Aziz, J.A. 2001. Pakistan water quality mapping and management project. Scoping study. LSHTM/WEDC Report to DFID.

²² Hina, S. 2000. Bacterial contamination major cause of groundwater pollution. <http://lists.isb.sdnpc.org/pipermail/eco-list/2000/2000-September/000355.html>.

Sufficient data Air Quality Monitoring at a national level is not available for the country, as such work has been done in isolation.²³

4.3. Ecological Environment

4.3.1. Biodiversity

Pakistan has a rich biodiversity due to diverse physiography, soil types, and climate. Terrestrial biomes of Pakistan range from deserts in the south to the mountain ranges of the Himalayas, Karakorum, and Hindu Kush in the north and west. Of the total national land area, 62.7% constitutes wilderness, regions that are neither suitable for agriculture or for commercial forestry.²⁴ Majority of these areas comprising of deserts, arid lands and mountains are either communally owned or state lands with undefined tenure and usufruct rights. Approximately 5.9 million ha of these lands are designated as rangelands.²⁵ Pakistan can be divided into eleven ecological zones and nine main agro-ecological zones according to distribution of flora and fauna.

Up to 174 mammal species have been reported in Pakistan. A high percentage of Pakistan's birds are migratory; over 30% of recorded species are Palaearctic winter visitors. The Sulaiman Range, the Hindu-Kush and the Himalayas in KPK and federally administered areas comprise part of the Western Himalayan Endemic Bird Area.²⁶ As Pakistan is predominantly an arid and semi-arid country, only 22 species of amphibians have been recorded. A number of marine turtle species nest on Pakistan's beaches. Out of 29 endemic fish species, nine are snow trout occurring in northern snow fed rivers. Eighty species of butterflies have been recorded in the northern mountains, many of which are endemic. Almost 80% of Pakistan's endemic flowering plants are confined to the northern and western mountains.²⁷

4.3.2. Flora

More than 6,000 flowering species have been recorded in Flora of Pakistan. Though there is no detailed data available it is estimated that there are 465 endemic species in Pakistan, of which 50 species are on the verge of extinction.²⁸ Five monotypic genera (*Douepia*, *Sulaimania*, *Kurramiana*, *Wendelboa*, and *Spiroseris*), and 400 plant species belonging to 169 genera and 45 families are restricted to the northern and western mountains.²⁹ The flora of Pakistan includes eight species of mangroves, with *Avicennia Marina* being the predominant species.

Of the nearly 5,600 species of vascular plants recorded in Pakistan, around 400 species — 7.1% of the total flora — are endemic. Centres of endemism are in the northern and western mountains at altitudes above 1,200 m where 90% of the endemics are found. Deforestation and overgrazing are threatening the flora of Pakistan and the tree *Ulmus wallichiana* is listed as an

²³ State of the Environment Report, 2005; Pakistan Environmental Protection Agency

²⁴ National Biodiversity Strategy and Action Plan 2015, Government of Pakistan

²⁵ Government of Pakistan, 2005. Forests & Biodiversity Information/Data Report. Ministry of Environment, Government of Pakistan, Islamabad. 60 pp + 5 appendices

²⁶ Biodiversity of Pakistan, TJ Roberts, 1997

²⁷ Biodiversity in Pakistan: Key issues, 2011

https://www.researchgate.net/publication/239936897_Biodiversity_in_Pakistan_Key_issues

²⁸ Flora of Pakistan; Missouri Botanical Garden and Karachi University

²⁹ Ali, S. I. 2008. Significance of Flora with Special Reference To Pakistan. Pak. J. Bot., 40(3): 967-971,

endangered species. There are an estimated 2,000 medicinal plants that could play an important role in the country's economy.³⁰ **Table 4.1** shows the endemic flora of Pakistan.

4.3.3. Fauna

The main wildlife species found in the northern mountainous regions of the Himalayan, Karakorum and Hindukush Ranges are the snow leopard (*Panthera uncia*), the black and the brown bears, otter (*Lutrinae*), wolf (*Canis lupus*), himalayan ibex (*Capra ibex sibirica*), markhor (*Capra falconeri*), bharal (*Pseudois nayaur*), Marco Polo sheep (*Ovis ammon polii*), shapu (*Ovis orientalis vignei*), musk deer (*Moschus*), marmots (*marmot*), western tragopan (*Tragopan melanocephalus*) and monal pheasants (*Lophophorus impejanus*). At lower elevations there is a presence of the Rhesus monkey (*Macaca mulatta*), common langur (*Semnopithecus*), red fox, black bear, common leopard, a variety of cats, musk deer, goral (*Naemorhedus*), several species of flying squirrels, chakor partridge (*Alectoris chukar*) and pheasants (koklass, kaleej and cheer). The Himalayan foothills and the Potohar region, including the Salt Range and Kala Chitta Range, are home to medium-sized animals such as the Punjab urial (*Ovis orientalis*), barking deer, goral, chinkara (*Gazella bennettii*), partridges (grey and black) and chakor. A variety of songbird fauna also occurs in these areas.

Moving south, vast areas of the Indus flood plains have been cleared of natural vegetation for agriculture. These areas are home to the jackal, mongoose, jungle cat, civet cat, scaly anteater, desert cat and the wild hare, as well as the Hog deer in riverine tracts and black and grey partridges. The desert areas of Cholistan and Thar are home to the Chinkara, Grey partridge, species of sand grouse and the Indian courser and pea fowl.

There are six endemic mammal species in Pakistan. Among them two — the little known woolly flying squirrel (*Eupetaurus cinereus*), found in the northern mountain areas, and the Indus dolphin — are endangered. Other threatened species include the Balochistan black bear, (*Ursus thibetanus gedrosianus*), the snow leopard and four ungulates: markhor (*Capra falconeri*), Marco Polo sheep (*Ovis ammon polii*), goitred gazelle (*Gazella subgutturosa*), and urial (*Ovis orientalis*).³¹ Over 177 species of reptiles are known in Pakistan; Chelonia - 14, Crocodilia - 1, Sauria - 90, and Serpentes - 65. Of these, 13 species are believed to be endemic.

Pakistan has 668 bird species of which one third are waterbirds. Majority of these are migratory species, including geese, ducks, swans, waders, and other waterbirds. Species that require urgent conservation attention include the Siberian Crane (*Grus leucogeranus*), the Sarus Crane (*Grus Antigone*), the Dalmatian Pelican (*Pelicanus crispus*), the Sociable Plover (*Vanellus gregarius*), the Lesser White-fronted Goose (*Anser erythropus*), Pallas's Fish Eagle (*Haliaeetus leucorhynchus*), and vultures.²⁷ Pakistan does not have a fully endemic bird species. Two species of pheasants, the western tragopan (*Tragopan melanocephalus*), and the cheer pheasant (*Catreus wallichii*), together with the great Indian bustard (*Ardeotis nigriceps*) are listed as endangered. Two significant populations of the western tragopan are found in the Pallas Valley of Kohistan and the Neelum Valley. Pakistan is the second most important wintering ground for the white-headed duck (*Oxyura leucocephala*).

Of the 177 species of reptiles recorded in Pakistan, 18 are endemic: 13 lizards and 5 snakes. The most distinctive *heptrofauna* is found in the Chaghai desert where 6 endemic species occur. Four species are listed as endangered; the green turtle (*Chelonia mydas*), the olive ridley turtle,

³⁰ Biological Diversity in Pakistan, IUCN, 1997

³¹ National Biodiversity Strategy and Action Plan 2015, Government of Pakistan

(*Lepidochelys olivacea*), the gharial (*Gavialis gangeticus*), and the Central Asian cobra (*Naja oxiana*).³²

The National Biodiversity Strategy and Action Plan of 2015 identifies 198 species of freshwater fish fauna in Pakistan. The fish fauna is predominantly south Asian, with some west Asian and high Asian elements. The fish fauna of the northern areas of Pakistan comprises 20 restricted species. About 140 species of fish fauna, especially warm water fish, is restricted to the Indus plain. Of these, the genus *Schistura* is restricted to sub-mountain areas while the genus *Triplophysa* is mainly confined to high altitude regions. Snow trout are found in the Himalayas, Hindukush, and Karakoram mountain ranges and are not represented in the Indus plain. The coastal areas of Pakistan are nesting grounds of the green turtle (*Cheloniemydas*) and the olive ridley turtle (*Lepidochelys olivacea*).

The number of endemic species and those considered as threatened with extinction is presented in **Table 4.1**. However, there is no consistent analysis of threatened species in Pakistan. The IUCN Red List of threatened species lists 45 species of internationally threatened animals occurring in Pakistan. Of these, 4 are critically endangered, twelve are endangered and twenty nine vulnerable. Out of these 45 species, 18 are mammals, 17 birds 9 reptiles, and one fish. Among the endangered mammals are snow leopards, flare horned markhors, marco polo sheep, ladakh urial, musk deer, brown bear, and woolly flying squirrel. The project interventions are not likely to be carried out in habitats of endangered species of plants and animals according to IUCN Red List³³.

Table 4.1: Endemic and Threatened Species in Pakistan³⁴

Species/Group	Total number reported	Endemic	Threatened
Mammals	174	6	20
Birds	668	N/a	25
Reptiles	177	13	6
Amphibians	22	9	1
Fish (freshwater)	198	29	1
Fish (marine)	788	-	5
Echinoderms	25	-	2
Molluscs (marine)	769	-	8
Crustaceans (marine)	287	-	6
Annelids (Marine)	101	-	1
Insects	>5000	-	

³² Biological Diversity in Pakistan, IUCN, 1997

³³ <http://www.iucnredlist.org>

³⁴ Biodiversity in Pakistan: Key issues, 2011

Angiosperms	5700	380	N/a
Gymnosperms	21	-	N/a
Pteridophytes	189	-	N/a
Algae	775	20	N/a
Fungi	>4500	2	N/a

4.3.4. Protected Areas

Protected Areas are defined as areas dedicated to the protection and maintenance of biological diversity, as well as natural and associated cultural resources. Pakistan has a total of 334 Protected Areas which include 28 National Parks, 102 Game Reserves and 99 Wildlife Sanctuaries, with the remaining falling into other categories such as Wildlife Parks and Wildlife Refuges and unclassified. The project interventions are not likely to be carried out in protected areas/ sanctuaries and national parks of Pakistan. **Table 4.2** presents a list National Parks in Pakistan, while **Table 4.3** shows the land areas covered by Protected Areas. The list of game reserves and wildlife sanctuaries is available at [World Database on Protected Areas](#).

Table 4.2: List of National Parks

#	National Park	Established	District(s)	Province
1.	Deva Vatala	2009	Bhimber	Federally Administered Areas
2.	Ghamot	2004	Neelum	
3.	Gurez	2009	Neelum	
4.	Machiara	1996	Muzaffarabad	
5.	Pir Lasura	2005	Kotli	
6.	Poonch River Mahaseer	2010	Kotli, Mirpur and Poonch	
7.	Toli Pir	2005	Poonch	
8.	Panjal Mastan	2005	Bagh District	
9.	Hazarganji-Chiltan	1980	Quetta	Balochistan
10.	Hingol	1988	Awaran, Gwadar and Lasbela	
11.	Shandure-Phander National Park	2012	Ghizer	Federally Administered Areas
12.	Central Karakoram	1993	Gilgit and Skardu	
13.	Deosai	1993	Skardu	
14.	K2	—	Gilgit, Skardu	
15.	Khunjerab	1975	Gilgit	
16.	Qurumber	2011	Ghizer	

#	National Park	Established	District(s)	Province
17.	Broghil Valley	2010	Chitral	KPK
18.	Chitral Gol	1984	Chitral	
19.	Lulusar-Dudipatsar	2003	Mansehra	
20.	Saiful Muluk	2003	Mansehra	
21.	Sheikh Buddin	1993	Dera Ismail Khan	
22.	Ayub	—	Rawalpindi	Punjab
23.	Chinji	1987	Chakwal	
24.	Kala Chitta	2009	Attock	
25.	Lal Suhanra	1972	Bahawalpur	
26.	Margalla Hills	1980	Islamabad, Rawalpindi	
27.	Murree-Kotli Sattian-Kahuta	2009	Rawalpindi	
28.	Kirthar	1974	Dadu	Sindh

Table 4.3: Protected Areas of Pakistan by Province/Territory

Region/ Province	National Parks	Wildlife Sanctuaries	Game Reserves	Un Classified	Total PAS	Total Area Conserve d (ha)
Federally Administered Areas	06	06	18	00	30	2,238,364
Balochistan	02	15	07	07	31	1,837,704
Punjab	02	37	19	00	58	3,315,803
Khyber Pakhtunkhwa	03	06	38	05	52	470,675
Sindh	01	35	14	04	54	1,307,575
Total	14	99	96	16	225	9,170,121

4.3.5. Forests

The Land Use Atlas of Pakistan puts the official estimates of forest cover in Pakistan at 5.4%.³⁵ The forests of Pakistan are grouped into five physiognomic classes, conifers (40%), scrub (28%), riverine (7%), mangroves (8%), and plantations (11%).³⁶ Natural forests comprise a number of diverse ecosystems, including the Western Himalayan Temperate Forests, one of

³⁵ Government of Pakistan, 2009. Land use Atlas of Pakistan.

³⁶ Forestry Sector Master Plan (FSMP) Estimates of Land Use Based on Satellite Imagery Interpretation database

the global 200 priority ecosystems. In addition, Balochistan boasts the world's second largest compact forest of Juniper, considered a living fossil.³⁷ While all forest ecosystems in Pakistan are threatened, edible pine nut (*Pinus gerardiana*) forests, found primarily in community-controlled areas, are under serious threat of disappearance due to logging by local communities as a means of livelihoods.³⁸ **Figure 4.3** presents a Forest Cover map of Pakistan.

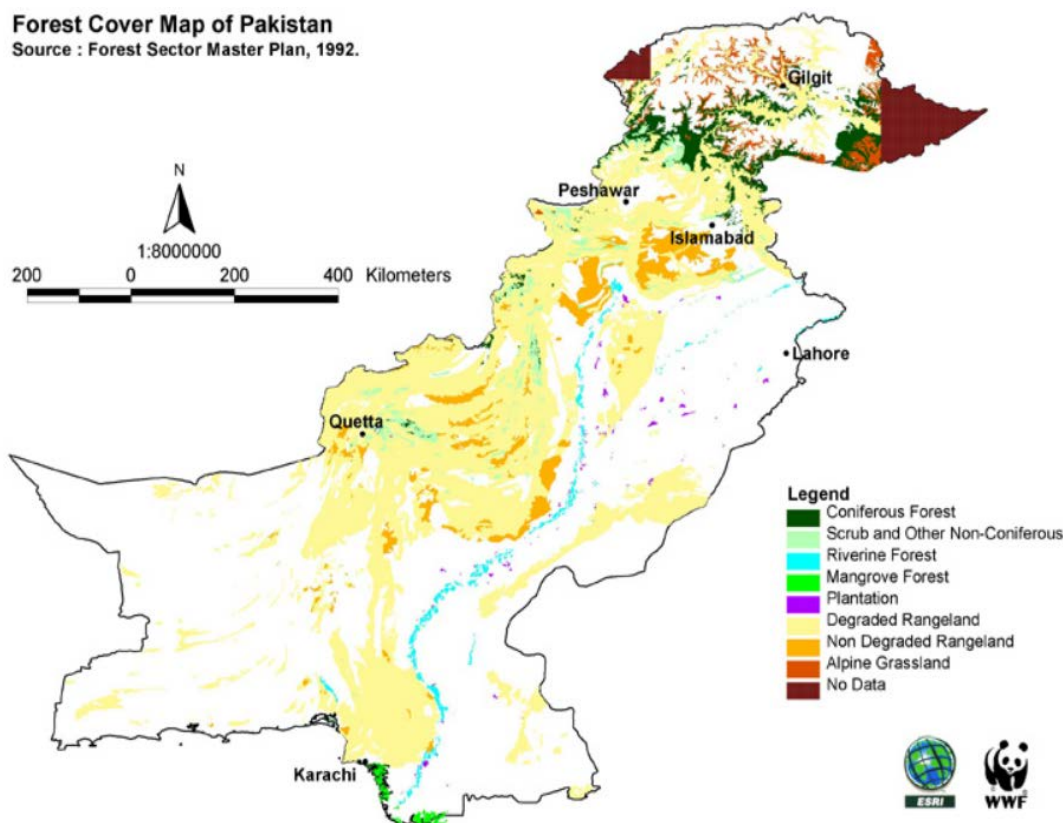


Figure 4.3: Forest Cover in Pakistan³⁹

4.4. Socioeconomic Profile

4.4.1. Demography

According to 2017 population census reports, the total population of the Pakistan is 207,774,520 approximately 207 million⁴⁰. The most heavily populated province is Punjab with a population of 110 million, followed by Sindh with 48 million Khyber Pakhtunkhwa with 30 million and Balochistan with a population of 12 million. The population Islamabad Capital Territory is 2 million, while that of FATA is 5 million. The population density is 250 persons per square km of the major part of the project area.⁴¹ The urban centers are densely populated with an average of 1000 person per square kilometer. Districts located close to the city centers

³⁷ UNESCO 2013; Man and Biosphere Reserve

³⁸ National Biodiversity Strategy and Action Plan 2015, Government of Pakistan

³⁹ WWF Pakistan

⁴⁰ Pakistan Bureau of Statistics, provincial census result 2017

⁴¹ Pakistan Population Census Organization

are thickly populated, whereas, the districts lying in the southern and northern boundaries are relatively thinly populated. The province wise distribution of population of Pakistan is given in **Table 4.4**.

Table 4.4: Provincial Results of Census 2017

ADMINISTRATIVE UNITS	POPULATION 2017	POPULATION 1998
PAKISTAN	207,774,520	132,352,279
KHYBER PAKHTUNKHWA	30,523,371	17,743,645
FATA	5,001,676	3,176,331
PUNJAB	110,012,442	73,621,290
SINDH	47,886,051	30,439,893
BALUCHISTAN	12,344,408	6,565,885
ISLAMABAD	2,006,572	805,235

Note:-

1. Total Population includes all persons residing in the country including Afghans & other Aliens residing with the local population
2. Population does not include Afghan Refugees living in Refugee villages

4.4.2. Literacy and Education

Literacy is defined as percentage of population that can read and write at the age of 10 or above. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Pakistan has one of the lowest literacy rates in the world, and stands 160th among world nations. Overall 55 % population including 69% male and 45% female is literate⁴². Literacy ratio of Pakistan is provided in **Figure 4.4**.

Education in Pakistan is overseen by the Federal Ministry of Education and the provincial governments, whereas the federal government mostly assists in curriculum development, accreditation and in the financing of research and development. Article 25-A of Constitution of Pakistan obligates the state to provide free and compulsory quality education to children from age 5 to 16 years. The country governed type of education institutes present in the project areas of intervention are include Primary schools, Secondary Schools, Higher Secondary

⁴² Boissiere, M., 2004. Determinants of Primary Education Outcomes in Developing Countries. World Bank, Independent Evaluation Group (IEG), Washington, DC.

Chaudhry, I.S., Rahman, S., 2009. The impact of gender inequality in education on rural poverty in Pakistan: an empirical analysis. Eur. J. Econ. Financ. Adm. Sci.

Colleges, Degree College, Graduate Colleges, Medical Colleges, Universities and Technical and vocational institutions.

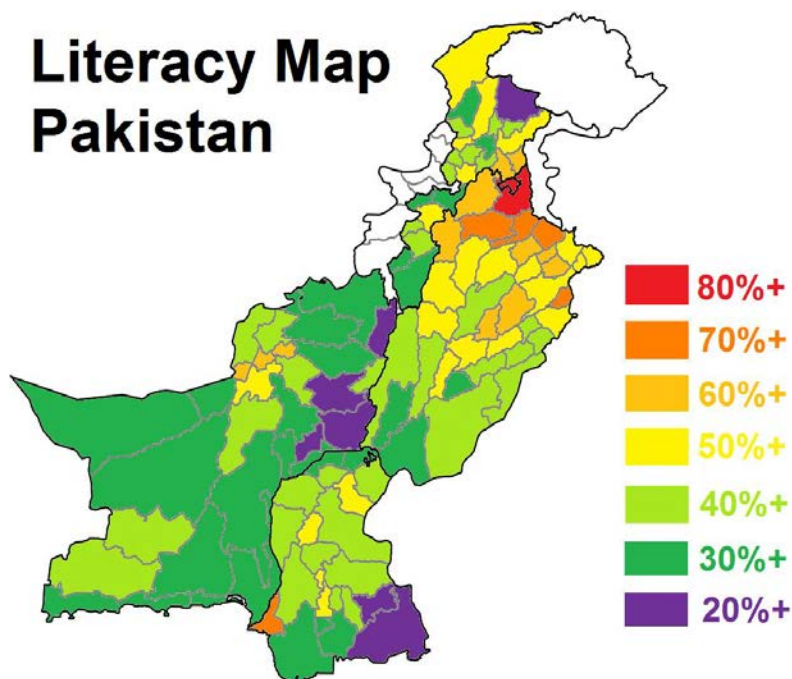


Figure 4.4: Literacy Ratio Map of Pakistan⁴³

4.4.3. Health

The government is active in the health care sector in all districts of the project area. The provinces in line with federal ministry of health are making efforts to provide quality health care services to the general public. A network of government hospitals and basic health units is operational but limited services are available due lack of resources. Other than government hospitals, private hospitals and clinics are present to fulfill the needs of the public.

4.4.4. Occupation

Agriculture is the main source of employment in Pakistan. 42% of the population works in the agriculture, fisheries and forestry sectors, followed by 35% in services (including government) and 22% in industry and associated jobs.⁴⁴

4.4.5. Gender

The social and cultural context of Pakistani society is predominantly patriarchal. However, women in mainly urban areas have improved access to education, face fewer problems in mobility and often seek employment. Men and women are conceptually divided into two separate worlds. Home is defined as a woman's legitimate ideological and physical space, while a man dominates the outside world. In the given social context, 70-80% of Pakistani

⁴³ UNESCO

⁴⁴ Pakistan Labour Force Survey, 2014-2015

women lack social value and status because of negation of their roles as producers and providers in all social roles. The preference for sons due to their productive role dictates the allocation of household resources in their favour. Male members of the family are given better education and are equipped with skills to compete for resources in the public arena, while female members are imparted domestic skills to be good mothers and wives.⁴⁵

Lack of skills, limited opportunities in the job market, and social and cultural restrictions limit women's chances to compete for resources in the public arena. This situation has led to the social and economic dependency of women that becomes the basis for male power over women in all social relationships. The nature and degree of women's subordination vary across classes, regions, and the rural/urban divide. Patriarchal structures are relatively stronger in the rural and tribal setting where local customs establish male authority and power over women's lives. On the other hand, women belonging to the upper and middle classes have increasingly greater access to education and employment opportunities and can assume greater control over their lives.

4.4.6. Indigenous Peoples

The World Bank Operational Policy OP 4.10 provides guidelines to ensure that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. All Bank financed projects are designed to ensure that Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive. The policy lays down requirements for the projects to be financed by the Bank that affects Indigenous Peoples that include:

- Screening by the Bank to identify whether Indigenous Peoples are present in, or have collective attachment to, the project area;
- A social assessment by the borrower;
- A process of free, prior, and informed consultation with the affected Indigenous Peoples' communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project;
- The preparation of an Indigenous Peoples Plan or an Indigenous Peoples Planning Framework; and
- Disclosure of the draft Indigenous Peoples Plan or draft Indigenous Peoples Planning Framework.

In Pakistan, the only recognized Indigenous Peoples are the Kailasha⁴⁶, residing in 15 villages in three valleys (Bamburet, Birir and Rambur) of the Ayun Union Council of Chitral district of the province of Khyber Pakhtunkhwa. They form the smallest minority community in the Islamic Republic of Pakistan. They are identified as indigenous peoples due to their distinct language, folklore, and polytheistic religion; differentiating them from the other communities in the area who migrated to Chitral at a later time. The community still relies mainly on their indigenous sources of livelihood including livestock, small-scale cultivation and wage labour. However, the community does not have a unique source of livelihood as these traditional occupations are shared with other ethnicities and tribes in the region. The Kalash people have

⁴⁵ ADB Gender Analysis, 2000

⁴⁶ Pakistan Poverty Alleviation Fund, Indigenous Peoples Planning Framework, 2014

only recently begun to move towards a cash economy, triggered by the influx of tourists in the area.

The extrapolated population of Kailasha people in 2015⁴⁷ was 3,628 (with 1,729 women). The Kailasha constitute about 15% of the total population of Ayun Union Council and around 20% of the total extrapolated population of the 15 villages in which they reside. There are 556 Kailash people settled in rest of the Chitral District, making the total estimated Kailash population as 4,184. No other accurate estimates of Kailash population are available as different sources vary in their estimates. Looking at the available demographic statistics, Kailash are in majority in the villages of Kalashandeh (Anish) and Rambur, 85% and 75%, respectively. Kailash population ranges from 7% to 44% in the villages of Burun, Birir, Batrik, Karakar and Pehlwanandeh. In the remaining 8 villages, their population is negligible (less than 1%).

The Project is anticipated to install an Automatic Weather Station (AWS) in Chitral District. As these weather stations require low scale physical constructions on less than 500 sq feet of land and will be built on secure government owned land, the most likely location for the AWS is the Chitral Aiport. Bamburet, the largest valley where the Kailasha live is approximately 40km, Birir is 34km and Rambur is 32km from Chitral Airport, connected to the main town of Chitral by a jeepable road. **Figure 4.5** shows the location of Chitral Aiport and the three Kailash valleys. It can be observed from the satellite image that the Kailash Valleys are remotely located with limited road access. Given the small scale of the AWS, remoteness, and the distance of the Kailasha villages from Chitral Aiport, there is no anticipated negative impact of this Project on the Kailsha.

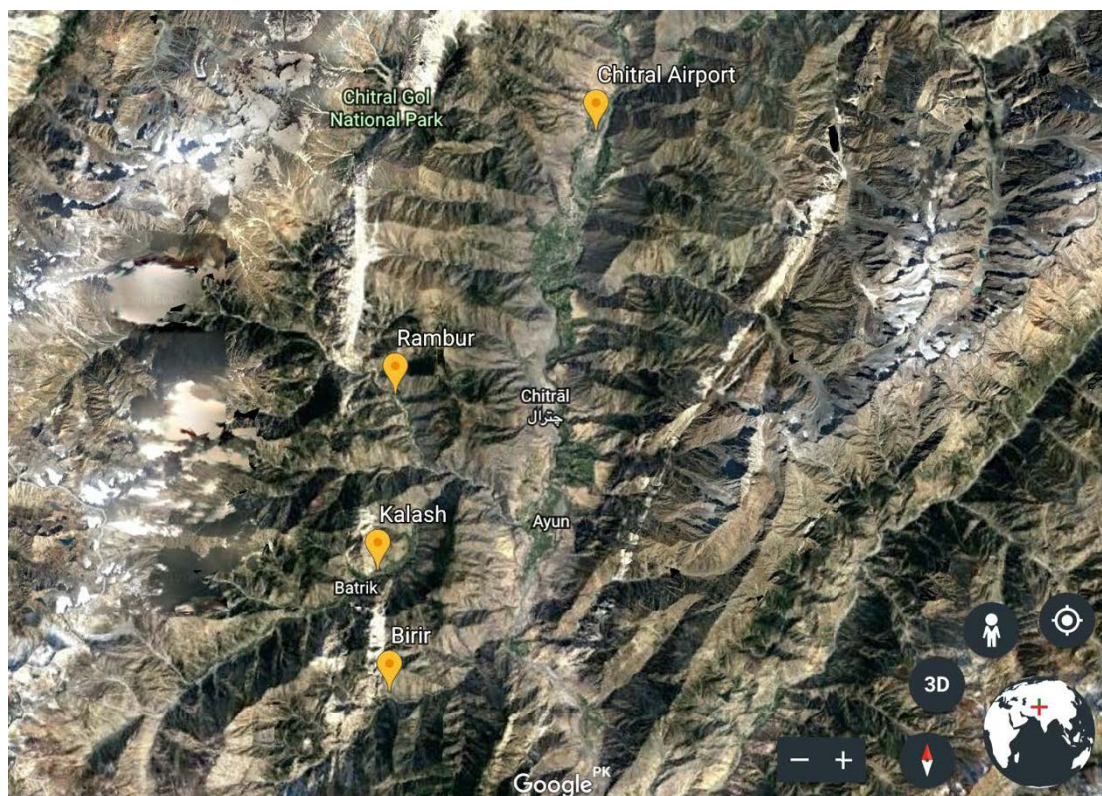


Figure 4.5: Location of Kailasha Valleys

⁴⁷ Extrapolated from the 1998 Population Census. Source: PPAF Indigenous Peoples Planning Framework.

Chapter 5. Stakeholders Consultations and Information Disclosure

This section of the report outlines the stakeholder consultation approach adopted for this project, identifies the concerned groups of stakeholders, and proposes the consultation framework for the project.

5.1. Introduction

The participation of project stakeholders in project planning, design and implementation is now universally recognized as an integral part of environmental impact assessment. The World Bank guidelines on disclosure of information and stakeholder participation lay emphasis on enforcement the mechanism in every stage of project execution. The Pakistan Environmental Protection Act 1997 Section 12(3) highlights that “every review of an environmental impact assessment shall be carried out with public participation.” United Nations Conference on Environment and Development (UNCED) in 1992 endorsed the process of stakeholder participation and consultation as one of the key documents of the conference Agenda 21. It emphasizes the role of public participation in environmental decision-making for the achievement of sustainable development.

5.2. Objectives of Stakeholder Consultation

In accordance with World Bank Guidelines, public consultations are essential to fulfill the following objectives:

14. Exchange of information related to the Project and its possible utilization in the Project designing/planning and implementation;
15. Identification of likely impacts on land, resettlement, loss of livelihood, etc.
16. Ascertaining the most acceptable solutions and mitigation measures for possible issues which could arise during implementation of the project activities;
17. Eliciting community comments and feedback on the proposed Project;
18. Facilitate and maintain dialogue with the stakeholders to gain consent on carrying out project activities in the area;
19. Encourage transparency and inculcate trust among various stakeholders to gain cooperation and partnership from the communities, local leadership, and NGOs.
20. Record concerns regarding the various aspects of the project, including the existing situation, project area/area of influence, construction works and the potential impacts of the construction-related activities and operation of the project.
21. Incorporate mitigations measures to address concerns with project design and implementation.

5.3. Consultation Process

The consultation process followed for the project is detailed below:

5.3.1. Identification and Classification of Stakeholders

The identification of stakeholders is important for the sustainability of a development project and helps to evaluate and envisage the role of stakeholders. The Stakeholders Analysis refers to the Project Affected Personal (PAPs)/ local community, associated departments/agencies, Non-Governmental Organizations (NGOs) and others, whose assets/land, business, structures, installations, interests may be impacted due to the project activities. The influence or impact of stakeholders on the project is elaborated in the form of a matrix and the mitigation measures are proposed accordingly. The stakeholders that are likely to be influenced by the project activities or would like to participate in the project will include:

- Government Organizations;
- Inhabitants of the sub project surrounding areas;
- Project beneficiaries

5.3.2. Classification of Stakeholders

Project Stakeholders are classified as primary and secondary stakeholders depending on the influence of the project activities:

- Primary Stakeholders: People, groups or institutions directly effected by the project and can influence the project outcome.
- Secondary Stakeholders: People, groups, or institutions that are indirectly affected by the project and can influence project delivery process.

The list of primary and secondary stakeholders for this project is provided in **Table 5.1** .

Table 5.1: List of Stakeholders

Stakeholders	
Primary	Pakistan Meteorological Department (PMD)
	National Disaster Management Authority
	Communities within 1 km radius of sub project sites
Secondary	Civil Aviation Authority
	WAPDA
	Provincial Irrigation Department
	Federal Flood Commission
	Provincial Agriculture Department
	Ministry of Climate Change
	Global Change Impact Study Center
	Agriculture Research Council
	Provincial Agriculture Departments
Indus River System Authority	

5.3.3. Methodology

One to one meetings were conducted with the primary stakeholders, barring the communities, which would be done subsequently in sub-projects' design phase. Sessions were informal to encourage friendly environment, comfortable enough for participants to express their concerns, questions and opinions about the project activities in addition to seeking clarification regarding the project. Survey team highlighted the potential benefits of project implementation and documented any aspects, which need to be covered in detail during the execution stage. The meetings progressed in the following manner:

- A brief project description was provided to the stakeholders.
- Stakeholders were given the opportunity to raise queries or concerns regarding the Project.
- Queries were responded to and concerns were documented.

5.3.4. Consultation Findings/ Concerns

Concerns raised by stakeholders during consultation processes are detailed in **Table 5.2** below.

Table 5.2: Stakeholder Concerns

Stakeholders Consulted	Concerns	Response
Location: Islamabad Pakistan Meteorological Department Respondents: Hazrat Mir, Deputy Director General/ Chief Meteorologist Mr Jan Muhammad Khan, Director Planning Mr Aleem ul Hassan, Deputy Director	Pakistan Hydro-Meteorological and DRM Project has several components managed by various partners. There is high risk that incompleteness or non-performance at one component will impact the other components. Thus, affecting the sustainability of the project. It is suggested to provide PMD autonomy for completion of project components. No separate funds should be allocated for equipment training; the provision should be made in the contractual requirement of manufacturer installing the equipment for the whole project. Required experts for various components of the project should be hired locally. If international consultant is needed, there should be open competition among local and international experts. The project budget has more than 40% budget for experts needed from the World Bank. The budget estimation should take in to account The provision of climate specific data needed for climate change assessments should be included in the project.	Project to respond to these concerns at the sub-project phase

	<p>Height of the radar should be taken into consideration in the presence of population nearby.</p> <p>NOC from CDA, LDA, CAA, NDMA and local authorities should be taken prior to construction work.</p> <p>The AWS should be installed in government owned land in a guarded locality to avoid damage to the equipment.</p> <p>Cost of land acquisition (if required) should be made part of the project.</p>	
<p>Location: Lahore</p> <p>Respondents: Muhammad Riaz (Chief Meteorologist)</p> <p>Fayaz Nazir (Senior Electronic Engineer)</p> <p>Sahibzad Khan (Director)</p> <p>Organization: Regional Meteorological Center, FFD Lahore</p>	<p>Currently, there is no space available at the FFD center for new radar installation; however, a possible solution is to shift the Pilot Balloon Observatory (PBO) building to the Regional Meteorological Center building which is right across the road and has ample space to house PBO. This scenario would have the following benefits:</p> <p>The new radar building would be located right next to the existing one.</p> <p>It would not hamper the efficiency of the observation instruments in the front yard as it would be built behind the existing radar.</p> <p>Height of the tower should be elevated above 100 ft to increase efficiency.</p> <p>Latest and most sustainable building standards should be followed to increase the life of the infrastructure for long term benefits.</p> <p>Power backup system should be up to the mark keeping in view the current load shedding scenario in the city.</p> <p>New radar technology uses less power, so a possibility of hybrid systems should be considered</p> <p>Auto Calibration rain gauges should be installed at different ranges i.e. 50, 100, 200, 240 and 480 kilometers. This would increase the efficiency of current and proposed systems.</p> <p>The maintenance arrangement after the project implementation must be chalked out. The provision of spares must be guaranteed for at least 10 years.</p> <p>Additional staff must be hired for the new system, which should include at</p>	<p>Project to respond to these concerns at the sub-project phase</p>

	<p>least 5 meteorologists and 4 sub-engineers.</p> <p>Vehicles should be provided for remote sensing.</p> <p>The staff should all be given trainings on radar meteorology.</p> <p>Coordination for the project implementation should be improved with timely information dissemination.</p> <p>High resolution output systems should be used.</p>	
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5.4. Stakeholders Consultation Framework

A continuous process of keeping the stakeholders informed and receiving their feedback at various stages of Project implementation will be carried out to improve the acceptability of the Project by the stakeholders and ensuring their participation in the process of sub project preparation and development. A strategy for public consultation during the implementation of the Project is delineated, for different stages of the project, i.e. design, construction and operation. The consultations framework at each stage is explained in **Table 5.3** below.

Table 5.3: Public Consultation/ Participation Framework

Objective	Target Stakeholders	Implementation Stage	Responsibility
Meetings/scoping sessions/ survey/interviews etc. to inform stakeholders about project and obtain feedback about the project design.	Potential stakeholders in the sub-project area, general public, and line departments/ agencies especially PMD, CAA and RMC	Design Stage of sub-projects	PMD/ NDMA PIUs
Public awareness sessions to share the ESMP/RAP with the project affected persons/communities; and other stakeholders.	Potential stakeholders in the sub-project area, general public; and line departments/ agencies.	Design/ Implementation Stage	PMD/ NDMA PIUs
Consultations during formation of PAP Committees (PAPCs)	PAPs in the sub-project area(if any)	Construction Stage	PMD/ NDMA PIUs
Setting of Grievance Redress and Community Complaint Register	Stakeholders in the sub-project area.	Construction Stage	PMD/ NDMA PIUs
Consultations during internal monitoring	Stakeholders in the sub-project area	Construction Stage	PMD/ NDMA PIUs

Objective	Target Stakeholders	Implementation Stage	Responsibility
Fortnightly meetings at project sites	PMD and NDMA	Construction Stage	PMD/ NDMA PIUs
Consultations with the Stakeholders during the Independent Monitoring	PAPs/communities in the sub-project area	Construction Stage	PMD/ NDMA PIUs / Independent monitoring consultant
Consultations with the Stakeholders relating to the leftover tasks	PAPs/communities in the sub-project area	Operation Stage	PMD/ NDMA PIUs
Consultations with the Stakeholders during the site visits by the World Bank Review Missions	PMD AND NDMA/PIU/contractors as well as sub-project PAPs/ Communities	Construction/ Operation Stage	PMD/ NDMA PIUs

Chapter 6. Environmental and Social Impact Assessment and Mitigation Measures

6.1. Pakistan Hydro-meteorological and DRM Services Project (PHDSP)

The Pakistan Hydro-meteorological and DRM Services Project has three main components through which it will seek to improve hydro-meteorological information and services, strengthen forecasting and early warning systems, and improve dissemination of meteorological and hydrological forecasts, warnings and advisory information to stakeholders and end-users through the Pakistan Meteorological Department. It will also strengthen the existing disaster risk management (DRM) capacity and services of the National Disaster Management Authority (NDMA). Environmental and social impacts of this project are expected from construction and expansion of NDMA and PMD offices and facilities, and installation of Weather Surveillance Radar and Automatic Weather Stations across the country under Components 1 and 2. An analysis of each project component and associated environmental and social impacts are discussed in this section.

6.1.1. Component 1: Hydro-meteorological and Climate Services

The objective of this component is to improve the capability and thereby performance of the PMD to understand and make use of meteorological and hydrological information for decision making..

Sub-Component 1.2A: Technical Modernization of Observation Networks

The sub-component will support the expansion and upgrade of the prioritized stations of the network, expansion of doppler radar network, restoration of upper air observations, installation of wind profilers, improvement of hydrological stations and systems, and expansion and re-equipment of agro-meteorological network.

Sub-Component 1.2E: Expansion and Refurbishment of PMD Facilities in Pakistan

The sub-component will establish the Monsoon Monitoring Centre in Islamabad, as well as up gradation of Flood Forecasting Division (FFD) to National Flood Forecasting Center (NFFC) and establishment of 5 Regional Flood Forecasting Centers (RFFC).

Sub-components 1.2A and 1.2E will involve civil works during construction and refurbishment of PMD offices and installation of WSR and AWS at various locations in Pakistan. The project interventions under 1.2 E may result in limited and reversible environmental impacts during construction due to their location at existing PMD office facilities in commercial settings, however, social impacts during construction may rate higher due to presence of sensitive social receptors near MMC and AWS intervention. The project locations for the AWS are not yet known. This section will detail the potential environmental and social impacts for each of the planned interventions during first phase specifically Monsoon Monitoring Centre, WSR and AWS and propose required mitigation measures.

6.1.2. Component 2: Disaster Risk Management

This component will focus on strengthening capacity of NDMA through increased emergency response capacity, construction of DM complex that will house offices, NEOC,

NIDM and the NDRF, reviewing the existing DRM system in the country and conducting hazard assessments in priority district.

Sub-Component 2.2A: Establishment of Disaster Management Complex

This component mainly involves developing institutional set-up and operational capacity of NDMA through construction of NDMA headquarters that will host National Institute of Disaster Management (NIDM), National Emergency Operations Center (NEOC) and NDRF Facility.

Sub-components 2.2A will involve civil works during construction of the Disaster Management Complex. The project interventions may result in limited and reversible environmental and social impacts since the location of the project is in an area designated for commercial and government offices. This section will detail the potential environmental and social impacts for each of the planned interventions during first phase

6.1.3. Component 3: Contingent Emergency Response Component

This component will support preparedness and rapid response to climate and natural disasters, emergency, and/or catastrophic events as needed. The component and associated sub-components do not involve physical works to be undertaken at present. There are no potential environmental and social impacts associated at this stage, however, in case of a national disaster, entire infrastructure development/reconstruction projects will be screened for environmental and social impacts.

6.2. Impact Assessment Matrix

To screen, identify and evaluate the impacts, the nature, extent, duration, scale and other parameters of the sub project activities are to be studied along with conditions of the environmental and social receptors (secondary baseline). Mitigation measures are based on the magnitude of the impact, sensitivity and behaviour of the environmental and social receptors at the sub-project sites and, regulatory requirements using best management practices. The detailed impact assessment matrix of design, construction and operations/post construction phase is given **Table 6.1**.

Table 6.1: Potential Environmental and Social Impacts (Prior Mitigation)

Project Activities	Impacts on Physical Environmental										Impacts on Ecological Environment			Impacts on Social Environment								
	Soil Erosion	Land use	Ambient Air Quality	Surface Water Quality	Groundwater Quality	Water/ Electricity /Gas /	Solid Waste	Ambient Noise level	Electromagnetic Field	Climate	Flora	Fauna	Biodiversity /Ecology	Resettlement	Traffic	Public Health, Safety and	Health and Safety of	Economy	Employment	Drinking Water	Loss of land holdings and	Cultural/religious and Archaeological resources
Component 1: Technical Modernization of Observation Networks; Expansion and Refurbishment of PMD Facilities																						
Design Phase	M-	M-	M-	M-	M-	H+	M-	M-	M-	M-		M-	M-to H-					M-to H-			M-to H-	
Construction Phase	H-	L-	H-	M-	L-	M-	H-	H-	H-	M-	M-	M-	L-	L-	H-	H-	H-	H+	H+		L-	L-
Operation Phase			M-	M-		M-	M-	H-	M-						M-	M-	H+	H+				
Component 2: Establishment of Disaster Management Complex																						
Design Phase	M-	M-	M-	M-	M-	H+	M-	M-		M-		M-	M-to H-					M-to H-			M-to H-	
Construction Phase	H-	L-	H-	M-	L-	M-	H-	H-		M-	M-	M-	L-	L-	H-	H-	H-	H+	H+		L-	L-
Operation Phase			M-	M-		M-	M-		M-						M-	M-	H+	H+				
Component 3: Contingent Emergency Response Component																						
Design Phase																						
Construction Phase																						
Operation Phase																						

H- = High Negative Impact; Blank =None
M- = Moderate Negative Impact;
L- = Low Negative Impact;
H+ = High Positive Impact;
M+ = Moderate Positive Impact;
L+ = Low Positive Impact.

6.3. Potential Environmental and Social Impacts during Design and Mitigation

The design phase activities of the sub projects include the infrastructure design, site selection and preparation for civil works. The associated impact of activities under Components 1 and 2 of the project on ecological, physical and human environment presented in this section. These activities include expansion of facilities at PMD offices, installation of Weather Surveillance Radar and Automatic Weather Stations, and construction of a Disaster Management Complex.

6.3.1. Biodiversity and Natural Resource

None of the sub-project activities will be carried out within the sensitive areas as per Environmental Protection Act, Forest and Wildlife Protection Act of each province. The project sites for expansion of PMD facilities, WSR and Disaster Management Complex are expected to be at existing locations of PMD stations/offices or on land owned by the government, thus at a reasonable distance from critical and sensitive receptors including reserve forests, national parks, wetlands, marine protected areas and wildlife sanctuaries. The AWS will be across the country and exact locations are not known. Similarly, there are no sensitive habitats present within the project sites that support endangered mammal or bird species. Hence impact on flora and fauna is negligible. Project sites may require tree cutting and vegetative clearing therefore mitigations are proposed in the design phase to avoid maximum damage. The following mitigation measures are proposed.

Mitigation Measures

- Incorporate technical design measures to minimize unnecessary removal of trees and vegetative cover;
- Plan for compensatory planting of eight trees against each fallen tree of similar floral function;
- Disallow introduction of invasive/ exotic species; and recommend native species for plantation.
- Locations for AWS will be selected outside/at a reasonable distance from the environmentally sensitive areas and archeological/cultural and religious sites of importance.

6.3.2. Land Acquisition, Resettlement, Loss of Livelihoods

Construction activities are expected to be on government owned land and may require temporary acquisition of land or removal of encroachments. The land for AWS installation may require acquisition from government and private land owners. This will be small areas as AWS require approximately 500 square feet for installation.

Mitigation Measures

If land acquisition/resettlement will be required or loss of livelihood will occur, impacts will be mitigated by preparing a RAP in accordance with the Resettlement Policy Framework (RPF), provided in this ESMF and WB OP 4.12. Details are provided in **Chapter 8** on Resettlement Policy Framework.

6.3.3. Natural Disasters

The project sites are prone to natural disasters including earthquakes and floods. The earthquake of 2005 caused damage to a number of engineering structures in Pakistan. Similarly, the flood of 2010 was devastating for various regions of country. The impact is likely to be high in case of a natural disaster.

Mitigation Measure

- The building design will be earthquake resistant according to Building Codes of Pakistan with Seismic provision and international best practices to avoid damage caused by earthquake;
- Variety of structural engineering measures or structural components like shear walls, braced frames, moment resisting frames, and diaphragms, base isolation, energy dissipating devices and bracing of non-structural components are proposed. Simpler techniques include avoiding soft stories and bolting the sill plate of houses to the foundation;
- Primary focus of earthquake design is initial life safety and getting people out of the building safely, not necessarily the ability of a building to withstand the effects of an earthquake, or to ensure occupancy or functionality following an event. Therefore building design will include emergency exits and alarm system;
- Planning, designing and constructing the building to minimize any potential flood damages using guidelines of **Annexure 6**. Following are proposed:
 - elevating as much of the building as possible above the design flood level,
 - designing the building foundation and any portions subject to flooding to withstand design flood conditions and loads,
 - using flood-damage-resistant materials for any portions of the building below the design flood level
 - where flood proofing is permitted, employing appropriate methods and materials to either dry-flood proof or wet-flood proof those portions of the building below the design flood level

6.3.4. Water /Electricity/ Natural Gas/ Fuel Consumption

There will be an increase in resource consumption due construction work and subsequently project operations due to increase in staff. It will pose a pressure on water and energy resources of the project area of interventions. The impact is likely to be high as the sub-project buildings and tower will host more than 200-1000 officials.

Mitigation Measures

- Green building council and international best practice will be engaged for design provisions to be followed for water, electricity and natural gas conservation;
- Water meters will be made part of the design in each building to monitor the consumption;
- Design of buildings will include installation of Solar Panels;
- Provision of Low Voltage electrical appliances will be made in procurement procedures;

- Prepare Energy and water conservation plan for construction.

6.3.5. Air Quality and Noise Levels

Project activities associated with construction may increase the ambient air quality and noise levels of the at the sub-project sites. The noise and air pollution sources include site clearing, construction machinery, generators, civil and mechanical work. The impacts are likely to be high.

Mitigation Measures

- Air quality and noise level baselines will be conducted to enable monitoring during construction phase;
- Provision of compliance to NEQS of vehicular emission will be made in the contract of construction contractor;
- Traffic management plan for construction will be formulated during design phase that enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density at a given area;
- Plan to neutralize dust emissions from construction activity, such as regular watering of sub-project sites to settle dust.
- Hazardous material list not to be used in construction will be made part of the contract.

6.3.6. Solid Waste Management

Improper solid waste disposal can result in increased air pollution through burning of waste, vector borne diseases, contamination of water sources and ambient aesthetics for surrounding communities.

Mitigation Measures

- Prepare a detailed Solid Waste Management Plan for the construction sites and labor camps;
- Identify current municipal systems of waste management
- Plan for placement of waste collection containers throughout the project area;
- Disallow the burning of any of type of waste;
- Prepare plans for the safe handling, storage and disposal of harmful materials;
- Prepare Solid Waste Management Plans for project sites for the operational phase (including adequate placement of waste bins, requirements of sanitary staff, transportation of waste, and identification of landfill sites).

6.3.7. Workers Health and Safety

Use of heavy machinery and handling of chemicals by workers can result in health impacts and accidents.

Mitigation Measures

Prepare a Worker Health and Safety Plan for the construction phase.

6.4. Potential Environmental and Social Impacts during Construction and Mitigation

The potential impacts associated with the construction and rehabilitation of PMD centers, research centers, field offices, installations of weather equipment and radars, and establishment of a Disaster Management Complex across the country are elaborated below:

6.4.1. Landscape/Soil

Expansion of PMD offices and research centers is expected to be on existing sites in use by PMD having urban and semi urban set up surrounded by commercial and residential areas. Hence there will be no drastic change in the landscape during construction. The location for the Disaster Management Complex and AWS may have trees, shrubs and water streams, however, the locations will not in an environmentally sensitive area with endangered vegetation. Construction and civil works are likely to carry out site clearance, vehicular, labour and machinery movement causing soil erosion and compaction. There is also a potential for contamination of soil via runoff from construction activities including oil spills, construction material, dredged / spoil materials and construction waste. The impact is likely to be high, however, the duration be will be confined to construction phase.

Mitigation Measures

- Removal of vegetation and trees will be avoided to the extent possible
- Water will be sprinkled during building of foundation to avoid erosion.
- Construction materials will be stored in proper stores on impervious sheets to avoid any soil contamination.
- Machinery and vehicles will be operated at designated routes to avoid erosion and compaction of un-impacted soils.
- Visual Inspection will be carried out for land contamination and dust emissions.
- The soil contaminated from minor and moderate spills will be removed and will be handed over to waste contractor for treatment at nearest incineration facility to the sub-project sites.
- Major spills may require specialized treatment such as incineration, bioremediation and biodegradation. The biological agents will be introduced to the spill to hasten biodegradation. Most of the components of oil will be broken down by bacteria and other microorganisms into harmless substances such as fatty acids and carbon dioxide. To stimulate the growth of the microorganisms, fertilizing nutrients like nitrogen and phosphorous will be places near the oil tanks.

6.4.2. Ambient Air Quality and Climate

The construction activities at sub-project sites will cause impact on air quality. Cement mixers (Batch Plant), movement of the machinery and soil excavation may release particulate matter 2.5/10 and fugitive dust which will deteriorate ambient air quality in the vicinity of the sub-project sites. Construction vehicles, generator is likely to generate dust and exhaust emissions such as oxides of Carbon (COx) Oxides of Sulphur (SOx), Oxides of Nitrogen (NOx). Impact on local air quality is high as a result of gaseous emissions and particulate matter. The construction work is not likely to impact the climate of the area, however, there will be minimal increase in GHG emission from above mentioned sources.

Mitigation Measures

- Following of NEQS as performance indicators;
- Contractor shall provide an Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles; Contractor should provide an operations and maintenance plan for the same;
- Water will be sprinkled twice a day to avoid fugitive dust emissions;
- Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance;
- Unnecessary movement of vehicles will be avoided at the construction location;
- Open burning of solid waste from the Contractor's camps should be strictly banned;
- Wind breaks /barriers (either natural or constructed) will be deployed to reduce the possibility of suspended particles in air;
- Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow;
- In order to further reduce the environmental impact Cement Works (Concrete Batching Plant), the concrete batching plant will incorporate the following design and practices:
 - Cement will be transferred directly from barges to the plant.
 - All mixing will be in the enclosed electric motor driven plant mixer, NOT in trucks.
 - Truck loaded with concrete will be in wet form.
 - All washing water used by the batch plant and storm water will be collected and stored and recycled for re-use.
 - No water will be discharged outside the plant boundary.
 - Concrete recycling machine be used to recycle waste material to slurry water and aggregates for reuse.

6.4.3. Surface/Ground Water Resources

Drainage channels may be located at the location for the Disaster Management Complex. Construction activities may encourage soil erosion and increase the sediment loads into the city drainage, while accidental leaks/spills of oil/fuel from storage tanks or maintenance vehicles can also pollute surface waters. Construction waste and oil spills, if left unattended will result in forming leachate that will percolate through the soil strata and may contaminate the groundwater table. The sources of contamination and wastewater may likely to generate from the following sources:

- Disposal of construction waste and solid waste from worker camps into the water channel;
- Possible oil spills from fuel storage area;
- Surface runoff due to rainfall causing blockage of drainage;
- Used oil, paints, cleaning solvents and other chemicals may generate liquid hazardous wastes.

- Wastewater from temporary sanitation facilities for the workers may also result in contamination of subsoil water.

The impact is likely to be high for infrastructure developments for the Disaster Management Complex.

Mitigation Measures

- **Debris Management Plan;** the contractor will ensure that construction debris does not find its way into the drainage or water channels which may get clogged;
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond;
- Construction work close to streams or other water bodies will be avoided, especially during monsoon period;
- All fuel storage will be properly marked to highlight their contents with a concrete pad underneath to prevent water contamination in case of leaks or spills. Daily monitoring will be carried out for leaks. Shovels, plastic bags, and absorbent material will be placed near fuel and oil storage or handling areas to attend spills and leaks;
- Used oil and vehicle related waste will be transported to local contractors for recycling or reuse;
- Diverting work area runoff into properly designed and constructed sediment traps or drainage collection system to ensure that exposed soils are not eroded. Runoff velocities in ditches or other drainage routes, or along slopes, to be kept low to minimize erosion potential. Runoff outfall locations to be protected with erosion resistant material, if required.
- Proper disposal of solid and sewage waste from workers camps to ensure it is not disposed in the drainage channel.

6.4.4. Water /Electricity/ Natural Gas and Fuel Consumption

The estimated water consumption calculated by Water and Sanitation Authority (WASA) is 72 gallon per person per day. There will be an increase in water, electricity, natural gas and fuel consumption from the baseline during construction causing increase in total GHG emissions from the project sites. Preparation of sand, cement mortar, curing of walls before and after plastering require a large amount of water that may reduce the availability of water in residing area. The impact is likely to be high.

Mitigation Measures

- Water meters will be installed at sub-project sites to monitor water consumption;
- Construction staff will be trained on water conservation practices to avoid excessive loss;
- Water required for construction should be obtained in a way so that water availability and supply to residing area remains unaffected;
- Approval will be attained from relevant departments prior to construction work.
- Prepare **Energy and water conservation plan** for construction.

6.4.5. Solid Waste Generation

During construction phase, solid waste can be generated from discarded equipment parts, scrap metals, equipment boxes, wood parts, empty bags, and leftover construction debris. The excavated material may also be considered as solid waste as it would require disposal. Solid waste will also be generated from workers camps at the construction sites. Waste collection and disposal mechanism is in place will be used for the maximum allowable waste. The construction material and waste may contain hazardous/toxic chemical materials banned as per international best practices. They may include:

- Asbestos (pipe covers flooring and building material)
- Lead (Roofing material and pipes)
- Cadmium (used as corrosion resistant agent in steel)
- Polyvinyl Chloride (pipes)
- VOCs (formaldehyde in form solvents, paints, synthetic coating cause)
- Silica (in various building material-exposure causes lung cancer)
- Wood preservatives (Creosotes and Arsenic)
- Halogenated flame Retardants (mixed in concrete construction material)

Mitigation Measures

- **Solid Waste Management Plan** will be prepared for all sub-project sites to be used by Construction Contractor. In case of the occurrence of toxic/hazardous chemical materials, it will be handled according to hazardous waste management best international practices. The **Waste Management Plan** will be prepared with following provision:
 - Solid waste collection, segregation, storage and disposal will be carried out for waste generated. For at source segregation separate waste bins will be placed at sub-project sites. Recyclable material will be segregated whereas non-hazardous waste will be disposed-off properly at approved disposal site;
 - Labeling of containers will be carried out including the identification and quantity of the contents, hazard information;
 - Marking of Hazardous/toxic waste 'if generated' separately and disposal using international best practices through registered contractor;
- Used oil will be collected in separate containers stored on impervious platform with restricted access and must be sold to licensed contractor;
- Burning of solid and waste oil should be strictly prohibited
- Training of workers will be carried out in the storage and handling of materials and chemicals that can potentially cause soil contamination;
- **Emergency Response Plan** will be prepared to address the accidental spillage of fuels and hazardous/toxic material, fire, vandalism and natural hazards;
- On completion of the construction phase of the project, the contractor will be required to rehabilitate the site. Rehabilitation will include removal of all construction materials and wastes, and the grading and landscaping of all exposed sites that may be prone to erosion. Where natural erosion protection measures may not be possible or practical, suitable physical erosion protection methods will be used. The purposes

of site rehabilitation will be to minimize the potential for soil erosion, enhance the aesthetic appearance of the site and restore safe public access to the surrounding area.

6.4.6. Noise Levels

Noise is one of the aspects which may cause hearing impacts on workers and communities in immediate vicinity especially during morning office/school hours and night time. The construction activities are likely to generate high noise levels. The sources of noise in construction are provided as follows:

- Asphalt Plant
- Construction and excavation work such as heavy earth moving equipment/machinery, piling work, welding, cuttings, drilling, grinding.
- Material loading/offloading vehicles and other transport used by construction contractor.
- Use of pressure horns.

In case of the sub-projects construction activities are restricted to a confined area within the site. Impact of noise is likely to be high from baseline noise levels (60-70dB). Noise impact will be high to the workers and moderate to the residents not causing hearing loss. **Table 6.2** details the impact of noise at various levels. Construction workers may suffer from Noise Induced Hearing Loss (NIHL) due to civil and mechanical work that may generate higher levels of noise.

Table 6.2: Noise Impact⁴⁸

Noise level dB	Impact
60	Hearing damage in 8 hours
80	Hearing damage in 8 hours
85	Hearing damage in 2 hours
100	Hearing damage in 2 hours
110	Hearing damage in 30 min
120	Hearing damage in 7.5 min
130	Pain threshold
150	Hearing damage in 30 sec
300	Complete hearing loss

Mitigation Measures

- The location for stationary sources of noise such as concrete mixers and pumps will be selected at a reasonable distance from residing population. The cement tankers will be working inside enclosure with cladding to reduce noise;
- The construction material loaders will only operate during night time as per rules of traffic police in the sub project areas. Working hours will be allocated for the use of batch plant, equipment and other machinery;

⁴⁸Source: Urbanization and Sustainable Cities 100: Environmental Science, International Science, 5th edition (1991) Cunningham Saigo

- School time and late night construction activities will be avoided;
- Use of noise barriers in locations next to schools;
- Blowing of horn will be strictly prohibited;
- Noise monitoring will be carried out at various locations using noise meters. Site labour working in high noise area where noise level exceeds 85 dB (A), will wear earplugs and ear muffs;
- Noise level of 55 dB at day and 45 dB at night time will be maintained.

6.4.7. Flora and Fauna

Since the sub-project locations are expected to be on existing sites in use by PMD or government owned land having urban and semi urban set up, there are no potential impacts on local flora and fauna. However, construction activities may require cutting of trees and clearing of vegetation. The ecological impacts of the project are not likely to be beyond the immediate footprint of the construction site.

Mitigation

- Planting of eight trees for every tree cut during construction;
- Do not introduce invasive or exotic species through plantation.

6.4.8. Public Health and Safety

Construction activities and movement of heavy vehicles at construction sites and access service roads may result in road side accidents, particularly with the residents who may not be familiar with the presence of heavy equipment. Roads and streets, particularly in urban areas may also be blocked during construction. For example, the MMC in Islamabad is located near schools. There will be a movement of school children in the vicinity during certain hours of the day.

Mitigation Measures

- Train drivers operating heavy vehicles in road and pedestrian safety;
- Set appropriate speed limits to avoid accidents;
- Use of heavy vehicles on public roads will be avoided during hours when students are coming to school or leaving school;
- Placement of construction and diversion signage, particularly at urban areas and at sensitive/accident-prone spots, in accordance to a **Public Safety Plan**;
- Provision of alternate routes for use by the public.

6.4.9. Workers Health and Safety

Use of heavy machinery and handling of hazardous waste and chemicals may result in health impacts for workers on the construction site. Presence of asbestos in old and new building material is hazardous to health.

Mitigation Measures

In accordance to the **Workers Health and Safety Plan**, ensure:

- The project locations have full access to health facilities and emergency response centers (fire, earthquake and floods) and police station. In case of emergency, the injured will be taken to the nearest medical facility.
- Provision of clean drinking water will be ensured for the construction crew;
- Hygiene inspections will be carried out to avoid disease epidemic;
- In case of unlikely incidents (fire, vandalism) the workers will be evacuated and emergency response and law enforcement agencies will be engaged;
- Fire safety alarms will be installed at various locations;
- Fire extinguishers will be placed at various locations including a water hose installation at ground level;
- Fire safety and emergency response trainings will be conducted;
- Hazards indicator signs and firefighting equipment will be installed;
- The construction crew will be trained on important aspects of workplace safety;
- Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles;
- Flammables and other toxic materials will be marked and stored at secured sites;
- Onsite first aid kits will be kept at construction sites and randomly moving vehicles\machinery.
- Do not allow workers with inadequate training to operate heavy machinery;
- Provision of appropriate and high quality Personal Protective Equipment (PPE) to workers such as gloves, vests, hard-hats, masks etc.;
- Train workers in the use of PPE and safety measures while using heavy machinery and handling chemicals.
- Follow guidelines for Asbestos and Asbestos based product use in construction (**Annexure 7**)

6.4.10. Physical /Cultural/ Archeological Resources

The sub-project locations may have religiously and culturally important sites at a reasonable distance. Excavation work during construction may result in the uncovering of ancient sites or artifacts. Impact is likely to be low for example the only known sensitive site close to sub project MMC is a grave yard which will not have any direct and indirect impacts.

Mitigation Measures

- Construction staff will be trained and informed on identifying the evidence of archaeological/historic remains;
- In case evidence of archaeological remains is found during construction activities, the actions listed below will be undertaken.
- Excavation work in the vicinity of the find will be stopped;
- Assistance will be sought from the nearest office of the Department of Archaeology and Museums to identify the remains;

- If the department decides to salvage the find, PMD will provide assistance.
- Detailed procedure for Archaeological Chance Finds included in **Annexure 8**.

6.4.11. Traffic Management

The sub-project sites in urban areas may be close to socioeconomic sensitive receptors like schools, colleges, offices and hospitals. The construction work may likely impact the traffic flow. Increase the traffic flow will occur as a result of:

- Use of trucks for movement of construction material to project site;
- Mobilization and use heavy equipment for construction;
- Use of pressure horns.

This slight increase in traffic may also cause accidental injuries, deteriorate ambient air quality and generate noise. It may also cause restrictions to access, traffic congestion and nuisance to the general public.

Mitigation Measures

- Vehicles will be inspected prior to start of construction work.
- Alternate routes will be created to avoid disturbance to school and hospital;
- Construction site will be barricaded to minimize accidental injuries and visual nuisance to the general public;
- Movement of construction equipment will be limited to specific duration when there is least disturbance to the residing offices e.g after school timings;
- Adequate road signs will be erected to warn general public;
- The contractor will be advised to follow vehicular maintenance to reduce engine noise;
- Drivers will be trained to follow the designated routes and avoid honking;
- The construction trucks will be adequately covered with tarpaulin covers to avoid flow into air.

6.5. Potential Environmental and Social Impacts during Operations and Mitigation

This section describes the impacts of subprojects during operations/ post construction.

6.5.1. Electromagnetic Field Generated

There may be radiation impacts of EMF related to radars at various selected sites which will be proposed by the PMD at implementation stage. People who live or routinely work around radars have expressed concerns about long-term adverse effects of these systems on health, including cancer, reproductive malfunction, cataracts and changes in behaviour or development of children. Radars usually operate at radio frequencies (RF) between 300 MHz and 15 GHz. They generate EMFs that are called RF fields. RF fields within this part of the electromagnetic spectrum are known to interact differently with human body. RF fields below 10 GHz (to 1 MHz) penetrate exposed tissues and produce heating due to energy absorption. The depth of penetration depends on the frequency of the field and is greater for lower frequencies. Absorption of RF fields in tissues is measured as a Specific Absorption Rate (SAR) within a

given tissue mass. The unit of SAR is watts per kilogram (W/kg). SAR is the quantity used to measure the "dose" of RF fields between about 1 MHz and 10 GHz. An SAR of at least 4 W/kg is needed to produce known adverse health effects in people exposed to RF fields in this frequency range.

RF fields above 10 GHz are absorbed at the skin surface, with very little of the energy penetrating into the underlying tissues. The basic dosimetric quantity for RF fields above 10 GHz is the intensity of the field measured as power density in watts per square metre (W/m²) or for weak fields in milliwatts per square metre (mW/m²) or microwatts per square metre (μ W/m²).

However studies have shown that weather radars operate at higher frequencies but generally have lower average and peak powers. Under normal conditions, if radar is installed at a higher elevation, they pose no hazard to the general public however impact on workers exposed is likely to be high.

Mitigation Measures

- Engineering controls for EMF include interlocks, electronic means to exclude the radar pointing within office complex in the tower building, and shielding.
- Administrative controls include audible and visible alarms, warning signs, and restriction of access through barriers, locked doors, or limiting access time to radar.
- Workers will use personal protective equipment to ensure compliance with exposure standards. Conductive suits, gloves, safety shoes and other types of personal protective equipment for RF fields are now commercially available. PPEs should be used with great care, since the attenuation properties of the material used to make this protective equipment can vary dramatically with frequency.
- RF safety glasses will be used near the radar operating area. Special care will be taken in buying the glasses since any metal may enhance local fields by acting as a receiving antenna.
- There are no exposure situations where members of the general public need to use protective equipment for RF fields from weather radars. An extensive program of measurement surveys, hazard communication, coupled with effective protective measures, is required around all radar installations for safety of workers.

6.5.2. Air Quality and Climate

The subprojects are likely to hire additional staff subsequently there will be an increase in number of vehicles entering the project area. This will lead to increased vehicular emissions during project operation that may pose potentially negative impacts on the air quality of the area if not mitigated properly. Similarly, in absence of solar panel backup generators may cause emissions. Emissions may carry over long distances, depending on wind speed and direction, the temperature of the surrounding air, and atmospheric stability. If no mitigation measures adopted, the impact is likely to be moderate.

Mitigation Measures

- The project staff will be advised to car pool and use local transport;
- Provision of pick and drop for staff to avoid additional load on air quality;

- Vehicles with excessive smoke emissions should not be allowed to enter the sub-project locations.

6.5.3. Surface/ Ground Water

The type of sub projects proposed are not likely to cause direct contamination of water bodies and groundwater, siltation of surface water resources and alterations in drainage pattern. Relevant district authorities are responsible for the drainage and sewerage system. The sewerage water from the existing buildings enters the city sewerage drains. The sewerage lead to the surface water Nullah and surface water drains that are heavily polluted. The sub- projects are not likely to impact ground water, however, the impact on surface water through sewerage is likely to be moderate. The subproject sites may have drainage channels that might be used for sewage disposal.

Mitigation Measures

- Ensure sewage is directed into municipal drains leading to sewerage treatment Plant.
- Restoration and protection if monsoon led water channels at the sub-project sites

6.5.4. Solid Waste

There will be an increase in solid waste generation due to additional building maintenance and staff employed for the sub-projects. Sub-project sites are located in areas where solid waste collection is provided by the municipality. However, these systems have been known to be unreliable resulting in open dumping of waste in nearby channels and green areas.

Mitigation Measures

The mitigation measures include:

- Decrease solid waste going to landfills by segregating at source with labeled dust bins for biodegradable, non- biodegradable and recyclable products;
- Disposal of biodegradable to the municipality for treatment;
- Clearance of reusable and recyclable waste to certified recycling companies.

6.5.5. Electricity/ Water /Natural Gas /Fuel Consumption

The estimated water consumption calculated by Water and Sanitation Authority (WASA) is 72 gallon per person per day. There will be an increase in electricity, water, natural gas and fuel consumption as the sub-projects likely to hire staff. In absence of solar panels the electricity consumption will have high impact; if the proposed design recommendation for Solar panel is included then the building will be self-sustainable.

Mitigation Measures

- Water meters will be installed to assess the water consumption and water sensors at taps to avoid the wastage in case of leakages;
- Plumping system will be checked and maintained on monthly basis;

- Installation of Korean technology toilets that enable the reuse of sink water in WC. Similarly in Korea most building have waste water treatment plants installed in the basement for water conservation;
- The staff of PMD and NDMA will be trained on water conservation;

6.5.6. Ecological Impacts (Flora and Fauna)

Scientific literature was screened for articles on ecological effects of RF-EMF. According to a review of the ecological effects of radiofrequency electromagnetic fields ⁴⁹, RF-EMF had a significant effect on birds, insects, other vertebrates, other organisms and plants in 70% of the studies. Development and reproduction of birds and insects are the most strongly affected endpoints. An uncertainty exists on the effects of EMR exposure on birds due to lack of studies. Most studies indicate the possibilities of the changes in the behaviour, physiology, breeding success and mortality. The effects of EMF exposure may be examined in light of multiple intensities are not conducted. The possible biological effects of electromagnetic fields on avian biology are inconclusive and uncertain. Since the EMF will not be directed towards ground, therefore, it is unlikely to impact vegetation including trees, grass, and shrubs and ground animals. Moreover the influence of EMF with other environmental factors on birds is not available that may provide important information for conservation of birds.

6.6. Environmental and Social Monitoring and Management Plan

6.6.1. Mitigation and Monitoring of Environmental and Social Impacts

Table 6.3 describes the implementation of mitigation measures for potential environmental and social impacts and their monitoring plan.

⁴⁹ S.Cucurachietal W.L.M.Tamis, M.G.Vijver, W.J.G.M.Peijnenburg, and G.R.de Snoo

Table 6.3: Environmental and Social Mitigation Implementation and Monitoring Plan

Phase	Implementation Plan			Monitoring Plan			
Impacts	Environmental and Social Impacts	Proposed Mitigation Measures	Responsibility	Monitoring Parameter(s)	Frequency	Responsibility	Compliance Criteria
Design Phase							
Biodiversity and Natural Resources	The sub-project sites may require tree cutting for site clearing.	<ol style="list-style-type: none"> 1. Incorporate technical design measures to minimize unnecessary removal of trees and vegetative cover; 2. Plan for compensatory planting of eight trees against each fallen tree of similar floral function; 3. Disallow introduction of invasive/ exotic species; and recommend native species for plantation. 4. Locations for AWS will be selected outside/at a reasonable distance from the environmentally sensitive areas and archeological/cultural and religious sites of importance. 	Project Implementation Units (PIUs) Design Contractors/Engineers	Construction designs and maps Project plans Tree count Compensatory Tree Plantation Plans Tree Species	At the time of design preparation At the time of design finalization	Environmental Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	Site specific ESMP
Land Acquisition, Resettlement, Loss of Livelihoods	The sub-project sites may require land acquisition and removal of encroachments	If land acquisition/resettlement will be required or loss of livelihood will occur, impacts will be mitigated by preparing a RAP in accordance with the Resettlement Policy Framework (RPF), provided in this ESMF and WB OP 4.12. Details are provided in Chapter 8 on Resettlement Policy Framework.	Social Safeguards Specialist– PIUs	Site selection maps Preparation of RAP	At the time of design	Social Safeguards Specialists Project Directors	RPF and WB OP 4.12
Natural Disasters	The project sites are prone to natural disasters including earthquakes and floods.	<ol style="list-style-type: none"> 1. The building design will be earthquake resistant according to Building Codes of Pakistan with Seismic provision and international best practices to avoid damage caused by earthquake; 2. Variety of structural engineering measures or structural components like shear walls, braced frames, moment resisting frames, and diaphragms, base isolation, energy dissipating devices and bracing of non-structural components are proposed. Simpler techniques include avoiding soft stories and bolting the sill plate of houses to the foundation; 3. Primary focus of earthquake design is initial life safety and getting people out of the building safely, not necessarily the ability of a building to withstand the effects of an earthquake, or to ensure occupancy or functionality following an event. Therefore building design will include emergency exits and alarm system; 4. Planning, designing and constructing the building to minimize any potential flood damages using guidelines of Annexure 6. Following are proposed: 5. elevating as much of the building as possible above the design flood level, 6. designing the building foundation and any portions subject to flooding to withstand design flood conditions and loads, 7. using flood-damage-resistant materials for any portions of the building below the design flood level 	Project Implementation Units (PIUs)	Sub-project design maps with incorporation of building code for relevant Zones Construction contractor ToRs	At the time of design	Environmental Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	Building Codes of Pakistan with Seismic Provision using earthquake Zone standards for identified project sites

		8. where flood proofing is permitted, employing appropriate methods and materials to either dry-flood proof or wet-flood proof those portions of the building below the design flood level					
Water /Electricity/ Natural Gas/ Fuel Consumption	There will be an increase in resource consumption due to construction work and subsequently project operations due to increase in staff.	<ol style="list-style-type: none"> Green building council and international best practice will be engaged for design provisions to be followed for water, electricity and natural gas conservation; Water meters will be made part of the design in each building to monitor the consumption; Design of buildings will include installation of Solar Panels; Provision of Low Voltage electrical appliances will be made in procurement procedures; Provision of pick and drop will be made part of sub-project design to manage the resource consumption including fuel and reduction in GHG emissions. Prepare Energy and water conservation plan for construction 	Project Implementation Units (PIUs)	Design provision for water, electricity, natural gas and fuel conservation	At the time of design	Environmental Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	Green Building Council guidelines
Air Quality and Noise Levels	Project activities associated with construction may increase the ambient air quality and noise levels of the at the sub-project sites. The impacts are likely to be high.	<ol style="list-style-type: none"> Air quality and noise level baselines will be conducted to enable monitoring during construction phase; Provision of compliance to NEQS of vehicular emission will be made in the contract of construction contractor; Traffic management plan for construction will be formulated during design phase that enable continuous traffic flow and avoid congestions which result in increased vehicle smoke density at a given area; Plan to neutralize dust emissions from construction activity, such as regular watering of sub-project sites to settle dust. 	Project Implementation Units (PIUs)	Monthly monitoring of Ambient Air Quality and Noise for baseline.	At the time of design	Environmental Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	IFC/World bank OHS, ECP and NEQS for Ambient Air Quality and Noise.
Solid Waste Management	Improper solid waste disposal can result in increased air pollution through burning of waste, vector borne diseases, contamination of water sources and ambient aesthetics for surrounding communities. The impacts are likely to be high.	<ol style="list-style-type: none"> Prepare a detailed Solid Waste Management Plan for the construction sites and labor camps; Identify current municipal systems of waste management Plan for placement of waste collection containers throughout the project area; Disallow the burning of any of type of waste; Prepare plans for the safe handling, storage and disposal of harmful materials; Prepare Solid Waste Management Plans for project sites for the operational phase (including adequate placement of waste bins, requirements of sanitary staff, transportation of waste, and identification of landfill sites) Hazardous material list not to be used in construction will be made part of the contract. 	Contractor Project Implementation Units (PIUs)	Solid Waste Management Plan Contractual binding on prohibited use of Hazardous Material for construction contractor (CC)	At award of construction Contract	Environmental Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	Hazardous Substance Rules 2003 ToRs

Workers Health and Safety	Use of heavy machinery and handling of chemicals by workers can result in health impacts and accidents. The impacts are likely to be high.	Prepare a Worker Health and Safety Plan for the construction phase	Contractor Project Implementation Units (PIUs)	Worker Health and Safety Plan	At award of Construction Contract	Social Safeguards Specialist – PIU, Contractor, Project Directors PMD and NDMA	World Bank OHS Guidelines
Construction Phase							
Landscape/Soil	Construction at sites is likely to carry out site clearance, vehicular, labour and machinery movement causing soil erosion and compaction. There is also a potential for contamination of soil via runoff from construction activities including oil spills, construction material, dredged / spoil materials and construction waste.	<ol style="list-style-type: none"> 1. Removal of vegetation and trees will be avoided to the extent possible 2. Water will be sprinkled during building of foundation to avoid erosion. 3. Construction materials will be stored in proper stores on impervious sheets to avoid any soil contamination. 4. Machinery and vehicles will be operated at designated routes to avoid erosion and compaction of un-impacted soils. 5. Visual Inspection will be carried out for land contamination and dust emissions. 6. The soil contaminated from minor and moderate spills will be removed and will be handed over to waste contractor for treatment at nearest incineration facility to the sub-project sites. 7. Major spills may require specialized treatment such as incineration, bioremediation and biodegradation. The biological agents will be introduced to the spill to hasten biodegradation. Most of the components of oil will be broken down by bacteria and other microorganisms into harmless substances such as fatty acids and carbon dioxide. To stimulate the growth of the microorganisms, fertilizing nutrients like nitrogen and phosphorous will be placed near the oil tanks. 8. Training of staff on oil spills. 	Contractor Project Implementation Units (PIUs)	Visual inspections and photographic record of site clearing and oil spills. Water sprinkling	Daily	Environmental Safeguards Specialist – PIUs Construction Contractor	World Bank OHS for Ambient
Ambient Air Quality and Climate	The construction activities at sub-project sites will cause impact on air quality, cement mixers (Batch Plant), movement of the machinery, generators	<ol style="list-style-type: none"> 1. Contractor shall provide an Emissions Monitoring Plan to ensure constant checking of emissions by construction machinery and vehicles; Contractor should provide an operations and maintenance plan for the same; 2. Water will be sprinkled twice a day to avoid fugitive dust emissions; 	Contractor Project Implementation Units (PIUs)	Ambient Air Quality monitoring for SO _x , NO _x and Particulate Matter PM _{2.5} /10	Monthly	Environmental Safeguards Specialist -PMD and NDMA/ Construction Contractor	NEQS and World Bank OHS

	soil excavation, construction vehicles, is likely to generate dust and exhaust emissions. Impact on local air quality is high	<ol style="list-style-type: none"> 3. Construction machinery and vehicles will be kept in good conditions to avoid vehicular emissions. Vehicular and generator exhaust emissions will be monitored to ensure compliance; 4. Unnecessary movement of vehicles will be avoided at the construction location; 5. Open burning of solid waste from the Contractor's camps should be strictly banned; 6. Wind breaks /barriers (either natural or constructed) will be deployed to reduce the possibility of suspended particles in air; 7. Raw materials such as cement, gravels and sand will be kept under sheet covers to prevent air flow; 8. In order to further reduce the environmental impact Cement Works (Concrete Batching Plant), the concrete batching plant will incorporate the following design and practices: 9. Cement will be transferred directly from barges to the plant. 10. All mixing will be in the enclosed electric motor driven plant mixer, NOT in trucks. 11. Truck loaded with concrete will be in wet form. 12. All washing water used by the batch plant and storm water will be collected and stored and recycled for re-use. 13. No water will be discharged outside the plant boundary. 14. Concrete recycling machine be used to recycle waste material to slurry water and aggregates for reuse. 					
Surface/Ground Water Resources	Drainage channel is located at sub- project site for NDMA complex and drainage channel are in close vicinity of MMC and WSR sites. Construction activities may encourage soil erosion and waste may increase the sediment loads into the city drainage, while accidental leaks/spills of oil/fuel from storage tanks or maintenance vehicles can also pollute surface waters. The impact is likely to be high in sub- project site for NDMA complex	<ol style="list-style-type: none"> 1. Debris Management Plan; the contractor will ensure that construction debris does not find its way into the drainage or water channels which may get clogged; 2. Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond; 3. Construction work close to streams or other water bodies will be avoided, especially during monsoon period; 4. All fuel storage will be properly marked to highlight their contents with a concrete pad underneath to prevent water contamination in case of leaks or spills. Daily monitoring will be carried out for leaks. Shovels, plastic bags, and absorbent material will be placed near fuel and oil storage or handling areas to attend spills and leaks; 5. Used oil and vehicle related waste will be transported to local contractors for recycling or reuse; 6. Diverting work area runoff into properly designed and constructed sediment traps or drainage collection system to ensure that exposed soils are not eroded. Runoff velocities in ditches or other drainage routes, or along slopes, to be kept low to minimize erosion potential. Runoff outfall locations to be protected with erosion resistant material, if required. 7. Proper disposal of solid and sewage waste from workers camps to ensure it is not disposed in the drainage channel. 	Contractor Project Implementation Units (PIUs)	Surface Water	Monthly Quarterly	Environmental Safeguards Specialist -PMD and NDMA Construction Contractor	NEQS and World Bank OHS

<p>Water /Electricity/ Natural Gas and Fuel Consumption</p>	<p>Construction activities require a large amount of water that may reduce the availability of water in residing area. It will add load to the electricity natural gas fuel consumption increasing GHG emissions. The impact is likely to be high.</p>	<ol style="list-style-type: none"> 1. Water meters will be installed at sub-project sites to monitor water consumption; 2. Construction staff will be trained on water conservation practices to avoid excessive loss; 3. Water required for construction should be obtained in a way so that water availability and supply to residing area remains unaffected; 4. Approval will be attained from relevant development authority at district level/CDA prior to construction work. 5. Construction workers and supervisor will be trained on energy and water conservation practices. 	<p>Contractor Project Implementation Units (PIUs)</p>	<p>Water, Electricity and Natural Gas Consumption Energy Conservation Plan Trainings</p>	<p>Monthly/ Quarterly</p>	<p>Environmental Safeguards Specialist -PMD and NDMA Construction Contractor</p>	<p>World Bank Environmental Code of Practice</p>
<p>Solid Waste Generation</p>	<p>During construction phase, solid waste can be generated from discarded equipment parts, scrap metals, equipment boxes, wood parts, empty bags, and leftover construction debris. The construction material and waste may include toxic/hazardous chemical materials.</p>	<ol style="list-style-type: none"> 1. Solid Waste Management Plan will be prepared for all sub-project sites to be used by Construction Contractor. The Waste Management Plan will be prepared with following provision of hazardous chemical handling plan: <ul style="list-style-type: none"> ▪ Solid waste collection, segregation, storage and disposal will be carried out for waste generated. For at source segregation separate waste bins will be placed at sub-project sites. Recyclable material will be segregated whereas non-hazardous waste will be disposed-off properly at approved disposal site; ▪ Labeling of containers will be carried out including the identification and quantity of the contents, hazard information; ▪ Marking of Hazardous/toxic waste 'if generated' separately and disposal using international best practices through registered contractor; ▪ Used oil will be collected in separate containers stored on impervious platform with restricted access and must be sold to licensed contractor; ▪ Burning of solid and waste oil should be strictly prohibited 2. Training of workers will be carried out in the storage and handling of materials and chemicals that can potentially cause soil contamination; 3. Emergency Response Plan will be prepared to address the accidental spillage of fuels and hazardous/toxic material, fire, vandalism and natural hazards; 4. On completion of the construction phase of the project, the contractor will be required to rehabilitate the site. Rehabilitation will include removal of all construction materials and wastes, and the grading and landscaping of all exposed sites that may be prone to erosion. Where natural erosion protection measures may not be possible or practical, suitable physical erosion protection methods will be used. The purposes of site rehabilitation will be to minimize the potential for soil erosion, enhance the aesthetic appearance of the site and restore safe public access to the surrounding area. 	<p>Contractor Project Implementation Units (PIUs)</p>	<p>Solid waste Management Plan trainings Amount and type of solid waste generated from sub- project sites; List of hazardous chemical used for construction</p>	<p>Monthly</p>	<p>Environmental Safeguards Specialist -PMD and NDMA Construction Contractor</p>	<p>Hazardous Chemicals Rules, 2003</p>

Noise Levels	The construction activities are likely to generate high noise levels. The sources of noise in construction include Asphalt Plant excavation work, heavy earth moving equipment/machinery, pilling work, welding, cuttings, drilling, grinding and material loading/offloading vehicles. Impact is likely to be high.	<ol style="list-style-type: none"> 1. The location for stationary sources of noise such as concrete mixers and pumps will be selected at a reasonable distance from residing population. The cement tankers will be working inside enclosure with cladding to reduce noise; 2. The construction material loaders will only operate during night time as per rules of traffic police. Working hours will be allocated for the use of batch plant, equipment and other machinery; 3. School time and late night construction activities will be avoided; 4. Use of noise barriers in locations next to schools; 5. Blowing of horn will be strictly prohibited; 6. Noise monitoring will be carried out at various locations using noise meters. Site labour working in high noise area where noise level exceeds 85 dB (A), will wear earplugs and ear muffs; 7. Noise level of 55 dB at day and 45 dB at night time will be maintained. 	Contractor Project Implementation Units (PIUs)	Noise Monitoring Residing Areas and Construction Site	Monthly	Environmental Safeguards Specialist -PMD and NDMA Construction Contractor	NEQS, World Bank OHS
Flora and Fauna	The construction may require cutting of trees and clearing of vegetation.	<ol style="list-style-type: none"> 1. Planting of eight trees for every tree cut during construction by the contractor and managed by Project staff; 2. Do not introduce invasive or exotic species through plantation. 	Contractor Project Implementation Units (PIUs)	Tree count Tree Plantation in designated area and count eight for one cut	Prior /Start/Post construction	Environmental Safeguards Specialist -PMD and NDMA Construction Contractor	Site specific ESMP
Public Health and Safety	Construction activities and movement of heavy vehicles may impact public safety. Similarly emissions and noise from the site may impact the health of residing communities	<ol style="list-style-type: none"> 1. Train drivers operating heavy vehicles in road and pedestrian safety; 2. Set appropriate speed limits to avoid accidents; 3. Use of heavy vehicles on public roads will be avoided during hours when students are coming to school or leaving school; 4. Placement of construction and diversion signage, particularly at urban areas and at sensitive/accident-prone spots, in accordance to a Public Safety Plan; 5. Provision of alternate routes for use by the public. <p>Mitigation associated with public health including noise and air quality is included in earlier sections.</p>	PIUs	Complaint/ Accident Register	Prior /Start/Post construction	Social Safeguards Specialist -PMD and NDMA Construction Contractor	World Bank OHS Guidelines and ECP
Workers Health and Safety	Use of heavy machinery and handling of hazardous waste and chemicals may result in health impacts for workers on the construction site.	<p>In accordance to the Solid Waste Management and Workers Health and Safety Plan, ensure:</p> <ol style="list-style-type: none"> 1. The project locations have full access to health facilities and emergency response centers (fire, earthquake and floods) and police station. In case of emergency, the injured will be taken to the nearest medical facility. 2. Provision of clean drinking water will be ensured for the construction crew; 3. Hygiene inspections will be carried out to avoid disease epidemic; 4. In case of unlikely incidents (fire, vandalism) the workers will be evacuated and emergency response and law enforcement agencies will be engaged; 	Contractor Project Implementation Units (PIUs)	Health and Safety Management Plan and trainings Medical record of workers Prior /Start/Post construction	Monthly	Social Safeguards Specialist -PMD and NDMA Construction Contractor	World Bank OHS Guidelines and ECP , Health and Safety Management Plan

		<ol style="list-style-type: none"> 5. Fire safety alarms will be installed at various locations; 6. Fire extinguishers will be placed at various locations including a water hose installation at ground level; 7. Fire safety and emergency response trainings will be conducted; 8. Hazards indicator signs and firefighting equipment will be installed; 9. The construction crew will be trained on important aspects of workplace safety; 10. Construction machinery operators and drivers will be trained to avoid associated accidents using machines and vehicles; 11. Flammables and other toxic materials will be marked and stored at secured sites; 12. Onsite first aid kits will be kept at construction sites and randomly moving vehicles\machinery. 13. Do not allow workers with inadequate training to operate heavy machinery; 14. Provision of appropriate and high quality Personal Protective Equipment (PPE) to workers such as gloves, vests, hard-hats, masks etc.; 15. Train workers in the use of PPE and safety measures while using heavy machinery and handling chemicals. 16. Follow guidelines for Asbestos and Asbestos based product use in construction (Annexure 7) 					
Physical /Cultural/ Archeological Resources	<p>The sub-projects may include religiously and culturally important sites at a reasonable distance. Excavation work during construction may result in the uncovering of ancient sites or artifacts. Impact is likely to be low as the only identified sensitive site close to sub project MMC is a grave yard.</p>	<ol style="list-style-type: none"> 1. The construction work will be stopped at the time of the funeral and burial at the grave yard. 2. Construction staff will be trained and informed on identifying the evidence of archaeological/historic remains; 3. In case evidence of archaeological remains is found during construction activities, the actions listed below will be undertaken. <ul style="list-style-type: none"> ▪ Excavation work in the vicinity of the find will be stopped; ▪ Assistance will be sought from the nearest office of the Department of Archaeology and Museums to identify the remains; ▪ If the department decides to salvage the find, PMD will provide assistance. 4. Detailed procedure for Archaeological Chance Finds included in Annexure 8. 	Contractor Project Implementation Units (PIUs)	<p>Consultation with the relevant departments</p> <p>Preparation of PCR Plan, if needed.</p>	At the start of construction	Social Safeguards Specialist -PMD and NDMA Construction Contractor	RPF and WB OP 4.12
Traffic Management	<p>The sub-project sites are in urban area close to social sensitive receptors like schools, colleges, offices and residents. The construction work may likely impact the traffic flow.</p>	<ol style="list-style-type: none"> 1. Vehicles will be inspected prior to start of construction work. 2. Alternate routes will be created to avoid disturbance to school and hospital; 3. Construction site will be barricaded to minimize accidental injuries and visual nuisance to the general public; 4. Movement of construction equipment will be limited to specific duration when there is least disturbance to the residing offices e.g after school timings; 5. Adequate road signs will be erected to warn general public; 	Contractor Project Implementation Units (PIUs)	Construction vehicles trimmings Accident register	Continuous	Social Safeguards Specialist -PMD and NDMA Construction Contractor	Compliance Traffic management plan

		<ol style="list-style-type: none"> 6. The contractor will be advised to follow vehicular maintenance to reduce engine noise; 7. Drivers will be trained to follow the designated routes and avoid honking; 8. The construction trucks will be adequately covered with tarpaulin covers to avoid flow into air. 					
Land Acquisition and Resettlement	Sub-projects may require some small scale private land acquisition and removal of encroachments	<ol style="list-style-type: none"> 1. A Resettlement Action Plan (RAP) will be prepared for the sub-project based on guidance from the Resettlement Planning Framework (RPF) 	Contractor Project Implementation Units (PIUs)	RAP	Monthly	Social Safeguards Specialist – PMD/NDMA Resettlement Specialist	RPF and RAP
Operations Phase							
EMF	The sub-project operations at MMC and WSR sites may have radiation impacts of EMF related to radars	<ol style="list-style-type: none"> 1. Engineering controls for EMF include interlocks, electronic means to exclude the radar pointing within office complex in the tower building, and shielding. 2. Administrative controls include audible and visible alarms, warning signs, and restriction of access through barriers, locked doors, or limiting access time to radar. 3. Workers will use personal protective equipment to ensure compliance with exposure standards. Conductive suits, gloves, safety shoes and other types of personal protective equipment for RF fields are now commercially available. PPEs should be used with great care, since the attenuation properties of the material used to make this protective equipment can vary dramatically with frequency. 4. RF safety glasses will be used near the radar operating area. Special care will be taken in buying the glasses since any metal may enhance local fields by acting as a receiving antenna. 5. There are no exposure situations where members of the general public need to use protective equipment for RF fields from weather radars. An extensive program of measurement surveys, hazard communication, coupled with effective protective measures, is required around all radar installations for safety of workers. 	Project Management NDMA and PMD	Monitoring should be performed to quantify RF field levels in the area. While extremely high RF field levels can be measured directly in front of radar to assess the levels of EMF.	Quarterly	Environment and Social Safeguards Specialist -PMD and NDMA	World Health Organisation Standards
Land Acquisition and Resettlement	Sub-projects may require some small scale private land acquisition and removal of encroachments	<ol style="list-style-type: none"> 1. A Resettlement Action Plan (RAP) must be completed 	Project Implementation Units (PIUs)	RAP	Project Completion	Social Safeguards Specialist – PMD/NDMA Resettlement Specialist	RPF and RAP
Air Quality and Climate	An increase in number of vehicles entering the offices may pose potentially negative	<ol style="list-style-type: none"> 2. The project staff will be advised to car pool and use local transport; 3. Provision of pick and drop for staff to avoid additional load on air quality; 	Project Management NDMA and PMD	Vehicular Emissions	Quarterly	Environment and Social Safeguards	NEQs Permissible limits of

	impacts on the air quality of the area if not mitigated properly	4. Vehicles with excessive smoke emissions should not be allowed to enter the sub-project locations.				Specialist -PMD and NDMA	vehicular exhaust
Surface and Ground water	The sub- projects are not likely to impact ground water, however, the impact on surface water through sewerage is likely to be moderate. The NDMA Complex has a drainage channel that might be used for sewage disposal.	<ol style="list-style-type: none"> 1. Ensure sewage is directed into municipal drains leading to sewerage treatment Plant. 2. Restoration and protection monsoon led water channel at the site of NDMA complex 	Project Management NDMA and PMD	Ground water /drinking quality	Biannual	Environment and Social Safeguards Specialist -PMD and NDMA	NEQs liquid Effluent
Solid Waste	There will be an increase in solid waste generation due to additional building maintenance and staff employed for the sub-projects.	<ol style="list-style-type: none"> 1. Monitor and ensure that solid waste collection is provided by the municipality. 2. Decrease solid waste going to landfills by segregating at source with labeled dust bins for biodegradable, non- biodegradable and recyclable products; 3. Disposal of biodegradable to the municipality for treatment; 4. Clearance of reusable and recyclable waste to certified recycling companies. 	Project Management NDMA and PMD			Environment and Social Safeguards Specialist -PMD and NDMA	Solid Waste Management Plan
Electricity/ Water /Natural Gas /Fuel Consumption		<ol style="list-style-type: none"> 1. Water meters will be installed to assess the water consumption and water sensors at taps to avoid the wastage in case of leakages; 2. Plumping system will be checked and maintained on monthly basis; 3. Installation of Korean technology toilets that enable the reuse of sink water in WC. Similarly in Korea most building have waste water treatment plants installed in the basement for water conservation; 4. The staff of PMD and NDMA will be trained on water conservation; 5. Use of solar panels to generate electricity 	Project Management NDMA and PMD	Electricity/ Water /Natural Gas /Fuel Consumption	Monthly	Environment and Social Safeguards Specialist -PMD and NDMA	N/A

Chapter 7. Environmental and Social Screening

7.1. Sub-Project Screening and Impact Assessment Process

While preparing any sub-projects, the ESMF will be followed to screen sub-projects and to determine the appropriate safeguards instruments which will be required in line with the World Bank Operational Policies. The following guidelines, codes of practice and requirements will be followed in the screening, selection, design and implementation of any sub-project.

Criteria for the type of assessment to be conducted for sub-projects are provided in **Table 7.1**. The sub-projects will be screened for social, environmental and archaeological impacts using screening given in **Annexure 9**. Category-A sub-projects will not be financed under this project. If Category-A sub-project is identified, sub-project will be either dropped or replaced with a Category B or C sub-project. Environmental and Social Management Plans (ESMPs) will need to be prepared and clearance obtained from the Bank prior to initiating environmental category 'B' sub-projects; For sub-projects categorized as Category C, no further activity beyond screening would be required.

Table 7.1: Subproject Category Classification System

Category	Description	Requirement
A	Proposed subproject is classified significant adverse social and/or environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.	Full ESIA Category A subproject examines the project's potential negative and positive environmental and social impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental and social performance.
B	Proposed subproject is classified as Category B, if it's potential adverse social impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than for Category A projects.	Narrower scope of ESIA for a Category B subproject than that of ESIA for Category A. But, like ESIA for Category A, it examines the subproject's potential negative and positive environmental and social impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental and social performance.
C	Proposed subproject is classified as Category C if it is likely to have minimal or no adverse social and/or environmental impacts.	Beyond screening, no further ESIA action is required for a Category C subproject.

Note: Any proposed subproject under the project which results in a Category A assignment will only be considered for financing if the individual subproject activity resulting in the Category A assignment is appropriately mitigated from the subproject and/or replaced with an element that presents a less significant environmental risk (Category B or C).

The guidelines for preparation of ESMPs are given below. The assessments will also be submitted to the relevant EPA for obtaining No Objection Certificate (NOC) before

commencing the sub-projects implementation, in line with the provincial regulatory requirements.

ESMP Guidelines for Sub-Projects

When a subproject includes distinct mitigation measures (physical works or management activities), an Environmental and Social Management Plan (ESMP) needs to be included with the subproject application.

Site Specific ESMP General Format/ Contents:

An ESMP usually includes the following components:

Description of adverse effects: The anticipated effects are identified and summarized.

Description of mitigation measures: Each measure is described with reference to the effect(s) it is intended to deal with. As needed, detailed plans, designs, equipment descriptions, and operating procedures are described.

Description of monitoring program: Monitoring provides information on the occurrence of environmental and social effects. It helps identify how well mitigation measures are working, and where better mitigation may be needed. The monitoring program should identify what information will be collected, how, where and how often. It should also indicate at what level of effect there will be a need for further mitigation. How environmental and social effects are monitored is discussed below.

Responsibilities: The people, groups, or organizations that will carry out the mitigation and monitoring activities are defined, as well as to whom they report and are responsible. There may be a need to train people to carry out these responsibilities, and to provide them with equipment and supplies.

Implementation schedule: The timing, frequency and duration of mitigation measures and monitoring are specified in an implementation schedule, and linked to the overall subproject schedule.

Cost estimates and sources of funds: These are specified for the initial subproject investment and for the mitigation and monitoring activities as a subproject is implemented. Funds to implement the EMP may come from the subproject grant, from the community, or both. Government agencies and NGOs may be able to assist with monitoring.

Monitoring Methods:

Methods for monitoring the implementation of mitigation measures or environmental effects should be as simple as possible, consistent with collecting useful information, so that community members can apply them themselves.

If social impacts related to land, resettlement, livelihood, infrastructure damage are identified during screening process, the sub-projects will also be screened for need of land acquisition and resettlement using Involuntary Resettlement Screening Checklist Attached as **Annexure 10**. If confirmed, necessary planning efforts will be carried out to develop mitigation measures in accordance with RPF presented in Chapter-8 of this ESMF.

All projects/subprojects will be screened for impacts on physical cultural resources and necessary mitigation measures. An outline of Physical Cultural Resource Management Framework providing a roadmap for preparing a Management Plan for the protection of cultural property and chance discovery of archaeological artifacts, unrecorded graveyards and burial sites are outlined in **Annexure 8**.

The following will be applicable for all sub-projects:

22. ESMPs of sub-projects should be made part of all construction contracts to ensure effective implementation.
23. The Environment, Health and Safety Guidelines developed by the International Finance Corporation (IFC) and the World Bank will also be applicable to the activities under the emergency projects/subprojects.

24. Subject to the needs as determined by the Bank's safeguards' team, the implementing agency will engage independent technical resources to conduct an annual environmental and social audit as third party validation, of the subprojects undertaken during each year of the Project implementation.

7.2. Planning Review and Approval

PIU will be responsible for the screening and preparation of any safeguards instrument required in line with this Framework. The PIU will submit the initial ESMPs documents to World Bank prior to implementation of sub projects to maintain the quality control and consistency. The implementation agencies will not approve the proposed operations until the required environmental and social safeguard action plans are cleared for compliance with the Framework by the World Bank.

The implementing agency will implement the projects in close coordination with the relevant line departments, local governments, and political agents. The implementing agency will be responsible for applying the safeguard screening and mitigation requirements to its own sub-projects. It should also be ensured that other necessary NOCs should also be obtained from all other departments before commencing works of any sub-project.

Chapter 8. Resettlement Policy Framework

8.1. Involuntary Resettlement under the Project

The Project activities may have some small scale land acquisition requirements. Planned and anticipated sub-projects and their land requirements are:

Expansion and refurbishment of PMD facilities and offices

This sub-component will establish the Monsoon Monitoring Centre in Islamabad, as well as up gradation of Flood Forecasting Division (FFD) to National Flood Forecasting Center (NFFC) in Lahore. Both facilities will be built on the existing offices of PMD in Islamabad and Lahore, hence not requiring any acquisition of land.

Construction of NDMA Headquarters in Islamabad

This component mainly involves developing institutional set-up and operational capacity of NDMA through construction of NDMA headquarters that will host National Institute of Disaster Management (NIDM), National Emergency Operations Center (NEOC) and NDRF Facility. The NDMA Headquarters are most likely going to be built on government owned land allocated for this purpose. Screening will be required to ensure that there are no squatters or encroachments on this land. A Resettlement Action Plan (RAP) will be prepared and implemented if encroachments are ascertained and Project Affected Persons (PAPs) are identified during screening.

Installation of Automatic Weather Stations (AWS)

Automatic Weather Stations will be installed at undisclosed locations across Pakistan. Land requirements for each station are small, approximately 500 square feet. These stations will be installed on:

- Government owned land where possible
- If government owned land is not available, the project will explore voluntary land donations
- If government owned or voluntary land is not available, the project will as a last option, consider acquisition of private land. In case of land acquisition, a Resettlement Action Plan (RAP) will be prepared.

8.2. Objectives of the Resettlement Planning Framework (RPF)

The Resettlement Planning Framework has been developed under guidance of World Bank Policy OP4.12 on Involuntary Resettlement to respond to possible resettlement due to project activities. The RPF provides guidelines on preparation of a Resettlement Action Plan (RAP) in case land acquisition is ascertained or Project Affected Person (PAPs) are identified during screening of sub-projects. Screening tools are provided in Chapter 7 and Annexure 10 of this ESMF.

OP 4.12 on Involuntary Resettlement covers direct economic and social impacts that are caused by:

- The involuntary taking of land resulting in i) relocation or loss of shelter; ii) loss of assets or access to assets; or iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or
- The involuntary restriction of access to legally designated parts and protected areas resulting in adverse impacts on the livelihoods of displaced persons.

Implementation of any sub-project requiring involuntary resettlement will not commence before a RAP has been prepared and implemented. The RAP will lay out provisions for land and other compensation, assistance required for relocation of PAPs, prior to displacement, as well as livelihood restoration measures. In particular, the taking of land and related assets can happen only after compensation has been paid and other allowances and entitlements have been provided to displaced persons and measures have been taken to ensure livelihood restoration. The selection of sub-projects will be based on the following principles:

- Involuntary resettlement and land acquisition should be avoided where feasible, or minimized, exploring all viable alternative sub projects design;
- Where involuntary resettlement and land acquisition is unavoidable, resettlement and compensation activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to give the persons displaced by the project the opportunity to share in project benefits. Displaced and compensated persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs; and
- Displaced and compensated persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

8.3. Eligibility and Cut-off-Date

In accordance with the World Bank OP 4.12, census will be required to identify the person/persons who will be affected by the project to determine the eligibility for compensation and other resettlement assistance⁵⁰.

The project affected persons eligible for compensation or rehabilitation/resettlement assistance are discussed below:

- All land owning affected persons losing land or non-land assets, whether covered by legal title or customary land rights, whether for temporary or permanent acquisition;
- Tenants and sharecroppers, whether registered or not; for all non-land assets, based on prevailing tenancy arrangements;
- Persons losing the use of structures and utilities, including titled and non-titled owners, registered, unregistered, tenants and lease holders plus encroachers and squatters;
- Persons losing business, income and salaries of workers, or a person or business suffering temporary effects, such as disturbance to land, crops, and business operations both permanently and also temporarily during construction;
- Loss of communal property, lands and public infrastructure;

⁵⁰ Resettlement assistance may consist of land, other assets, cash, employment, and so on, as appropriate.

- Vulnerable persons identified through the census/impact assessment survey/analysis; and
- In case of relocation, all affected persons will receive transitional and other support to re-establish their livelihoods.

The compensation eligibility will be limited by a ‘cut-off date’ for the proposed project on the day of the start of the “census” survey for the impact assessment in order to avoid an influx of outsiders. The cut-off date⁵¹ will be announced through mass media (like pamphlets/leaflets, newspaper). The project affected persons who settle within the alignment after the cut-off date will not be eligible for compensation.

8.4. Entitlement for Compensation

The following entitlements are applicable for the project affected persons losing land, structures, and other assets and incurring income losses. These displaced persons are eligible for rehabilitation subsidies and for the compensation of lost land, structures and utilities along with loss of livelihood. There will also be special provisions for vulnerable displaced persons.

8.4.1. Agricultural Land Impacts

Permanent Losses:

- Legal/legalizable landowners (including who may have customary rights) are compensated either in cash at replacement cost plus a 15% compulsory acquisition surcharge (CAS) free of taxes and transfer costs;
- Leaseholders of public land will receive rehabilitation in cash equivalent to the market value of the gross yield of lost land for the remaining lease years (up to a maximum of three years); and
- Encroachers will not receive payment for land – they will be rehabilitated for land use loss through a special self-relocation allowance equivalent to one year of agricultural income or through the provision of a free or leased replacement.

Temporary Land Loss

Legal/legalizable owners and tenants or encroachers will receive cash compensation equal to the average market value of rental of land. For agriculture land, compensation will be paid for each lost harvest for the duration of the loss, and by the restoration of both, cultivable and uncultivable land, to pre-construction conditions. Through specification in the contract agreements, contractors will be required to carry out restoration works before handing over land back to the original occupiers, or PAPs will be provided with cash to rehabilitate the land.

Severely Project Affected Persons

- Vulnerable households, legal/legalizable owners, tenants or encroachers will be entitled to one vulnerable impact allowance equal to the market value of the harvest of the lost land for one year (summer and winter), in addition to the standard crop compensation.

⁵¹ Normally, this cut-off date is the date the census begins. The cut-off date could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information on the area delineated, and systematic and continuous dissemination subsequent to the delineation to prevent further population influx.

- The aim of this payment is to assist severely displaced persons to overcome the short term adverse impacts of land and asset loss, and help them to readjust to their changed circumstances while they are making replacement earning arrangements. There will be a need to closely monitor such severely displaced persons. The one-time payment should, at the absolute minimum be adequate to provide them with equivalent level of livelihood.
- Other options can be considered, including non-cash based livelihood support and employment, both temporary and permanent. Other additional income restoration measures can be considered during preparation of RAP, if required for any sub-project.

8.4.2. Residential and Commercial Land

- Residential and commercial land will be compensated at replacement value for each category of the PAPs.
- Residential and commercial land owners will be entitled to the following:
- Legal/legalizable owners will be compensated by means of either cash compensation for lost land at replacement cost based on the market value of the lost land plus a 15% CAS, free of taxes and transfer costs; or in the form of replacement land of comparable value and location as the lost asset;
- Renters are compensated by means of cash compensation equivalent to three months of rent or a value proportionate to the duration of the remaining lease, including any deposits they may lose; and
- Squatters/Encroachers are compensated through either a self-relocation allowance covering six months of income or the provision of a leased replacement plot in a public owned land area. They will be compensated for the loss of immovable assets, but not for the land that they occupy.

8.4.3. All Other Assets and Incomes

- Structures will be compensated for in cash at replacement cost plus 15% CAS. Material that can be salvaged is allowed to be taken by the owner, even if compensation has been paid for it;
- Renters or leaseholders of a house or structure are entitled to cash compensation equivalent to three months rent or a value proportionate to the duration of the remaining lease period;
- Crop compensation will be paid to owners, tenants and sharecroppers based on their agreed shares. The compensation will be the full market rate for one year of harvest including both winter and summer seasons;
- Fruit and other productive trees will be compensated for based on rates sufficient to cover income replacement for the time needed to re-grow a tree to the productivity of the one lost. Trees used as sources of timber will be compensated for based on the market value of the wood production, having taken due consideration of the future potential value;
- Businesses will be compensated for with cash compensation equal to one year of income for permanent business losses. For temporary losses, cash compensation equal

to the period of the interruption of business will be paid up to a maximum of six months or covering the period of income loss based on construction activity;

- Workers and employees will be compensated with cash for lost wages during the period of business interruption, up to a maximum of three months or for the period of disruption;
- Relocation assistance is to be paid for PAPs who will be required to vacate their property. The level of assistance should be adequate to cover transport costs and also special livelihood expenses for at least 1 month or based on the severity of impact;
- Community structures and public utilities, including mosques and other religious sites, graveyards, schools, health centers, hospitals, roads, water supply and sewerage lines, will be fully replaced or rehabilitated to ensure their level of provision is, at a minimum, to the pre-project situation; and
- Particular attention will be paid to vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, indigenous peoples, ethnic minorities, or other displaced persons who may not be protected through national land compensation legislation.

8.5. Entitlement Matrix

The compensation and resettlement & rehabilitation entitlements are summarized in the Entitlement Matrix presented as **Table 8.1** below:

Table 8.1: Entitlement Matrix

Asset	Specification	Project Affected Persons	Compensation Entitlements ⁵²
Temporary impacts on arable land	Access is not restricted and existing or current land use will remain unchanged	Farmers/ Titleholders	No compensation for land acquisition provided that the land is rehabilitated/restored to its former quality following completion of works; Rental for land will be provided in cash based on the use of land and in accordance with market value. Compensation, in cash, for all damaged crops and trees.
		Leaseholders (registered or not)	No compensation for land provided that the land is rehabilitated/restored to its former quality following completion of works; Land rental will be provided in accordance with market value. Compensation, in cash, for all damaged crops and trees.
		Sharecroppers (registered or not)	Compensation, in cash, for all damaged crops and trees. Land rental will be provided in accordance with market value.
		Agricultural workers	Compensation, in cash, for all damaged crops and trees.

⁵² Compensation for all assets will be to the owner of the asset.

Asset	Specification	Project Affected Persons	Compensation Entitlements ⁵²	
		Squatters	Compensation, in cash, for all damaged crops and trees, where these are owned by the squatters.	
Permanent impacts on Arable land where access is restricted and/or land use will be affected	All adverse effects on land use independent of severity of impact	Farmers/ Titleholders	Land for land compensation with plots of equal value and productivity to the plots lost; or; Cash compensation plus 15% CAS for affected land at replacement cost based on market value free of taxes, registration, and transfer costs.	
		Leaseholders (registered or not)	Renewal of lease contract in other plots of equal value/productivity of plots lost, or Cash equivalent to market value of gross yield of affected land for the remaining lease years (up to a maximum of 3 years).	
		Sharecroppers (registered or not)	Cash equivalent to market value of the lost harvest share once (temporary impact) or twice (permanent impact).	
		Agricultural workers losing their contract	Cash indemnity corresponding to their salary (including portions in kind) for the remaining part of the agricultural year.	
		Squatters	1 rehabilitation allowance equal to market value of 1 gross harvest (in addition to crop compensation) for land use loss.	
	Additional provisions for severe impacts (More than 10% of land loss)	Farmers/ Titleholders Leaseholders	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crop and additional to standard crop compensation).	
		Sharecroppers (registered or not)	1 severe impact allowance equal to market value of share of harvest lost (additional to standard crop compensation)	
			Squatters	1 severe impact allowance equal to market value of gross harvest of the affected land for 1 year (inclusive of winter and summer crops and additional to standard crop compensation)
	Residential/ Commercial Land		Titleholders	Land for land compensation through provision of a plots comparable in value/ location to plot lost or Cash compensation plus 15% CAS for affected land at full replacement cost free of taxes, registration, and transfer costs.
			Renters/ Leaseholders	3 months rent or a value proportionate to the duration of the remaining lease, including any deposits they may lose.
Squatters			Accommodation in available alternate land/ or a self-relocation allowance	
Houses/ Structures		All relevant PAPs (including squatters)	Cash compensation plus 10% electrification allowance at replacement rates for affected structure and other fixed assets free of salvageable materials, depreciation and transaction costs.	

Asset	Specification	Project Affected Persons	Compensation Entitlements ⁵²
			Affected tenants will receive cash compensation of a value proportionate to the duration of the remaining lease period, or three months, whichever is higher. In case of partial permanent impacts full cash assistance to restore remaining structure, in addition to compensation at replacement cost for the affected part of the structure.
Crops	Crops affected	All PAPs owning crops (including squatters)	All crop losses will be compensated at market rates based on actual losses.
Trees	Trees affected	All PAPs owning trees (including squatters)	For timber/ wood trees, the compensation will be at market value of tree's wood content. Fruit trees: Cash compensation based on lost production for the entire period needed to re-establish a tree of equal productivity.
Business/ Employment	Temporary or permanent loss of business or employment	All PAPs (including squatters, agriculture workers)	Business owner: (i) Cash compensation equal to one year income, if loss is permanent; ii) In case of temporary loss, cash compensation equal to the period of the interruption of business up to a maximum of six months or covering the period of income loss based on construction activity. Workers/ employees: Indemnity for lost wages for the period of business interruption up to a maximum of 3 months
Relocation	Transport and transitional livelihood costs	All PAPs affected by relocation	Provision of sufficient allowance to cover transport expenses and livelihood expenses for one month
Community assets	Mosques, foot bridges, roads,	Affected community	Rehabilitation/substitution of affected structures/ utilities (i.e. mosques, footbridges, roads).
Vulnerable PAPs livelihood	Households' below poverty line, female headed households, disable persons etc.	All vulnerable PAPs	Lump sum one time livelihood assistance allowance on account of livelihood restoration support. OPL should be per household member Or Minimum Wage per earning member per month. Temporary or permanent employment during construction or operation, where ever feasible.
Unidentified Losses	Unanticipated impacts	All PAPs	Deal appropriately during project implementation according to the World Bank Operational Policies.

8.6. Calculation for Compensation Payments

Individual and household compensation will be made in kind and/or in cash (refer to **Table 8.2**). Although the type of compensation may be an individual's choice, compensation in kind will be preferred, if available, when the loss amounts to more than 20 % of the total loss of assets. Compensations for land and other assets (buildings and structures) are determined as follows:

Table 8.2: Forms of Compensation

Compensation	Notes
Cash Payments	Compensation will be calculated and paid in the national currency. Rates will be based on the market value of land and/or assets when known, or estimated when not known, plus compensation for the value of standing crops.
In-Kind	Compensation may include items such as land, houses, and other buildings, building materials, seedlings, agricultural inputs and financial credits for equipment.
Assistance	Assistance may include moving allowance, transportation and labour.

8.6.1. Land Valuation and Compensation

There is a minimal chance of permanent land acquisition under this project. Should there be any land acquisition for installation of AWS and therefore RAP preparation, the following procedure will be adopted, as per the Land Acquisition Act 1894 (LAA):

- PMD will write to the relevant provincial revenue department for permanent land acquisition in the interest of welfare of the country;
- Revenue Mukhtiarkar will give a notice to land owner to produce the documents that prove land ownership;
- The land owner will provide the copy of the ownership document to Mukhtiarkar to prove ownership;
- Revenue Department will notify that the particular area is required for state welfare works permanently and hence section 4 and 6 of the LAA will be applied to that area;
- Following application of section 4 and 6 of the LAA, the price will be decided District Collector will pay the cheque to land owner in lieu of the required land.

Land will be valued following a valuation process consistent with LAA 1894 and the provisions of RPF. For land valuation, Land Valuation Committees (LVC) will be formed comprising members from PMD/PIU, local administration, PAPs and NGOs (if any) with a mandate to fix the rates based on market survey and negotiation with the communities. Compensation will be based on the market rates on the cut-off date along with 15 % over and above the cost of the land and other requirements of Sections 23 and 24 of LAA and RPF.

8.6.2. Buildings and Structures

Building, houses and structures will be compensated at replacement cost. Buildings/houses and structure valuation survey will be conducted by a joint team comprising members from PMD/PIU and Consultants to assess the value of the houses and other infrastructural facilities. In this regard meetings will also be held with local people as well as local administration. The schedule rates for the compensation of different types of losses, such as residential and, commercial structures, community owned and religious structures and other such assets will be used as a base which will be escalated with the help of market survey. These unit rates will be discussed and agreed upon with local communities and the affected persons. The following procedures/methods will be used for the proper assessment of unit compensation values of different items/assets located as standard for valuation of assets.

- Houses are valued at replacement value/cost based on cost of materials, type of construction, labour, transport and other construction costs;
- Hand pumps and other utilities are valued at current installation cost; and
- The relocation cost is the amount needed to displace and relocate temporary assets at prevailing market prices without adding costs for transaction.

8.7. Preparing Resettlement Action Plan

Should the screening process identify any involuntary resettlement, OP 4.12 calls for the preparation of individual RAPs that must be consistent with this RPF.

To address the impacts under this policy, the RAP must include measures to ensure that the displaced persons are;

- Informed about their options and rights pertaining to resettlement;
- Consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives; and
- Provided prompt and effective compensation at full replacement cost for losses of assets and access attributable to the sub project.

Following are the major steps to be adopted for preparation of the RAP:

8.7.1. Baseline, Socioeconomic Data, and Resettlement Surveys

An important aspect of preparing a RAP is to establish appropriate and accurate baseline socioeconomic data and census to identify the persons who will be affected by the project, to determine who will be eligible for compensation and assistance, and to discourage inflow of people who are ineligible for these benefits.

To identify the affected population and the possible adverse impacts, primary information will be collected through detailed resettlement assessment survey. This data will include:

- Inventory of houses, population and other assets will be developed by an inventory performa and will be filled through resettlement assessment survey by the team;
- Focus Census to enumerate the affected people and to register them according to location including the land holdings;
- Household Income and Living Standard Survey for assessment of lost and affected household, enterprises and community's living standard level;
- Village Level Survey for all affected people, with a focus on vulnerable groups, as necessary covering the factual position regarding the social amenities, electricity, telephone, water supply, education facilities etc. and other community resources;
- Buildings/Houses Valuation Survey to assess the value of the houses and other infrastructural facilities. In this regard meetings will be held with locals as well as local administration;
- Women Status Survey to establish the baseline data for ascertaining the women status; and
- Consultation with affected population for effective mitigation measures and planning.

8.7.2. Resettlement Entitlement and Policy Matrix

An entitlement matrix consistent with the RPF will be developed. For the restoration of the living standards of the PAP, provision will be made so that people should be provided proper compensation and assistance to restore their livelihoods.

8.7.3. Implementation Arrangements

For effective implementation, RAP will describe the implementation arrangements. Identification of critical path actions, preparation of RAP implementation arrangements, compensation procedures and resettlement process will be described for an efficient and smooth implementation of RAP.

8.7.4. Preparation of Monitoring, Evaluation and Reporting Plan

The mitigation measures are effective only if properly monitored. For this purpose, proper Monitoring, Evaluation and Reporting plan will be prepared.

8.7.5. Grievance Redressal Mechanism (GRM)

Under the GRM, RAP will describe the options available to affected persons for grievance redressal they may have about the entire process, the identification of eligible people for compensation, the valuation and compensation and any other complaints they may have against the entire process. The GRM will be consistent with the provisions of RPF.

8.7.6. Cost Estimates

The RAP preparation and implementation costs, including cost of compensation, various eligible allowances, monitoring & evaluation, grievances redress and LAR administration, as well as contingencies, will be estimated and included in the RAP and will be considered an integral part of Project cost.

Cost estimation will be made during preparation of RAP. The RAP (s) will include a budget section indicating (i) unit compensation rates for all affected items and allowances, (ii) methodology followed for the computation of unit compensation rates, and (iii) a cost table for all compensation expenses including administrative costs and contingencies.

8.7.7. Public Consultation and Participation

Public consultation and participation will afford the PAPs an opportunity to contribute to both the design and implementation of the program activities. In so doing, the likelihood for conflicts between and among the affected and with the management committees will be reduced.

In recognition of this, particular attention will be paid to public consultation with PAPs, households, homesteads (including host communities) as well as NGOs when resettlement and compensation concerns are involved. During RAP preparation, there must be adequate consultation and involvement of the local communities and the affected persons. Specifically, the affected persons must be informed about the intentions to use the earmarked sites for the project activities, facilities and structures. The affected persons must be made aware of:

- Their options and rights pertaining to resettlement and compensation;

- Specific technically and economically feasible options and alternatives for resettlement sites;
- Process of, and proposed dates for, resettlement and compensation;
- Effective compensation rates at full replacement cost for loss of assets and services; and
- Proposed measures to maintain or improve their living standards.

As a matter of strategy, public consultation will be an on-going activity taking place throughout the entire project cycle. Hence, public consultation will take place during the:

- Preparation of project designs
- Resettlement and compensation planning
- Drafting and reading/signing of the compensation contracts.
- Payment of compensations
- Resettlement activities

Public consultation and participation shall take place through local meetings, request for written proposals/comments, completion of questionnaires/application forms, public readings and explanations of the project interventions and requirements. Public documents shall be made available in appropriate languages at the local levels. RAPs should be translated to local languages and made freely available at a public place accessible to the PAPs to which it is relevant. Public consultation measures shall take into account the low literacy levels prevalent in the rural communities, by allowing enough time for discussions, consultations, questions, and feedback.

8.7.8. Resettlement Action Plan

The indicative outline of RAP is given below and it will include the following components:

- i Description of the project
- ii Potential Impacts
- iii Project Objectives
- iv Relevant findings of the socioeconomic study
- v Legal framework
- vi Institutional framework
- vii Eligibility
- viii Valuation of and compensation of losses
- ix Resettlement Entitlement and Policy Matrix
- x Site selection, site preparation, and relocation
- xi Housing, infrastructure and social service
- xii Environmental protection and management
- xiii Summary of Consultations
- xiv Integration with host populations
- xv Grievance procedures
- xvi Implementation Arrangements
- xvii Monitoring and Evaluation (M&E)
- xviii Implementation schedule
- xix Costs and budget

8.7.9. RAP Submission and Approval

The RAP(s), once prepared, will be submitted to the World Bank for review and approval.

8.8. Resettlement Budget, Flow of Funds and Payment of Compensation

Finances for RAP cost, including compensation, allowances, and administration of RAP preparation and implementation, will be provided by the Government as counterpart funds. Costs for external monitoring tasks can be allocated under the loan. In order to ensure that sufficient funds are available for RAP implementation, the Government will allocate 100% of the cost of compensation at replacement cost and expected allowances estimated in the RAP plus 15% of contingencies before RAP implementation. Funds will be transferred by the Govt. to the PIU. The District Collector will receive funds from the PIU and payment will be made directly to the affected persons without any delay, by way of crossed cheques, following issuance of notices as required by LAA 1894.

8.9. Institutional Arrangements for Implementing RAPs

For implementation of RAP, a Resettlement Unit (RU) will be instituted within the PIU by deploying the requisite staff. The composition of RU will include:

- i Resettlement Officer (Head of Unit)
- ii Land Acquisition and Collector (Member-assisted by Tehsil Dar and Patwari)
- iii Assistant Resettlement Officer (Focal Member)
- iv Gender Specialist,
- v Communication Officer (Member)
- vi Construction Supervision Consultant (Member)
- vii APs Representative (Member)

RU staff will work in close coordination with the Social Safeguards Officer and other staff already appointed at PIU. They will assist RU in all matters related to the land acquisition and resettlement. The overall scope of work of RU will include:

- i Updating, implementation and monitoring of RAP with the coordination of District administration, Revenue Department and other line Departments.
- ii Updating the census of PAPs linked with project impacts by type, category and severance and prepare compensation packages for each PAP on the basis of agreed unit rates and entitlements criterion;
- iii Disbursement of compensation, and community complaints etc.
- iv Have regular monthly meetings to review the progress regarding RAP implementation as per the schedule given in this resettlement plan.
- v Organize, conduct and record meaningful/informed consultations participation with PAPs.
- vi Disclose project/LAR related information to PAPs and Development of database of PAPs

Chapter 9. Institutional Arrangements

This section defines the organizational roles and responsibilities of the key players in the proposed project and grievance redress mechanism.

9.1. Project and ESMF Implementation

The activities and investments under the Project will be implemented through two federal entities. The project envisages the use of existing government structures for implementation. Component 1 focusing on hydro meteorological and climate services will be implemented by the Pakistan Meteorological Department, while National Disaster Management Authority will be responsible for implementing Component 2 focusing on disaster risk management in the country. These federal entities would establish dedicated Project Implementation Units (PIUs) to assist in the implementation of the project activities. Both Implementing Agencies (IAs) will be responsible for appointing a Project Director (PD) and hiring of key staff and consultants for respective PIUs as per project requirements.

The IAs through their respective PIUs would have responsibility for project implementation including, but not limited to, reporting, monitoring and evaluation, social and environmental management, procurement, financial management, audit and disbursements, as well as coordination with the line agencies and the Bank. The PIU will be adequately resourced with skillsets and competencies required for project implementation and monitoring. The PIUs would be created and adequately staffed within one month of project effectiveness. The implementation of Component 1 will require close coordination between different government stakeholder agencies as well as within IA. To ensure overall guidance and coordination for project implementation, a dedicated Project Coordination Committee (PCC), comprising senior representatives from concerned federal and provincial departments, would be established as the apex forum.

The ESMF will be implemented by PIUs at PMD and NDMA and will be supported by one environmental and social specialist/ officer at each PIUs. The design engineer will also have staffed with environmental engineer to ensure the engineering design will integrate the appropriate environmental and social policies and provisions describe in ESMF in each infrastructure design at implementation level. Similarly, the Contractor when undertaking the constructional activities will be supported by environmental and social technical staff to implement the ESMF and ESMPs.

9.2. Implementing Partners

Key public-sector partner institutions would act as implementing partners for Component 1, including the Aviation Division, the National Disaster Management Authority and Provincial Disaster Management Authorities (PDMAs), WAPDA/Ministry of Water and Power, Provincial Irrigation Departments (PIDs), and the Provincial Agriculture Departments (PADs). This joint-implementation arrangement will enable stakeholders to closely oversee improvements of products and services funded by the project within their respective sectors. To facilitate this objective, a Joint Technical Stakeholder Group (JTSG) has already been established during project preparation; this consists of both implementation partners and other stakeholders who will benefit from improved hydromel services. The project will be implemented according to the guidelines and procedures outlined in the Operations Manual (OM), which should be adopted by project effectiveness and reviewed periodically. The

documents will lay out roles and responsibilities of different stakeholders and provide details of project processes and project cycle.

The Project will support the Implementing Agencies in developing and implementing an internal and external communications strategy during project implementation. The communication functions for the project will be housed at PMD and NDMA.

9.3. ESMMP Institutional Arrangement

The ESMMP will be implemented under the overall supervision of the Project Directors, PIUs. The designated project directors (PD) and Director Implementation will be the overall in-charge of the Project. They will engage, hire and delegate the supervisory responsibilities to the staff. The Project Directors will be responsible for the implementation, monitoring and reporting of the ESMMP through the Environment and Social Safeguards Specialists to be appointed by the project. The Social Safeguards Specialist will ensure implementation of the Resettlement Policy Framework and other social safeguards related measures defined in ESMMP along with implementation of Grievance Redress Mechanism (GRM) provided in following section. PIUs will be responsible for hiring of Construction Contractor and supervision of contractors work on the sites in accordance with ESMMP.

9.3.1. Roles and Responsibilities of Design Engineers

Design engineers for each sub-project will be required to ensure integration of ESMF/ESMP requirements in all civil and engineering designs. They will also be involved in the preparation of EOIs for contractors and ensure that ESMF/ESMP requirements are integrated in EOI and BOQ documents.

9.3.2. Roles and Responsibilities of Contractors

Contractors for each sub-project will be required to prepare all relevant plans for mitigating environmental and social impacts and ensure that ESMF/ESMP requirements are part of the engineering design and implemented at the field level. A list of plans to be prepared by contractors is given below:

1. Debris Management Plan
2. Energy and Water Conservation Plans
3. Solid Waste Management Plan
4. Emergency Response Plan
5. Public Safety Plan
6. Workers Health & Safety Plan
7. Emissions Monitoring Plan

9.3.3. Roles and Responsibilities of Project Team

Roles and responsibilities of the designated Specialists and project team have been detailed in **Table 9.1** below. In cases of overlapping roles by more than one Specialist, the higher officer

will have the authority to re-designate the roles and responsibilities of those officers in the best interest of the project and to ensure clarity of responsibilities for EMP implementation.

Table 9.1: Roles and Responsibilities

Organization	Position	Responsibility
Project Implementation Unit (PIU)	Project Director	Ensure ESMMP implementation
Project Implementation Unit (PIU)	Environment Safeguards Specialist	<ul style="list-style-type: none"> ▪ Ensure implementation of the ESMMP during various stages of design and construction; ▪ Ensure that timely and robust environmental monitoring is carried out in the field; ▪ Ensure that the construction contracts include clauses for ESMMP implementation; ▪ Ensure that environmental trainings are planned and implemented; ▪ Overall monitoring and reporting of ESMMP; ▪ Conduct financial management of the ESMMP; ▪ Coordinate and ensure development of awareness material; ▪ Commission annual third party validations of the project; ▪ Prepare Environmental Bi-Annual Progress Reports for the project.
Project Implementation Unit (PIU)	Social Safeguards Specialist	<ul style="list-style-type: none"> ▪ To carry out the screening of the sub-projects with respect to the social aspects as defined in the ESMF; ▪ Monitor and check the proper implementation of all social mitigation measures as suggested in ESMF/ESMP; ▪ Monitoring and evaluation of social related matters of the project and maintain a social complaint register to document social issues; ▪ Top supervise the Contractor's activities and make sure that all the contractual obligations related to the social compliance are met; ▪ Review of periodic social reports being prepared by the contractor ▪ Ensure inclusion of ESMMP guidelines in project designs. ▪ Screen sub-projects for Involuntary Resettlement, gender focus and citizen engagement ▪ Ensure Resettlement Policy Framework (RPF) is implemented and RAP is prepared if required ▪ Remain the focal point for managing the project GRM, and maintain analysis and reports on types of complaints received, resolved, time taken to action, etc.

Project Implementation Unit (PIU)	Environment and Social Safeguard officer / Database/MIS Specialist	<ul style="list-style-type: none"> ▪ Ensure that ESMMP and RPF are being implemented by contractors at the site level; ▪ Monitor implementation of ESMMP through regular site visits and report to PIU; ▪ To facilitate the implementation of the GRM; ▪ To receive and record complaints and issue acknowledgment; ▪ To maintain the record of all grievances and their status; ▪ Maintain a record of all documentation produced; ▪ Responsible for Grievance Redress at each site.
Project Implementation Unit (PIU)	Third Party Monitoring consultants	<p>Environmental Monitoring and Testing Supervision of ESMMP implementation during construction on sites</p> <p>Ensure Compliance with EMMP guidelines.</p>

Sample TORs for Environmental and Social Specialists at PIUs are given in **Annexure 11**.

9.4. Monitoring Plan

9.4.1. Internal Monitoring– ESMMP

In addition to monitoring by the Environment and Social Safeguards Specialists, Project Coordinators will play a pivotal role in monitoring implementation of ESMMP especially where technical designs and construction related impacts are involved. Project Directors will ensure that mitigation measures which require administrative approval remain under his/her direct reporting. In addition, Monitoring and Evaluation Officer can also be requested to conduct random monitoring of construction sites in the project areas, both during construction and operation. Monitoring reports will be submitted to the Environment and Social Safeguard Specialists in the PIU for necessary corrective action.

9.4.2. Internal Monitoring - RAP

If RAPs are prepared for sub-projects, internal monitoring will be carried out routinely by the PIUs assisted by the RU and their results will be communicated to concerned Project Affected Persons and to World Bank through the quarterly project implementation reports. Indicators for the internal monitoring will be those related to process and immediate outputs and results. This information will be collected directly from the field by the RU and reported monthly to the PRMP to assess the progress and results of RAP implementation, and to adjust the work Program accordingly (if necessary). The monthly progress reports will be consolidated on quarterly basis and will be submitted to World Bank. Specific monitoring indicators will be as follows:

1. Information campaign and consultation with PAPs;
2. Status of land acquisition and payments on land compensation;
3. Compensation for affected structures and other assets;
4. Relocation of PAPs;

5. Payments for loss of income/ livelihood;
6. Selection and distribution of replacement land areas; and
7. Income restoration activities
8. Gender segregated analysis of RAP implementation
9. Progress on the gender sensitive grievance redress mechanism

The above information will be collected by PMD/NDMA with the assistance of RU and field office which are responsible for monitoring the day-to-day social and resettlement activities of the project through the following instruments:

1. Review of census information for all PAPs;
2. Consultation and informal interviews with PAPs;
3. In-depth case studies;
4. Sample survey of PAPs;
5. Key informant interviews; and
6. Community/ public meetings/ consultations

9.4.3. External Monitoring/Third Party Validation – ESMMP

External Monitoring will be used to ensure that both construction and the operation phase activities have been undertaken in line with the ESMMP. Third Party Validation (TPV) exercises, conducted through an independent monitoring agency will be carried out on annual basis to evaluate the overall ESMMP compliance and implementation progress, and to ensure that the mitigation measures are implemented as per the mitigation plan. In case of any deviation, corrective actions will be taken where necessary. For the TPV, environmental consultants with relevant expertise and previous experience will be engaged. The PIUs may hire the services of an environment expert (consultant), if required, to address issues related to environmental impact mitigation or non- conformity that emerge from monitoring activities.

9.4.4. External Monitoring/Third Party Validation – RAP

If RAPs are prepared for the sub-projects, external monitoring will be carried out twice a year, and its results will be communicated to all concerned PAPs, the PIUs and World Bank through quarterly and semi-annual reports. Sub-projects whose implementation time-frame will be under 6 months will be monitored on quarterly basis. The indicators for External Monitoring will include:

1. Review and verify internal monitoring reports prepared by the PIUs assisted by social safeguard specialist and its field offices;
2. Review of the socio-economic baseline census information of pre-project affected persons;
3. Identification and selection of impact indicators;
4. Impact assessment through formal and informal surveys/interview with the project affected persons;
5. Consultation with PAPs, officials, community leaders for preparing external monitoring report; and

6. Assess the resettlement efficiency, effectiveness, impact and sustainability, drawing lessons for future resettlement policy formulation and planning.

The external monitoring agency/consultant will also assess the status of project affected vulnerable groups such as female-headed households, disabled/elderly and families below the poverty line. The following will be considered as the basis for monitoring and evaluation of the project:

1. Socio-economic conditions of the PAPs in the post-resettlement period;
2. Communications and reactions from PAPs on entitlements, compensation, options, alternative developments and relocation timetables etc.;
3. Changes in housing and income levels;
4. Rehabilitation of squatters;
5. Valuation of property;
6. Grievance procedures/ mechanism;
7. Disbursement of compensation; and
8. Level of satisfaction of the PAPs in the post resettlement period.

The external monitoring agency/consultant will carry out a post-implementation evaluation of the RAP implementation about a year after completion of its implementation. The compelling reason for this study is to find out if the objectives of the RAP have been attained or not. The benchmark data of socioeconomic survey of severe impacts/severely affected PAPs conducted during the preparation of the RAP will be used to compare the pre and post project conditions. The external monitoring agency/consultant will recommend appropriate supplemental assistance/ or corrective action plan for the PAPs to ensure the accomplishment of objectives of the RAP.

9.4.5. Reporting

Environmental and Social Mitigation and Monitoring Report

The Environment and Social Safeguards Specialist will compile and evaluate monitoring reports from environmental social safeguard officer and third party monitoring. The compiled reports and mid-course correction actions will be shared with the Project Director and World Bank. The Environment and Social Safeguards Specialist will be responsible to prepare and circulate ESMMP progress reports on a bi-annual basis. These bi-annual Progress Reports will provide progress on implementation of mitigation measures, safeguard monitoring, capacity building, and any other ESMP implementation activity carried out during the reporting quarter. These reports will be shared with, among others, the World Bank within one month of the completion of six month for the World Bank. The report will include sub-sections including air quality monitoring, monitoring of emissions.

Resettlement Monitoring Reports

If RAPs are prepared for the sub-projects, the RU will prepare monthly progress reports on RAP implementation activities with assistance of social safeguards officer and will submit to the Project Director – PIU and based on the monthly progress report, quarterly progress reports will be prepared and submitted to World Bank.

The Independent External Monitoring Consultants (IEMC) will submit quarterly external monitoring report and submit to the PMD/NDMA and the PMD/NDMA will further submit to World Bank for the review in order to assist in ascertaining whether resettlement goals have been achieved, and more importantly, whether livelihoods and living standards have been restored/enhanced. The reports will include suitable recommendations for improvement. Monitoring reports will be submitted on regular intervals as specified (i.e. MPR and QPR). The M&E documents and other social reports will also be publicly available, including posting in project website.

9.5. Capacity Development and Trainings

9.5.1. Environmental and Social Mitigation and Monitoring Plan

Capacity building and training of the staff associated with EMP implementation will be required for effective environmental management. Specific trainings on environmental impacts and mitigation will be arranged for the Project Directors, Environment and Social Safeguards Specialists, Project Coordinators and other members of the Project Implementation Units to deliver their monitoring responsibilities in an organized and effective manner as per requirement of the monitoring plan. The main objective of the trainings is to enhance the technical capacity of staff associated with ESMMP implementation and to keep the PIU Teams, aware of the emerging environmental and social issues, and enable them to resolve those issues through proposed mitigation measures. **Table 9.2** gives a tentative program for capacity building and trainings. 20 workshops are to be held throughout the course 5 years project. This includes annual refresher trainings. The workshops will focus on environmental issues arising during ESMMP implementation, mitigation measures, and health & safety. They will also focus on sensitizing the participants about environmental responsibility, managing the on-ground problems, and assuring implementation of the ESMMP. Each workshop will have no more than thirty participants. In case of extra participants, extra workshops will be conducted.

Table 9.2: Capacity Building and Training Plan

Description of Training	Training Module	Location	Frequency	Participation
Two-day Training Workshop	Objectives, need and use of ESMMP; Legal requirements of the EMP (Legislations and World Bank Operational Policies) ; Management of environmental issues and mitigation strategies as per EMP; Monitoring Mechanism Documentation and reporting procedures.	PIUs, Islamabad Lahore	Annually workshop at the start of the project	PIU Staff including Project Director, Project Coordinator, Environment and Social Safeguards Specialists , Infrastructure Specialists, Engineers, M&E Officer etc.
One Day Training Workshop	ESMMP with special focus on mitigation measures during design stage	PIUs Islamabad Lahore	One training workshop at design stage of project	All architects, contractors, sub-contractors, and supervision consultants

Description of Training	Training Module	Location	Frequency	Participation
One Day Training Workshop	ESMMP with special focus on mitigation measures during construction stage	PIUs Islamabad Lahore	One workshop every year during construction period of the project	All contractors, sub-contractors, and supervision consultants
One Day Training Workshop	ESMMP with special focus on mitigation measures during operational phase	PIUs Islamabad Lahore	One workshop every year during operational phase of the project	PMD and NDMA staff
One Day Refresher Trainings	ESMMP Implementation and Reporting	PIUs Islamabad Lahore	One workshop every year	PIU Staff

9.5.2. Resettlement Planning Framework (RPF)

Table 9.3 summarizes the training requirements of all the relevant staff to be involved in the implementation of Resettlement Policy Framework and Resettlement Action Plans if required.

Table 9.3: Capacity Building and Training Plan for RAP

Description of Training	Training Module	Location	Frequency	Participation
One Day Training Workshop on RPF and RAP	Application and use of RPF Social Assessment process LA process Necessity for RAP and its preparation process Implementation and Monitoring Institutional Mechanism Grievance Mechanism	PIU	Annually	RU, PIU, Consultants, relevant government officials, Local Community Reps., and other stakeholders

Chapter 10. ESMF implementation Budget

Approximate implementation cost of ESMF is given below:

Table 10.1:ESMF Implementation Budget

#	Description	Unit	Quantity	Unit Rate PKR	Total PKR	Total USD
1.	Trainings (including materials, logistics, venue)	Quarters	20	2,000,000	40,000,000	360,360
2.	Environment Specialist	Months	60	300,000	18,000,000	162,162
3.	Environment Assistant	Months	60	500,000	3,000,000	27,027
4.	Social Safeguard Specialist	Months	60	200,000	12,000,000	108,108
5.	External Monitors (5 annual reports, 1 inception and end project evaluation report)	Reports	7	2,000,000	14,000,000	126,126
6.	Environmental Testing				4,000,000	36,036
7.	Consultants (ESMP, RAP, RPF)	Reports	4	500,000	2,000,000	18,018
8.	Contingency @ 20 %				19,400,000	174,775
9.	Total				139,400,000	1,255,856

Budget for mitigation measures for each sub-project will be identified in site specific ESMPs.

Finances for RAP cost, including compensation, allowances, and administration of RAP preparation and implementation, will be provided by the Government as counterpart funds. Costs for external monitoring tasks can be allocated under the loan. In order to ensure that sufficient funds are available for RAP implementation, the Governments will have to allocate 100% of the cost of compensation at replacement cost and expected allowances estimated in the RAP plus 15% of contingencies before RAP Implementation.

Chapter 11. Grievance Redress Mechanism

11.1. Overview and scope

The Grievance Redress Mechanism proposed here spans the entire project implementation and will cater to both the directly and indirectly affected population/beneficiaries. Though the GRM proposed here has been designed to address environmental and social problems identified during implementation, it will also cater to manage any disconnects that emerge from the field level and that has significant implications for effective implementation of the sub-project interventions.

The Project Implementation Units (PIU) office will serve as the secretariat for the Grievance Redress Committee (GRC-Project) that will be responsible for providing oversight on the entire GRM process at a strategic level and monitoring of complaints management.

11.2. Objectives of the Grievance Redress Mechanism

The grievance redress mechanism (GRM) will be consistent with the requirements of the World Bank safeguard policies to ensure mitigation of community concerns, risk management, and maximization of environmental and social benefits. The overall objective of the GRM is therefore to provide a robust system of procedures and processes that provides for transparent and rapid resolution of concerns and complaints identified at the local level.

The GRM will be accessible to diverse members of the community, including women, senior citizens and other vulnerable groups. Culturally appropriate communication mechanisms will be used at all sub-project sites both to spread awareness regarding the GRM process as well as complaints management.

11.3. Communication & Awareness on GRM

The final processes and procedures for the GRM will be translated in to local language, if needed and disseminated at all sub-project locations. These shall be made available (in both leaflet and poster format) to all sub-project locations.

11.4. Proposed Mechanisms

A grievance redress mechanism (GRM) will be operational at each subproject level to facilitate amicable and timely resolution of complaints and grievances of the stakeholders including communities and project affected personnel (PAPs) (male and female) regarding all environmental and social issues. Under the GRM, Grievance Redress Committees (GRCs) will be formed comprising of PIU's general manager (GM), PIU's Environment and Social Specialists, representative of ESMP/ESIA consultants, Resettlement Specialist, representative of RAP Consultants, member of PAP Committee (male and female). Owing to the nature of the project, a GRC will be formed at each subproject level.

Under the GRM, Complaint Register (CR) will be maintained by the PIU at each subproject level. All complaints and grievances will be logged in the register along with details including date of complaint, name and address of complainant, location, and description of complaint. The GRC will then fill additional details in the Register including the corrective action needed, timeframe for corrective action to be taken, and person/project entity responsible for corrective action. Once the corrective action is implemented, the GRC will document the associated details in the Register including the description of action take, date of action completion, views

of the complainant regarding the corrective action, and any residual grievance. GRM procedures will be disseminated particularly among the local communities and PAPs. GRM will be gender responsive, culturally appropriate, and readily accessible to the PAPs at no cost and without retribution. A multi-tier GRM has been proposed for the project is described below.

1. Tier 1 (Community level): When a grievance arises, the PAP (male or female) may contact directly with the PAPC (male or female) Field implementation Unit (FIU) or PIU. PAPC may resolve the concern at field level. If the issue is successfully resolved, no further follow-up is required.
2. Tier 2 (GRC level): If no solution can be found at Tier 1, the PAP (male or female) may convey concern/grievance to the GRC, either verbally or in writing. The GRC will log the complaint along with relevant details in the complaint register (CR). For each complaint, the GRC will investigate and prepare a fact-finding report to assess its eligibility, and identify an appropriate solution. The GRC will, as appropriate, instruct the responsible entity to take corrective actions. The complaint will be redressed/appropriately responded within fifteen days. The GRC will review the responsible entity's response and undertake additional monitoring as needed. During the complaint investigation, the GRC will work in close consultation with the Contractors, Environment Specialist, the RAP Consultants, FIU, and PIU.
3. Tier 3 (PIU level): If the complainant is not satisfied/issue not resolved at the Tier 2, then GRC will forward the complaint to PIU for remedial measures and decisions accordingly. The committee at PIU level will consist of GM, Environment specialist, Resettlement Specialist of PIU, and ESMP/ESIA and RAP Consultants. The complaint at the Tier 3 will be resolved within three weeks.
4. Tier 4: If the PAPs are still not satisfied with the decision of PIU, then the complainant(s) may enter the reference in the Court of law.

11.5. Procedures

1. Any grievance in written, verbal or digital form shall be recorded by the receiving office in CR which will be maintained at PIU and FIU;
2. A serial number will be assigned to it together with the date of receipt;
3. A written acknowledgement to a complainant shall be sent promptly and in any case within three working days;
4. The acknowledgement shall contain the name and designation of the officer who will deal with the grievance; information that necessary action will be taken within the specified working days from the date of receipt of the grievance by the officer concerned; name, address, email address and phone number of the authority which the complainant could approach if the matter is not redressed within the specified timeframe or if s/he is not satisfied with the action taken;
5. If the office receiving the grievance/complaint is not the one designated to consider and dispose it, the receiving office shall forward it to the designated office, but after having complied with the requirements at 1 to 3 above;
6. The office designated to consider the matter shall make every effort to ensure that grievances/appeals are considered and disposed-off within the stipulated period of fifteen days in case of Tier 2 and three weeks in case of Tier 3.

7. If the grievance redress mechanism fails to satisfy the aggrieved affected person at all levels, s/he can submit the case to the appropriate court of law.

11.6. Grievance Closure

The complaint shall be considered as disposed-off and closed when:

1. The designated officer/authority has acceded to the request of the complainant fully;
2. Where the complainant has indicated acceptance of the response in writing;
3. Where the complainant has not responded to the concerned officer FIU/PIU within one month of being intimated about the final decision of the grievance officer on his grievance/complaint;
4. Where the complainant fails to attend the proceedings of the concerned officer at FIU/PIU within the stipulated period of the disposal of the complaint; and
5. Where the complainant withdraws his/her complaint.

Chapter 12. Disclosure

This ESMF and the RPF will be disclosed on the websites of PMD and NDMA, and on the World Bank Info Shop. Hard copies of this ESMF will also be shared with the Federal and Provincial EPAs, project stakeholders, contractors, Civil Society Organizations etc. A copy of the ESMF will be placed in the Project Implementation Units, PMD and NDMA for public access. The Urdu translation of the Executive Summary of the ESMF will also be distributed to all relevant stakeholders, especially to the communities in the project areas. The purpose will be to inform them about the project activities, negative environmental and social impacts expected from the project and proposed mitigation measures.

The executive summary of the RAP (if prepared for any sub-project) will be translated in local language (*Urdu*), which is understandable to all project affected persons and local community and will be provided to all PAPs as well.

This information brochure will also be disclosed in local language to the PAPs and some other local key persons resided in the vicinity of the project area, so that each PAP could be able to understand the project activities, i.e. the project, cut-off date, eligibility for entitlement of compensation, methods of measurement, price assessment & valuation of losses, payment of compensation, GRM, cost & budget and monitoring & evaluation.

The Project office (PIU) and social safeguards specialist will keep the PAPs informed about the impacts and entitlement of compensation and facilitate in addressing grievance (s). The ESMF study team has made an endeavor to hold consultative and scoping sessions with these stakeholders to evince their views on the proposed Project, *inter-alia*, their opinions, suggestions, understanding on various issues and concerns.

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Annexure-1: IEE/EIA Regulations and ESMP Format

EE/EIA Regulation 2000

SCHEDULE I

(See Regulation 3)

List of projects requiring an IEE

A. Agriculture, Livestock and Fisheries

1. Poultry, livestock, stud and fish farms with total cost more than Rs.10 million
2. Projects involving repacking, formulation or warehousing of agricultural products

B. Energy

1. Hydroelectric power generation less than 50 MW
2. Thermal power generation less than 200 KW
3. Transmission lines less than 11 KV, and large distribution projects
4. Oil and gas transmission systems
5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage
6. Waste-to-energy generation projects

C. Manufacturing and processing

1. Ceramics and glass units with total cost more than Rs.50 million
2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million
3. Man-made fibers and resin projects with total cost less than Rs.100 million
4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million
5. Wood products with total cost more than Rs.25 million

D. Mining and mineral processing

1. Commercial extraction of sand, gravel, limestone, clay, Sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million
2. Crushing, grinding and separation processes 9
3. Smelting plants with total cost less than Rs.50 million

E. Transport

1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metaled roads) with total cost less than Rs.50 million
2. Ports and harbor development for ships less than 500 gross tons

F. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers
2. Irrigation and drainage projects serving less than 15,000 hectares
3. Small-scale irrigation systems with total cost less than Rs.50 million

E. Water supply and treatment

Water supply schemes and treatment plants with total cost less than Rs.25 million

F. Waste disposal

Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters

G. Urban development and tourism

1. Housing schemes
2. Public facilities with significant off-site impacts (e.g. hospital wastes)
3. Urban development projects

H. Other projects

Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5

SCHEDULE II

(See Regulation 4) List of projects requiring an EIA

A. Energy

1. Hydroelectric power generation over 50 MW
2. Thermal power generation over 200 MW
3. Transmission lines (11 KV and above) and grid stations
4. Nuclear power plans
5. Petroleum refineries

B. Manufacturing and processing

6. Cement plants
7. Chemicals projects
8. Fertilizer plants
9. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above
10. Industrial estates (including export processing zones)
11. Man-made fibers and resin projects with total cost of Rs.100 M and above
12. Pesticides (manufacture or formulation)
13. Petrochemicals complex
14. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel), printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million
15. Tanning and leather finishing projects

C. Mining and mineral processing

1. Mining and processing of coal, gold, copper, sulphur and precious stones
2. Mining and processing of major non-ferrous metals, iron and steel rolling
3. Smelting plants with total cost of Rs.50 million and above

D. Transport

1. Airports
2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above
3. Ports and harbor development for ships of 500 gross tons and above
4. Railway works

E. Water management, dams, irrigation and flood protection

1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above
2. Irrigation and drainage projects serving 15,000 hectares and above
3. Water supply and treatment Water supply schemes and treatment plants with total cost of Rs.25 million and above

F. Waste Disposal

1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste)
2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters

G. Urban development and tourism

1. Land use studies and urban plans (large cities)
2. Large-scale tourism development projects with total cost more than Rs.50 million

H. Environmentally Sensitive Areas

All projects situated in environmentally sensitive areas

I. Other projects

1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5.
2. Any other project likely to cause an adverse environmental effect

ESMP Format

The ESMP for each sub-project will include the following:

1. Introduction
2. Project Description
3. Legal and Policy Framework
4. Environmental and Social Baselines
5. Social Impact Assessment (in case of Involuntary Resettlement or Indigenous Peoples)
6. Stakeholder Consultations
7. Environmental and Social Screening
8. Environmental and Social Impact Assessment and Mitigation
9. Environmental and Social Management and Monitoring Plan
10. Institutional Arrangements
11. Grievance Redress Mechanism
12. Budget for ESMP Implementation

Annexure-2: NEQS

Table 1: Effluent Discharge Standards NEQS 2000) Applicable to the Works

#.	PARAMETRS	NEQS
1	Temperature	40 °C =≤3 deg.
2	pH	6 – 9
3	BOD5	80 mg/l
4	Chemical Oxygen Demand (COD)	150 mg/l
5	Total Suspended Solid (TSS)	200 mg/l
6	Total Dissolved Solids	3500 mg/l
7	Grease and Oil	10 mg/l
8	Phenolic compounds (as phenol)	0.1 mg/l
9	Ammonia	40 mg/l
10	Chlorine	1.0 mg/l
11	Chloride	1000.0 mg/l
12	Sulphate	600 mg/l
13	Manganese	1.5 mg/l
14	Fluoride	10 mg/l
15	Cyanide (as CN') total	1.0 mg/l
16	An-ionic detergents (as MB As)	20 mg/l
17	Sulphide (S-2)	1.0 mg/l
18	Pesticides	0.15 mg/l
19	Cadmium	0.1 mg/l
20	Chromium trivalent and hexavalent	1.0 mg/l
21	Copper	1.0 mg/l
22	Lead	0.5 mg/l
23	Mercury	0.01 mg/l
24	Selenium	0.5 mg/l
25	Nickel	1.0 mg/l
26	Silver	1.0 mg/l
27	Total Toxic metals	2.0 mg/l
28	Zinc	5.0 mg/l
29	Arsenic	1.0 mg/l
30	Barium	1.5 mg/l
31	Iron	8.0 mg/l
32	Boron	6.0 mg/l

Table 2: National Environmental Quality Standards (NEQS) for Gaseous Emission (mg/Nm³, Unless Otherwise Defined)

#	Parameter	Source of Emission	Existing Standards	Revised Standards
1.	Smoke	Smoke Opacity not to exceed	40% or 2 Ringlemann Scale	40% or 2 Ringlemann Scale or equivalent smoke number
2.	Particulate Matter (I)	(a) Boilers and Furnaces		
		(i) Oilfired		
		(ii) Coalfired	300	300
		(iii) Cement Kilns	500	500
		(b) Grinding, crushing, clinker coolers and Related processes, Metallurgical Processes, converter, blast furnaces and cupolas.	200	200
			500	500
3.	Hydrogen Chloride	Any	400	400
4.	Chlorine	Any	150	150
5.	Hydrogen Fluoride	Any	150	150
6.	Hydrogen Sulphide	Any	10	10
7.	Sulphur Oxide (2) (3)	Sulfuric acid/ Sulphonic acid plants		
		Other plants except power plants operating on oil and coal	400	1700
8.	Carbon Monoxide	Any	800	800
9.	Lead	Any	50	50
10.	Mercury	Any	10	10
11.	Cadmium	Any	20	20
12.	Arsenic	Any	20	20
13.	Copper	Any	50	50
14.	Antimony	Any	20	20
15.	Zinc	Any	200	200

#	Parameter	Source of Emission	Existing Standards	Revised Standards
16.	Oxides of Nitrogen (3)	Nitric acid manufacturing unit. Other plants except power plants operating on oil or coal:	400	400
		Gas fired	-	600
		Oil fired	-	1200
		Coal fired		

Explanations:-

1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1 percent sulphur content in fuel. Higher content of Sulphur will case standards to bepro-rated.
3. In respect of emissions of sulphur dioxide Nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to National Environmental Quality Standards (NEQS) specified above, comply with the following standards.

Table 3: National Environmental Quality Standards (NEQS, 2009) for Vehicular Emission

#	Parameter	Standard (Maximum permissible Limit)	Measuring Method	Applicability
1	Smoke	40% or 2 on the Ringlemann Scale during engine acceleration mode.	To be compared with Ringlemann Chart at a distance of 6 meters or more	Immediate effect
2	Carbon Monoxide (CO)	6%	Under idling condition: Non-dispersive infrared detection through gas analyzer.	
3	Noise	85 dB(A)	Sound Meter at 7.5 meters from the source	

Table 4: National Environmental Quality Standards (NEQS, 2010) for Noise

#	Category of Area / Zone	Effective from 1 st July, 2010		Effective from 1 st July, 2013	
		Limit in dB (A) Leq*			
		Daytime	Night-time	Daytime	Night-time
1	Residential Area (A)	65	50	55	45
2	Commercial Area (B)	70	60	65	55
3	Industrial Area (C)	80	75	75	65
4	Silence Zone (D)	55	45	50	45

Note:

1. Daytime hours: 6:00 a.m. to 10:00p.m.
2. Night-time hours: 10:00 p.m. to 6:00a.m.
3. Silence Zone: Zones which are declared as such by the competent authority. An area comprising not less than 100 meters round hospitals, educational institutions and courts.
4. Mixedcategoriesofareasmaybedecidedasoneofthefourabovementionedcategoriesbythecompetentauthority.

*dB (A) Leq: Time weighted average of the level of sound in scale "A" which is relatable to human hearing.

Table 5: National Environmental Quality Standards (NEQS, 2010) for Drinking Water

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
BACTERIAL				
1	All water is intended for drinking (E.Coli or Thermotolerant Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
2	Treated water entering the distribution system (E.Coli or Thermotolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample	Must not be detectable in any 100ml sample	Most Asian Countries also follow WHO Standards
3	Treated water entering the distribution system (E.Coli or Thermo tolerant Coliform and total Coliform bacteria)	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12-month period.	Must not be detectable in any 100ml sample. In case of large supplies, where sufficient samples are examined, must not be present in 95% of the samples taken throughout any 12- month period.	Most Asian Countries also follow WHO Standards
PHYSICAL				
4	Colour	≤15 TCU	≤15 TCU	
5	Taste	Non Objectionable/ Acceptable	Non Objection able/ Acceptabl e	
6	dour	Non Objectionable/ Acceptable	Non Objection able/ Acceptable	
7	Turbidity	<5 NTU	<5 NTU	
8	Total hardness as CaCO ₃	<500mg/l	---	

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
9	TDS	<1000	<1000	
10	pH	6.5-8.5	6.5-8.5	
RADIOACTIVE				
11	Alpha Emitters bq/L or pCi	0.1	0.1	
12	Beta Emitters	01	01	
CHEMICAL				
Essential Inorganics		mg/litre	mg/litre	
13	Aluminum (Al) mg/l	≤0.2	0.02	
14	Antimony (Sb)	≤0.005	0.02	
15	Arsenic (As)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
16	Barium (Ba)	0.7	0.7	
17	Boron (B)	0.3	0.3	
18	Cadmium (Cd)	0.01	0.003	Standard for Pakistan similar to most Asian developing Countries
19	Chloride (Cl)	<250	250	
20	Chromium (Cr)	≤0.05	0.05	
21	Copper (Cu)	2	2	
Toxic Inorganics		mg/litre	mg/litre	
22	Cyanide (CN)	≤0.05	0.07	Standard for Pakistan similar to most Asian developing Countries
23	Fluoride (F)	≤1.5	1.5	
24	Lead (Pb)	≤0.05	0.01	Standard for Pakistan similar to most Asian developing Countries
25	Manganese (Mn)	≤0.5	0.5	
26	Mercury (Hg)	≤0.001	0.001	
27	Nickel (Ni)	≤0.02	0.02	
28	Nitrate (NO ₃)	≤50	50	
29	Nitrite (NO ₂)	≤3	3	
30	Selenium (Se)	0.01	0.01	
31	Residual Chlorine	0.2-0.5 at consumer end	---	

#	Properties/Parameters	Standard Values for Pakistan	WHO Standards	Remarks
		0.5-1.5 at source		
32	Zinc (Zn)	5.0	3	Standard for Pakistan similar to most Asian developing Countries
Organics				
33	Pesticides mg/L	---	PSQCA No. 4629-2004, Page No.4, Table No. 3, Serial No. 20-58 may be consulted	Annex-II
34	Phenolic Compounds (as Phenols) mg/L	---	≤0.002	
35	Poly nuclear aromatic hydrocarbons (as PAH) g/L		0.01 (By GC/MS method)	
***PSQCA: Pakistan Standards Quality Control Authority				

Table 6: National Environmental Quality Standards (NEQS, 2010) for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of Measurement
		Effective from 1st July 2010	Effective from 1st January 2013	
Sulphur Dioxide (SO ₂)	Annual Average*	80µg/m ³	80µg/m ³	Ultraviolet Fluorescence Method
	24 hours**	120µg/m ³	120µg/m ³	
Oxides of Nitrogen as (NO)	Annual Average*	40µg/m ³	40µg/m ³	Gas Phase Chemiluminescence
	24 hours**	40µg/m ³	40µg/m ³	
Oxides of Nitrogen as (NO ₂)	Annual Average*	40µg/m ³	40µg/m ³	Gas Phase Chemiluminescence
	24 hours**	80µg/m ³	80µg/m ³	
Ozone (O ₃)	1 hour	180µg/m ³	130µg/m ³	Non disperse UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m ³	360µg/m ³	High Volume Sampling, (Average flow rate not less than 1.1m ³ /minute)

Annexure-3: World Bank Environmental and Social Safeguard Policies

#	Subject	Policy Reference	Triggered	Source Web
1.	Environmental Assessment	OP/BP 4.01	Yes	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3900&ver=current
2.	Natural Habitats	OP/BP 4.04	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1581&ver=current
3.	Pest Management	OP 4.09	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1637&ver=current
4.	Forestry	OP 4.36	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1585&ver=current
5.	Safety of Dams	OP 4.37	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1576&ver=current
6.	Physical and Cultural Resources	OP/BP 4.11	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1583&ver=current
7.	Involuntary Resettlement	OP/BP 4.12	Yes	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1584&ver=current
8.	Indigenous Peoples	OP 4.10	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1582&ver=current
9.	Disputed Areas	OP 7.60	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1841&ver=current
10.	International Waterways	OP 7.50	No	https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=2660
11.	Bank Disclosure Policy	BP 17.50	Applicable	http://siteresources.worldbank.org/OPSMANUAL/Resources/DisclosurePolicy.pdf

Annexure-4: Screening Checklist

a. Brief Description of the Project:

b. Location: _____

c. Name of Proponent: _____

#	Questions to be Considered	Briefly Describe Yes/No?	Is this likely to result in a Significant effect? Yes/No- why
Environmental and cumulative Impacts			
1	Will construction or operation of the project use natural resources? Such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?		
2	Will the project involve use, storage, transport, handling or production of substance or materials, which could be harmful to human health or the environment or concerns about actual or perceived risks to human health?		
3	Will the Project produce solid waste during construction, operation, or decommissioning?		
4	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?		
5	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?		
6	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters and groundwater?		
7	Will there is any risk of accidents during construction or operation of the project, which could affect human health or the environment?		
8	Are there any other factors, which should be considered such as consequential development that could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?		
9	Are there any areas on or around the locations, which, are protected under international, national, or local legislation for their ecological, landscape, cultural, or other value, which could be affected by the project?		
10	Are there any other areas on or around the location, which are important or sensitive for reasons of their ecology e, g. wetlands, watercourses or other water bodies, mountains, forests or woodlands, which could be affected by the project?		
11	Are there any areas on or around the location which are used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, over wintering, migration, which could be affected by the project?		

12	Are there any in land or underground water sonor around the location that could be affected by the project?		
13	Are there any areas or features of high landscape or scenic value on or around the location, which could be affected by the project?		
14	What kind of effluents can be discharged during operation of this project/ units?		
15	Is this project likely to affect the soil, water and air of the surrounding environment?		
16	Are there any transport routes passing through or around the location which are susceptible to congestion or which cause environmental problem, which could be effected by the project?		
17	Is the project located in a previously undeveloped area where there is a loss of Greenfield land?		
18	Are there any areas on or around the locations which are occupied by the sensitive land-use e.g. hospitals, schools, worship places, community facilities which could be affected by the project?		
19	Are there any areas on or around the locations which contain important high quality or scarce resources e.g. ground & surface water forestry, agriculture, fisheries tourism, minerals which could be affected by the project?		
20	Are there any areas on or around the locations which that are already subject to pollution or environmental damage e.g. where existing legal environmental standers are exceeded which could be affected by the project?		
21	Is the project location is susceptible to earthquake, subsistence, landslide erosions flooding or extreme adverse climate conditions e.g. temperature inversion, fogs, severe winds, which could cause the project to present environmental problem?		
22	What would be the source of energy supply for this project?		
23	What would be the mechanism of solid waste disposal/management when this project would become functional?		
24	What would be the mechanism of waste water drainage/disposal / treatment when this project would become functional?		
25	What kind of effluents are expected /discharged when this project would become functional?		

Social and land use impacts		
1	Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?	
2	Are there any routes or facilities on or around the locations, which are used by the public for access to recreation, or other facilities, which could be affected by the project?	
3	Are there any areas or features of historic or cultural importance on or around the location which could be effected by the project?	
4	Are there existing land uses on or around the location e.g. homes, gardens or other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be effected by the project?	
5	Are there any plans for future land uses on or around the location which could be effected by the project?	
6	Are there any areas on or around the location which are densely populated or built up, which could be affected by the project?	

Observations/Recommendation:-

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Survey Conducted by

Verified by

Name and Designation

Name and designation

Signatures

Signatures

Annexure-5: Environmental Code of Practices

Introduction

The objective of preparation of the Environmental Code of Practices (ECP) is to address less significant environmental impacts and all general construction related impacts of the proposed project implementation. The ECPs will provide guidelines for best operating practices and environmental management guidelines to be followed by the contractors for sustainable management of all environmental issues.

ECP 1: Waste Management

ECP 2: Fuels and Hazardous Substances Management

ECP 3: Water Resources Management

ECP 4: Drainage Management

ECP 5: Soil Quality Management

ECP 6: Erosion and Sediment Control

ECP 7: Borrow Areas Development & Operation

ECP 8: Air Quality Management

ECP 9: Noise and Vibration Management

ECP 10: Protection of Flora

ECP 11: Protection of Fauna

ECP 12: Protection of Fisheries

ECP 13: Road Transport and Road Traffic Management

ECP 14: Construction Camp Management

ECP 15: Cultural and Religious Issues

ECP 16: Workers Health and Safety

The Contractor can also prepare a 'Construction Environmental Action Plan' (CEAP) demonstrating the manner in which the Contractor will comply with the requirements of ECPs and the mitigation measures proposed in the ESMMP of the ESA Report. The CEAP will form the part of the contract documents and will be used as monitoring tool for compliance. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the contractors.

ECP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Develop waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to WAPDA for approval. - Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact. - Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. - Segregate and reuse or recycle all the wastes, wherever practical. - Collect and transport non-hazardous wastes to all the approved disposal sites. - Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. - Provide refuse containers at each worksite. - Request suppliers to minimize packaging where practicable. - Place a high emphasis on good housekeeping practices. - Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot. - Store, transport and handle all chemicals avoiding potential environmental pollution. - Store all hazardous wastes appropriately in banded areas away from water courses. - Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. - Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. - Construct concrete or other impermeable flooring to prevent seepage in case of spills

ECP 2: Fuels and Hazardous Substance Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
<p>Fuels and hazardous goods.</p>	<p>Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Prepare spill control procedures and submit the plan for WAPDA approval. - Train the relevant construction personnel in handling of fuels and spill control procedures. - Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses. - Refueling should occur only within bunded areas. - Make available MSDS for chemicals and dangerous goods on-site. - Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by EPA. - Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored and personnel trained in the correct use. - Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. - Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. - Store hazardous materials above flood plain level. - Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area should preferably slope or drain to a safe collection area in the event of a spill. - Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak. - Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. - Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.

ECP 3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous Material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Follow the management guidelines proposed in ECPs 1 and 2. - Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables
Discharge from construction sites	During construction both surface and groundwater quality may be deteriorated due to construction activities in the river, sewerages from construction sites and work camps. The construction works will modify groundcover and topography changing the surface water drainage patterns, including infiltration and storage of storm water. The change in hydrological regime leads to increased rate of runoff and in sediment and contaminant loading, increased flooding, groundwater contamination, and effect habitat of fish and other aquatic biology.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials - Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site - Divert runoff from undisturbed areas around the construction site - Stockpile materials away from drainage lines - Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to a approved waste disposal site or recycling depot - Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion - Ensure that roads used by construction vehicles are swept regularly to remove sediment. - Water the material stockpiles, access roads and bare soils on an as required basis to minimize

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		dust. Increase the watering frequency during periods of high risk (e.g. high winds)
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading, and effect habitat of fish and other aquatic biology.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Dewater sites by pumping water to a sediment basin prior to release off site – do not pump directly off site - Monitor the water quality in the runoff from the site or areas affected by dredge plumes, and improve work practices as necessary - Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers - Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables. - Use environment friendly and non-toxic slurry during construction of piles to discharge into the river. - Reduce infiltration of contaminated drainage through storm water management design - Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.
Drinking water	Groundwater at shallow depths might be contaminated and hence not suitable for drinking purposes.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Control the quality of groundwater to be used for drinking water on the bases of NEQS and World Bank standards for drinking water. Safe and sustainable discharges are to be ascertained prior to selection of pumps. - Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination - All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned
	Depletion and pollution of groundwater resources	<ul style="list-style-type: none"> - Install monitoring wells both upstream and downstream areas near construction yards and construction camps to regularly monitor and report on the water quality and water levels. - Protect groundwater supplies of adjacent lands

ECP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	<ul style="list-style-type: none"> - The Contractor shall: - Prepare a program for prevent/avoid standing waters, which EMSU will verify in advance and confirm during implementation - Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line - Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there. - Rehabilitate road drainage structures immediately if damaged by contractors' road transports. - Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to the relevant standards provided by EPA, before it being discharged into recipient water bodies. - Ensure the internal roads/hard surfaces in the construction yards/construction camps that generate has storm water drainage to accommodate high runoff during downpour and that there is no stagnant water in the area at the end of the downpour. - Construct wide drains instead of deep drains to avoid sand deposition in the drains that require frequent cleaning. - Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion - Protect natural slopes of drainage channels to ensure adequate storm water drains. - Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem. - Reduce infiltration of contaminated drainage through storm water management design
Ponding of water	Health hazards due to mosquito breeding	<ul style="list-style-type: none"> - Do not allow ponding of water especially near the waste storage areas and construction camps - Discard all the storage containers that are capable of storing of water, after use or store them in inverted position

ECP 5: Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2 - Construct appropriate spill contaminant facilities for all fuel storage areas - Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals - Train personnel and implement safe work practices for minimizing the risk of spillage - Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site - Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds

ECP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils that affects the growth of vegetation which causes ecological imbalance.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Reinstate and protect cleared areas as soon as possible. - Mulch to protect batter slopes before planting - Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turfings/tree plantations
Construction activities and material stockpiles	<p>The impact of soil erosion are:</p> <p>(i) Increased run off and sedimentation causing a greater flood hazard to the downstream,</p> <p>(ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the spawning grounds of fish, and</p> <p>(iii) destruction of vegetation by burying or gullyng.</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Locate stockpiles away from drainage lines - Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds - Remove debris from drainage paths and sediment control structures - Cover the loose sediments and water them if required - Divert natural runoff around construction areas prior to any site disturbance - Install protective measures on site prior to construction, for example, sediment traps - Control drainage through a site in protected channels or slope drains - Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion - Observe the performance of drainage structures and erosion controls during rain and modify as required.

ECP 7: Borrow Areas Development & Operation

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Development and operation of borrow areas	In case, the borrow pits developed by the Contractor, there will be impacts on local topography, landscaping and natural drainage.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Reuse excavated or disposed material available in the project area to the maximum extent possible - Identify borrow pits in consultation with the local governments and WAPDA. - Obtain the borrow material from: <ul style="list-style-type: none"> - barren land or land without tree cover outside the road reserve; - Do not dig the borrow pits within 5m of the toe of the final section of the road embankment. - Dig the borrow pits continuously. Ridges of not less than 8 m widths shall be left at intervals not exceeding 300 m and small drains should be cut through the ridges to facilitate drainage - Slope the bed level of the borrow pits, as far as possible, down progressively towards the nearest cross drain, if any, and do not lower it than the bed of the cross-drain, to ensure efficient drainage. - Follow the below for restoration of borrow areas are: <ul style="list-style-type: none"> - Return stockpiled topsoil to the borrow pit if is used for agriculture; - return stockpiled topsoil to the borrow pit and all worked areas to be stabilized through re-vegetation using local plants. - Control at each site by ensuring that base of the borrow pit drains into a sediment trap prior to discharging from the site.

ECP 8: Air Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Fit vehicles with appropriate exhaust systems and emission control devices, in compliance with the NEQS. Maintain these devices in good working condition. - Operate the vehicles in a fuel efficient manner - Cover haul vehicles carrying dusty materials moving outside the construction site - Impose speed limits on all vehicle movement at the worksite to reduce dust emissions - Control the movement of construction traffic - Water construction materials prior to loading and transport - Service all vehicles regularly to minimize emissions - Limit the idling time of vehicles not more than 2 minutes
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. - Focus special attention on containing the emissions from generators - Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites - Service all equipment regularly to minimize emissions
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	<ul style="list-style-type: none"> - Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds) - Minimize the extent and period of exposure of the bare surfaces - Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site - Restore disturbed areas as soon as practicable by vegetation/grass-turfing - Store the cement in silos and minimize the emissions from silos by equipping them with filters.

ECP 9: Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures - Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Appropriately site all noise generating activities to avoid noise pollution to local residents - Use the quietest available plant and equipment - Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) - Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures - Install acoustic enclosures around generators to reduce noise levels. - Fit high efficiency mufflers to appropriate construction equipment
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Notify adjacent residents prior to any typical noise event outside of daylight hours - Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions - Employ best available work practices on-site to minimize occupational noise levels - Install temporary noise control barriers where appropriate - Notify affected people if noisy activities will be undertaken, e.g. blasting - Plan activities on site and deliveries to and from site to minimize impact - Monitor and analyze noise and vibration results and adjust construction practices as required. - Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas

ECP 10: Protection of Flora

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora are important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human-living. As such damage to flora has wide range of adverse environmental impacts.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Reduce disturbance to surrounding vegetation - Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetations. - Get approval from supervision consultant for clearance of vegetation. - Make selective and careful pruning of trees where possible to reduce need of tree removal. - Control noxious weeds by disposing of at designated dump site or burn on site. - Clear only the vegetation that needs to be cleared in accordance with the plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill and construction of diversion roads, etc. - Do not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds. - Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. - Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. - Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. - Ensure excavation works occur progressively and re-vegetation done at the earliest - Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction - Supply appropriate fuel in the work caps to prevent fuel wood collection

ECP 11: Protection of Fauna

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality,	The Contractor shall: <ul style="list-style-type: none"> - Limit the construction works within the designated sites allocated to the contractors - check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal
	Impact on migratory birds, its habitat and its active nests	The Contractor shall: <ul style="list-style-type: none"> - Not be permitted to destruct active nests or eggs of migratory birds - Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and located active nests - Minimize the release of oil, oil wastes or any other substances harmful to migratory birds to any waters or any areas frequented by migratory birds.
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	- The Contractor shall: <ul style="list-style-type: none"> - Restrict the tree removal to the minimum required. - Retain tree hollows on site, or relocate hollows, where appropriate - Leave dead trees where possible as habitat for fauna - Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Construction camps	Illegal poaching	- Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.

ECP 12: Protection of Fisheries

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities in River	The main potential impacts to fisheries are hydrocarbon spills and leaks from boats and disposal of wastes into the river	<ul style="list-style-type: none"> - The Contractor shall: - Ensure that boats used in the project are well maintained and do not have oil leakage to contaminate river water. - Contain accidental spillage and make an emergency oil spill containment plan to be supported with enough equipments, materials and human resources - Do not dump wastes, be it hazardous or non-hazardous into the nearby water bodies or in the river
Construction activities on the land	The main potential impacts to aquatic flora and fauna River are increased suspended solids from earthworks erosion, sanitary discharge from work camps, and hydrocarbon spills	<ul style="list-style-type: none"> - The Contractor shall: - follow mitigation measures proposed in ECP 3 : Water Resources Management and EC4: Drainage Management -

ECP 13: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Prepare and submit a traffic management plan to WAPDA for their approval at least 30 days before commencing work on any project component involved in traffic diversion and management. - Include in the traffic management plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary diversions, necessary barricades, warning signs/lights, road signs, etc. - Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Pakistani Traffic Regulations. - Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in Urdu: <ul style="list-style-type: none"> - Location: chainage and village name - Duration of construction period - Period of proposed detour/alternative route - Suggested detour route map - Name and contact address/telephone number of the concerned personnel - Name and contact address/telephone number of the Contractor - Inconvenience is sincerely regretted.
	Accidents and spillage of fuels and chemicals	<ul style="list-style-type: none"> - Restrict truck deliveries, where practicable, to day time working hours. - Restrict the transport of oversize loads. - Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize traffic disruptions. - Enforce on-site speed limit

ECP 14: Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Locate the construction camps at areas which are acceptable from environmental, cultural or social point of view. - Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. - Submit to the PMU for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. - Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	<p>Contractor shall provide the following facilities in the campsites:</p> <ul style="list-style-type: none"> - Adequate housing for all workers - Safe and reliable water supply. Water supply from tube wells that meets the national standards - Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by wall or by location. Female toilets should be clearly marked in language understood by the persons using them to avoid miscommunication. The minimum number of toilet facilities required is one toilet for every ten persons. - Treatment facilities for sewerage of toilet and domestic wastes - Storm water drainage facilities. Both sides of roads are to be provided with shallow v drains to drain off storm water to a silt retention pond which shall be sized to provide a minimum of 20 minutes retention of storm water flow from the whole site. Channel all discharge from the silt retention pond to natural drainage via a grassed

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>swale at least 20 meters in length with suitable longitudinal gradient.</p> <ul style="list-style-type: none"> - Paved internal roads. Ensure with grass/vegetation coverage to be made of the use of top soil that there is no dust generation from the loose/exposed sandy surface. Pave the internal roads of at least haring-bond bricks to suppress dusts and to work against possible muddy surface during monsoon. - Provide child crèches for women working on the construction site. The crèche should have facilities for dormitory, kitchen, indoor/outdoor play area. Schools should be attached to these crèches so that children are not deprived of education whose mothers are construction workers - Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by construction camps to be discouraged/prohibited to the extent possible.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Ensure proper collection and disposal of solid wastes within the construction camps - Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level. - Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipments/vehicles needed. - Dispose organic wastes in a designated safe place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. One may dig a large hole to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition. Cover the bed of the pit with impervious layer of materials (clayey, thin concrete) to protect groundwater from contamination. - Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<ul style="list-style-type: none"> - Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
<p>Fuel supplies for cooking purposes</p>	<p>Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass. - Make available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. - Conduct awareness campaigns to educate workers on preserving the protecting of biodiversity in the project area, and relevant government regulations and punishments on wildlife protection.
<p>Health and Hygiene</p>	<p>There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Provide adequate health care facilities within construction sites. - Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. - Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. - Initial health screening of the laborers coming from outside areas - Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work - Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis - Complement educational interventions with easy access to condoms at campsites as well as voluntary 135counseling and testing - Provide adequate drainage facilities throughout camps to ensure that disease vectors habitats (stagnant water bodies, puddles) do not form. Regular mosquito repellent sprays in monsoon. - Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices
<p>Safety</p>	<p>In adequate safety facilities to the construction camps may</p>	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry in to the camp area.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	create security problems and fire hazards	<ul style="list-style-type: none"> - Maintain register to keep track on a head count of persons present in the camp at any given time. - Encourage use of flameproof material for the construction of labor housing/site office. Ensure that these houses/rooms are of sound construction and capable of withstanding storms/cyclones. - Provide appropriate type of firefighting equipment suitable for the construction camps - Display emergency contact numbers clearly and prominently at strategic places in camps. - Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. - Dismantle camps in phases as the work decreases (do not wait for completion of the entire work). - Give prior notice to the laborers before demolishing their camps/units - Maintain the noise levels within the national standards during demolition activities - Different contractors should be hired to demolish different structures to promote recycling or reuse of demolished material. - Reuse the demolition debris to a maximum extent. - Handover the construction camps with all built facilities as it is if agreement between both parties (contractor and land-owner) has been made so. - Restore the site to its original condition or to an agreed condition with the landowner defined prior to the commencement of the works (in writing). - Not make false promises to the laborers for future employment in O&M of the project.

ECP 15: Cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. - Do not block access to cultural and religious sites, wherever possible - Restrict all construction activities within the foot prints of the construction sites. - Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections. - Take special care and use appropriate equipment when working next to a cultural/religious institution. - Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the PMU - Provide separate prayer facilities to the construction workers. - Show appropriate behavior with all construction workers especially women and elderly people - Allow the workers to participate in praying during construction time - Resolve cultural issues in consultation with local leaders and supervision consultants - Establish a mechanism that allows local people to raise grievances arising from the construction process. - Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

ECP 16: Worker Health and Safety

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc), (ii) risk factors resulting from human behavior (e.g. STD, HIV etc) and (iii) road accidents from construction traffic.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on ‘Safety and Health in Construction; World Bank Group’s ‘Environmental Health and Safety Guidelines’) and contractor’s own national standards or statutory regulations, in addition to complying with the national acts and rules of the Government of Pakistan - Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, - Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. - Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job - Appoint an environment, health and safety manager to look after the health and safety of the workers - Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters
	Child and pregnant labor	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the Pakistani Labor Laws and Employment of Child Act (1977).
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	<ul style="list-style-type: none"> - Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work - Document and report occupational accidents, diseases, and incidents. - Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		<p>practicable, the causes of hazards. In a manner consistent with good international industry practice.</p> <ul style="list-style-type: none"> - Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures. - Provide awareness to the construction drivers to strictly follow the driving rules - Provide adequate lighting in the construction area and along the roads
<p>Construction Camps</p>	<p>Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.</p>	<p>The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECP 14 Construction Camp Management:</p> <ul style="list-style-type: none"> - Adequate ventilation facilities - Safe and reliable water supply. Water supply from deep tube wells that meets the national standards - Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. - Treatment facilities for sewerage of toilet and domestic wastes - Storm water drainage facilities. - Recreational and social facilities - Safe storage facilities for petroleum and other chemicals in accordance with ECP 2 - Solid waste collection and disposal system in accordance with ECP1. - Arrangement for trainings - Paved internal roads. - Security fence at least two m height. - Sick bay and first aid facilities
<p>Water and sanitation facilities at the construction sites</p>	<p>Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.</p>	<ul style="list-style-type: none"> - The contractor shall provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities should be at least six m away from storm drain system and surface waters. These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment. - Contractor should provide bottled drinking water facilities to the construction workers at all the construction sites.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Other ECPs	Potential risks on health and hygiene of construction workers and general public	<p>The Contractor shall follow the following ECPs to reduce health risks to the construction workers and nearby community:</p> <ul style="list-style-type: none"> - ECP 2: Fuels and Hazardous Goods Management - ECP 4: Drainage Management - ECP 8: Air Quality Management - ECP 9: Noise and Vibration Management - ECP 13: Road Transport and Road Traffic Management
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	<p>The Contractor shall:</p> <ul style="list-style-type: none"> - Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS. - Train all construction workers in general health and safety matters, and on the specific hazards of their work Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. - Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing. - Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This should be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

Annexure-6: Flood Resistant Design Guideline

Any proposed development in the regulated floodplain must be consistent with the need to minimize flood damage. This can be accomplished, in part, by using materials, equipment, and construction techniques that are resistant to flood damage in locations that would be wet during a 100-year flood.

- **New construction and substantially improved structures** (including accessory structures): It is required that materials and equipment located below the flood protection level (and outside of dry flood proofed areas) be resistant to flood damage. This may apply to foundations, floor beams, joists, enclosures, and equipment servicing the building (electrical, plumbing, mechanical, ducts, etc.).
- **Non-substantial improvements to existing (pre-FIRM) buildings and non-building development:** New and replacement electrical, plumbing, and mechanical equipment must be located or designed to resist flood damage. The entire project should utilize flood resistant design, materials, and practices to the greatest extent practical.

pressures during floods. These pressures can result in displaced foundation walls, collapsed structures, floating fuel tanks, scouring, and other damage. Flood resistance thus requires that structural and non-structural components be durable, resistant to flood forces (including buoyancy), and resistant to deterioration caused by inundation with floodwater. Options that require emergency operation (such as shutting off electricity or removing vulnerable components) should be avoided if possible, particularly in areas subject to flash flooding. “Flood resistant” is not “dry floodproofing” of non-residential structures.

Flood Damage-Resistant Building Materials

It is important that all parts of a building or other project that are susceptible to flooding (including fasteners and connectors) be made of materials that are resistant to flood damage. “Flood-resistant materials” include any building product capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. “Prolonged contact” means at least 72 hours, and “significant damage” is any damage requiring more than cleaning or low-cost cosmetic repair (such as painting). The need to replace flood damaged drywall or other material is considered “significant damage” and is thus not acceptable. Components that are not inundated should be resistant to excessive humidity.

Flood damage-resistant materials include:

- Glazed brick, concrete, concrete block, glass block or stone (with waterproof mortar or grout);
- Steel trusses, headers, beams, panels, or hardware;
- Naturally decay resistant lumber, recycled plastic lumber, or marine grade plywood;
- Clay, concrete, rubber, or steel tiles (with chemical-set or waterproof adhesives);
- Cement board;
- Metal doors, cabinets, and window frames;
- Mastic, silicone, or polyurethane formed-in-place flooring;
- Sprayed polyurethane foam or closed-cell plastic foam insulation;
- Water-resistant glue; and
- Polyester epoxy paint (mildew-resistant paint contains toxic ingredients and should not be used indoors).



Anchoring

Foundations, equipment, accessory structures, and other components located below the flood protection level must be firmly anchored to resist flotation, collapse, and lateral movement.

Mechanical, Plumbing, and Electrical Systems

Location above the flood protection level is generally the best way to protect service equipment, such as heating, ventilating, air conditioning, plumbing appliances, plumbing fixtures, duct systems, and electrical equipment (service panels, meters, switches, and outlets). If these components are at a lower level, they must be designed to prevent damage from flooding. This may involve waterproof enclosures, barriers, protective coatings, or other techniques to protect vulnerable components. The municipality may require certification from a licensed professional that the standards for resistance to flood damage are met.

Backflow and Automatic Shut-Off Valves

Flooding can cause sewage from sanitary sewer lines to back up into buildings through drain pipes, causing both damage and health hazards. Backflow valves are designed to temporarily block pipes and prevent flow into the building and should be installed on any pipes that leave the building or are connected to equipment located below the flood protection level. In addition to sanitary sewer and septic connections, this may include water lines, washing machine drain lines, laundry sinks, downspouts, and sump pumps. Fuel supply lines must be equipped with float operated automatic shut-off valves.

Storage Tanks

Unanchored fuel tanks can be easily moved by flood waters, posing a serious threat of contamination and other damage. Even a buried tank can be pushed to the surface by buoyant effects. A tank can be anchored by attaching it to a concrete slab that is heavy enough to resist the force of flood waters or by running straps over it and attaching them to ground anchors. Tanks and other containers should have watertight fill caps, vents that extend above the flood protection level, and accurate labeling of contents (so that emergency personnel know what it contains if the tank breaks loose and floats away).

Additional Resources

- *Wet Flood proofing Requirements for Structures Located in Special Flood Hazard Areas*, Technical Bulletin 7-93, FEMA FIA-TB-7 (1993), available at <http://www.fema.gov/library/viewRecord.do?id=1720>, includes planning, safety, and engineering considerations for wet flood proofing.
- *Flood Damage-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas*, Technical Bulletin 2, FEMA FIA-TB-2 (2008), available at <http://www.fema.gov/library/viewRecord.do?id=1580>, includes lists of acceptable materials for flood-resistant construction.
- *Protecting Building Utilities from Flood Damage: Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems*, FEMA 348 (1998), available at <http://www.fema.gov/hazard/flood/pubs/pbuffd.shtm>. This publication provides technical guidance for the design and construction of flood-resistant utility systems, including HVAC systems, fuel systems, electrical systems, sewage management systems, and potable water systems.
- *Elevator Installation for Buildings Located in Special Flood Hazard Areas*, Technical Bulletin 4-93, FEMA FIA-TB-4 (1993), available at <http://www.fema.gov/library/viewRecord.do?id=1717>. Provides guidance concerning the installation of elevators below the Base Flood Elevation.
- *Flood-Resistant Design and Construction*, American Society of Civil Engineers (ASCE) 24-05, purchase at www.asce.org, highlights available at <http://www.fema.gov/library/viewRecord.do?id=3515>. ASCE 24 is a referenced standard in the NYS Building Code and the NYS Residential Code. Buildings designed according to ASCE 24 are better able to resist flood loads and flood damage

Annexure-7: Asbestos Handling Guidelines

Guidelines Asbestos and Asbestos Based Product use during Construction

Asbestos is a group of naturally occurring fibrous silicate minerals. It was used widely in the production of many industrial and household products because of its useful properties, including fire retardation, electrical and thermal insulation, chemical and thermal stability, and high tensile strength⁴.

Asbestos based products include Asbestos –Cement (A-C) construction materials such as A-C flat and corrugated sheets, A-C pipe, and A-C water storage tanks. Over 90% of the asbestos fiber produced today is chrysotile which is found in these products. Vehicle brake, clutch pads, roofing and gaskets are some other products that are still being manufactured with asbestos content. Due to international laws banning the use of asbestos, it is hardly used in construction materials other than asbestos –cement products. However, it is still found in older buildings in the form of friable surfacing materials, thermal system insulations, non-friable flooring materials, and other applications. In Sri Lanka, asbestos roofing sheets are widely used as it is the most cost effective and durable material given climate, environment and other factors. Other alternatives to asbestos roofing sheets in Sri Lanka are clay tile, zinc-aluminum, cadjan (matted coconut/Palmyra/palm leaves) and concrete. These alternatives have disadvantages such as:

- Clay tiles are easy to remove, and in areas where there are monkeys it poses a practical problem. Monkeys tend to travel over roofs and either deliberately or accidentally break tiles, thus expenses for replacing is high.
- Zinc-Aluminum – While durable and long lasting, given the tropical climate and monsoon rains, such roofing heats up during the day and during rainy periods the noise makes it impractical especially to use in classrooms.
- Cement – due to the climate in Sri Lanka if not properly treated can result in leaks and damage to the structure. Furthermore, in high temperatures the heat absorption is high thus increasing the temperature in the buildings. In classrooms, it would make it difficult for students and teachers to work. Furthermore, concrete roofs are costly, and will not be affordable, given the large number of school infrastructure requirements that will need to be met through the project.
- Cadjan roofs while environmentally friendly, need to be replaced frequently, causes leaks and will not be acceptable on school buildings.

Ban on Asbestos Use:

As health risks related to exposure to asbestos is widely known, many countries have banned the commercial use of asbestos. The International Labor Organization (ILO) established an Asbestos Convention (C162) in 1986 to promote national laws and regulations for the “prevention and control of, and protection of workers against, health hazards due to

occupational exposure to asbestos”. As of March 4, 2008, 31 countries had ratified the Convention, 17 of them have banned asbestos use. ILO asbestos convention requirements include:

- Work clothing to be provided by employers,
- Double changing rooms and wash facilities to prevent dust from going home on street clothes, Training of workers about the health hazards to themselves and their families,
- Periodic medical examinations of workers,
- Periodic air monitoring of the work environment, with records retained for 30 years,
- Development of a work plan for demolition work, to protect workers and provide for proper waste disposal, and
- Protection from retaliatory and disciplinary measures of workers who remove themselves from work that they are justified in believing presents a serious danger to health.

Health Risks:

Health hazards from breathing asbestos dust include:

- Asbestosis – a lung scarring disease
- Form of cancer such as mesothelioma.

The main risks of exposure from asbestos is where fibers are easily made air borne under little pressure, such as cutting of A-C products that can release fibers. Risks are from construction materials that need to be altered, repaired and disposed of that may release particles into the air, and increase the risk of inhalation. Renovations, repairs and decommission of buildings containing A-C products such as roof sheets can pose a risk. However, in the case of Asbestos –Cement (AC) corrugated sheets, the fiber is present in the non- friable form which means that fiber is embedded in cement and cannot be easily air-borne. Such materials are known to have little health risk once (a) the roof has been completed and (b) given that material is in good condition and not disturbed⁸. Although IDA Group’s Good Practice Note on Asbestos , and its Health and Safety Guidelines do not encourage the use of asbestos products in construction, in light of the practical uses for construction of school infrastructure, the costs, its availability in local markets and lack of feasible alternatives, the use of asbestos is the most feasible option. However, to minimize the health risks that asbestos products do pose, the following guidelines adapted from the World Bank’s Health and Safety Guidelines and other sources are recommended to be followed. As Sri Lanka has no regulations regarding the use of Asbestos, the use of ILO convention guidelines as stated above are recommended as well.

Construction phase:

- To minimize the risk of damage of A-C sheets for roofing, transportation of material must be done with care. Where possible, sheets should be transported in airtight containers or with dust covers.
- During installation of sheets, ensure that damage is minimized. Use of power tools to drill holes that may release particles needs to be kept to the minimum.

- Use a protective sheet (i.e. insulation foil) between the A-C sheets and the classrooms to reduce the risk of minute particles entering the rooms.
- Workers who are involved in handling and installing A-C sheets should take precautions to minimize exposure by wearing protective masks and showering to minimize spread of dust. Work clothes used during the installation of sheets should be washed and workers change to clean clothes before leaving construction site.
- Workers should be made aware of the risks of A-C sheets, and how to minimize these risks.

Post Construction/De-Commissioning:

- Contractors should dispose of waste containing asbestos in a manner that does not pose a health risk to the workers concerned or the population in the vicinity. Disposal at approved landfills and prompt burial under various levels of material apply to friable asbestos waste. Contractors should consult the Local Authority and Central Environmental Authority to obtain guidance on proper disposal of material.
- Contractor should be encouraged to develop an asbestos management plan that identifies the content (whether it is in friable form and has potential to release fibers), and proper removal procedures.
- During the removal of A-C sheets, workers should wear proper protective gear such as masks and shower to prevent the spread of dust. Clothes worn during this process should be washed and workers should change into clean clothes prior to leaving construction site.
- Workers who are, or have been, exposed to asbestos in their occupational activities should be provided, in accordance with national laws and practices, with such medical examinations as are necessary to supervise their health in relation to the occupational hazard, and to diagnose occupational diseases caused by exposure to asbestos. For the prevention of disease and functional impairment related to exposure to asbestos, all workers assigned to work involving asbestos exposure should be provided with:
 - a pre-assignment medical examination;
 - periodic medical examinations at appropriate intervals (at least every 3 years);
 - other tests and investigations, in particular chest radiographs and lung function test, which may be necessary to supervise their state of health in relation to the occupational hazard and to identify early indicators of disease caused by asbestos;
 - a copy of their medical record.
- The above requirements will be based on the type of construction and its magnitude.

Annexure-8: Physical Cultural Resource (PCR) Management Framework and Chance Find procedures

A. The PCR Management Framework

The PCR Management Plan can constitute a section of the Environmental Management Plan, if one is required. The Management Plan should clearly:

- Schedule the implementation of the proposed PCR mitigating measures and PCR monitoring, if any, taking into account the weather pattern, and identify roles and responsibilities for such implementation;
- Identify procedures for handling chance finds, including the role and responsibilities of the cultural authorities and the contractor; and
- Identify procedures for addressing PCR impacts which may occur during implementation but were not predicted in the impact assessment.

The following are the main considerations guiding the preparation of the PCR Management Plan.

1. Policy, Legal and Regulatory Framework

This section should contain reference to the following, including identification of any implications for the PCR component of the ESMP, such as special standards or requirements:

- The World Bank's EA policy OP/BP 4.01 and the PCR policy OP/BP 4.11;
- Sections of national EIA laws, regulations and guidelines relating to PCR;
- Sections of the national environmental conservation strategy, if any, relating to PCR;
- Legislation and regulations relating to:
 - Antiquities, including sale and export;
 - Procedures for addressing chance finds, in terms of ownership and requirements by the contractor and cultural authorities;
 - Archaeology, including the issue of permits.
- Relevant authorities charged with PCR identification, protection and management, their powers, the legal basis for their authority, and their actual capacity;
- PCR-related conventions and treaties to which the borrower country is signatory;
- Sites in the borrower country currently listed by other international agency in the field of PCR such as the World Monuments Fund, or ICOMOS, as being of national or international importance;

- Any national or provincial registers of PCR maintained by accredited authorities in the borrower country.

2. Project Description

The project description should detail construction and operation phases, including maps, diagrams and plans of planned activities. The description should take into consideration any potential impacts on PCR of planned activities, construction/rehabilitation processes, transport arrangements, etc.

3. Analysis of Alternatives

In cases where there are major PCR issues, the analysis of alternatives should consider alternative project sites or technologies that could specifically avoid or minimize those impacts on PCR.

4. Baseline Data

The baseline data should begin with an investigation and inventory of PCRs likely to be affected by the project. The data should consider all types of PCR that might be impacted, covering:

- Living-culture PCR, as well as historical, archaeological and paleontological PCR;
- Natural and human-made PCR;
- Movable and immovable PCR;
- Unknown or invisible PCR.

The data collection activity should involve consultations with concerned parties and potentially affected communities. Potential data sources might include cultural authorities, national or provincial PCR registers, universities and colleges, public and private PCR-related institutions, religious bodies and local PCR NGOs. Sources at the community level typically include, for example, community leaders and individuals, schools, religious leaders, scholars, PCR specialists, and local historians.

The baseline data section should include maps showing PCR baseline data within the potential impact areas. In addition, data should detail the cultural significance or value attributed by the concerned or affected parties to the PCR identified in the baseline. Consultation is a particularly important means of identifying PCR and documenting their presence and significance. This will normally not be expressed in monetary terms, but rather should explain the nature of the cultural significance, for example whether it is religious, ethnographic, historic, or archaeological. In the case of PCR of archaeological, architectural, paleontological or other scholarly or scientific value, the PCR Management Plan should provide an assessment of the relative importance of the PCR in this regard locally, nationally and/or internationally.

5. Impact Assessment

PCR should be included in the impact matrix and PCR impacts for each project stage – construction/rehabilitation, operation, etc. – should be detailed. The PCR Management Plan should specifically describe the nature and extent of the potential impacts and state precisely why they are considered to be significant or insignificant. The impact assessment should also consider the possibility of accidents during construction/rehabilitation and operations which

might affect PCR, especially in urban settings, which might call for special precautionary measures.

6. Mitigation Measures

It is particularly important that consultations with concerned and affected parties are conducted on the proposed mitigation measures relating to PCR impacts. Agreements must be reached and evidence of such agreements should be included in PCR Management Plan. It should be checked whether the recommended mitigation measures might themselves have environmental impacts (e.g. archaeological excavations). PCR Management Plan should detail the cost of implementing and the timing of the recommended PCR mitigation measures.

B. Chance Find Procedures

Chance find procedures which will be used during this Project are as follows:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Ministry in charge of Department of Archaeology take over;
- Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Ministry immediately (within 24 hours or less);
- Responsible local authorities and the Ministry in charge of Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of the Department of Archaeology and Museums (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible authorities and the Ministry in charge of Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Ministry in charge of Department of Archaeology; and
- Construction work could resume only after permission is given from the responsible local authorities and the Ministry in charge of Department of Archaeology concerning safeguard of the heritage.

These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered or observed.

Annexure-9: Sub-project Social and Environmental Screening Form

Pakistan Hydro-Meteorological and DRM Services Project

Subproject Title:

Subproject location (area/district/site):

Subproject scope of work:

Implementing Agency:

Date of screening:

Responsible agency:

#	Screening Criteria	Assessment of category	Explanation
ENVIRONMENT			
1	Is the subproject in an eco-sensitive area or adjoining an eco-sensitive area or monument? (Yes/No) If Yes, which is the area? Elaborate impact accordingly.		
2	<p>Will the subproject create significant/limited/no environmental impacts during the construction stage?</p> <ul style="list-style-type: none"> ▪ Clearance of vegetation/ tree-cover/other ▪ Direct discharge of construction run-off, improper storage and disposal of excavation spoils, wastes and other construction materials adversely affecting water quality and flow regimes. ▪ Flooding of adjacent areas. ▪ Improper storage and handling of substances leading to contamination of soil and water. ▪ Elevated noise and dust emission. ▪ Disruption to traffic and visitor's movements. ▪ Damage to existing infrastructure, public utilities, and amenities. ▪ Failure to restore temporary construction sites. ▪ Possible conflicts with and/or disruption to local community and/or visitors. ▪ Health risks due to unhygienic conditions at workers 'camps. ▪ Safety hazards during construction. ▪ Other, specify. 		

3	<p>Will the subproject create significant/limited/no environmental impacts during the operational stage? (Significant / limited / no impacts)</p> <ul style="list-style-type: none"> ▪ Flooding of adjacent areas ▪ Impacts to water quality due to effluent discharge ▪ Gas emissions ▪ Safety hazards ▪ Other, specify. 		
4	<p>Does the subproject involve any prior clearance from the State Forest Department for either the conversion of forest land or for tree-cutting? (Yes/ No). If yes, which?</p>		

CULTURAL HERITAGE

5	<p>Will the subproject create significant/limited/no cultural properties impacts?</p> <ul style="list-style-type: none"> ▪ Involve significant excavations, demolition, movement of earth, flooding or other major environmental damages. ▪ Is located within or in the vicinity of a recognized cultural property conservation area or heritage site. ▪ Is designed to support the management or conservation of a cultural property. ▪ Other, specify. 		
6	<p>Does the subproject involve any prior clearance from the Archeology Department for either the conservation or management of heritage sites or vicinities? (Yes/ No). If yes, which?</p>		

SOCIAL

7	<p>Will the subproject create significant/limited/no social impacts?</p> <ul style="list-style-type: none"> ▪ Land acquisition resulting in loss of income from agricultural land, plantation or other existing land. ▪ Impact on livelihood and economic activity. ▪ Land acquisition resulting in relocation of households. ▪ Any reduction of access to traditional dependent communities (to areas where they earn for their primary or substantial livelihood). ▪ Any displacement or adverse impact on tribal settlement(s). ▪ Adverse impacts to women, including economic and safety concerns. ▪ Impact on infrastructure (roads, water supply, any other type of infrastructure) <p>Other, specify.</p>		
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Overall Assessment

- | | | |
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| <ul style="list-style-type: none">▪ Subproject is declined▪ Subproject is accepted▪ Subproject is classified as environmental Category A and requires an in-depth Environmental and Social Impact Assessment and an Environmental Management Plan.▪ Subproject is classified as environmental Category B and requires an Environmental Management Plan.▪ Subproject is classified as environmental Category C and does not require an Environmental Management Plan. | | |
|--|--|--|

Annexure-10: Involuntary Resettlement Screening Checklist

Potential Impacts	Yes	No	Expected	Remarks
Does the sub-project involve any physical construction work, i.e. rehabilitation, reconstruction or new construction? Specify in “remarks” column.				
Does the sub-project involve impacts on land, assets and people, if “Yes” try to quantify the impacts and check following items? If “No” impacts, explain the situation in “remarks” and move to section 2.				
Potential impacts				
Land (quantify and describe types of land in “remarks column”.				
Government or state owned land free of occupation (agriculture or settlement)				
Private land				
▪ Residential				
▪ Commercial				
▪ Agriculture				
▪ Communal				
▪ Others (specify in “remarks”).				
Land-based assets:				
▪ Residential structures				
▪ Commercial structures (specify in “remarks”)				
▪ Community structures (specify in “remarks”)				
▪ Agriculture structures (specify in “remarks”)				
▪ Public utilities (specify in “remarks”)				
▪ Others (specify in “remarks”)				
Agriculture related impacts				
▪ Crops and vegetables (specify types and cropping area in “remarks”).				
▪ Trees (specify number and types in “remarks”).				
▪ Others (specify in “remarks”).				
Affected Persons (DPs)				
▪ Number of DPs				
▪ Males				
▪ Females				

Potential Impacts	Yes	No	Expected	Remarks
▪ Titled land owners				
▪ Tenants and sharecroppers				
▪ Leaseholders				
▪ Agriculture wage laborers				
▪ Encroachers and squatters (specify in remarks column).				
▪ Vulnerable DPs (e.g. women headed households, minors and aged, orphans, disabled persons and those below the poverty line). Specify the number and vulnerability in “remarks”.				
▪ Others (specify in “remarks”)				
Section 2				
Others (specify in “remarks”).				
Are there any other minority groups affected by land acquisition or project activities? If “Yes” check the following items				
▪ Minority groups (specify in “remarks”). Describe nature of impacts				

Annexure-11: Sample Terms of Reference

Environmental Safeguards Specialist

One Environmental Safeguards Specialist will be based in Project Implementation Unit (PIU) PMD Islamabad.

One Environmental Safeguards Specialist will be based in Project Implementation Unit (PIU) NDMA Islamabad.

Tasks: Environmental Safeguards Specialist will be responsible for the following duties and responsibilities relevant to project environmental safeguards compliances and mitigation measures

Objective:

Provide expert support to executing agencies in the office and field, provide support to implement activities related to the project components for compliance to environmental safeguards and mitigation measures.

Main responsibilities are:

- Deal with environmental aspects of the project and provide feedback to the Project Director on implementation of environmental action plan under the activities of the project.
- Support in compliance of the credit conditions and covenants pertaining to Environmental Safeguards.
- Update in Implementation of Environmental aspects of the project.
- Oversee environmental monitoring of the ESMF and site specific ESMPs
- Provide technical support to works consultants in the development of site specific ESMPs
- Coordinate with implementing agencies and works contractors for onsite implementation of ESMPs.
- Organize and conduct the trainings on ESMF and ESMP compliances as proposed in mitigation plan.
- Prepare monthly, quarterly progress reports of Environment and Social Management Framework (ESMF).
- Prepare final progress report of the ESMF and submit to the World Bank.
- Ensure the HSE compliance onsite by the civil works consultants / contractor at project sites.
- Coordinate and conduct Environmental Field Monitoring visits of Project Areas.
- Review and revision of documents and ensuring timely delivery of outputs as agreed between The World Bank and PIU, PMD.
- As and when required contribute to the ongoing activities of the safeguard unit.
- Assist the Project Director in routine office matter when require.
- Work as the focal point for World Bank to provide necessary requirements of environmental compliances within the project.

Academic Qualification:

Post Graduate degree in Environmental Sciences with 5-8 years of relevant work experience in dealing with Environmental management and implementation in development projects.

Salary and Benefits:

PMD and NDMA will decide as per their rules and regulations for the project

Duration: Till project duration

Social Safeguards Specialist

One Social Safeguards Specialist will be based in Project Implementation Unit (PIU) PMD Islamabad.

One Social Safeguards Specialist will be based in Project Implementation Unit (PIU) NDMA Islamabad.

Tasks: Social Safeguards Specialist will be responsible for the following duties and responsibilities relevant to project social safeguards compliances and mitigation measures

Objective:

Provide expert support to executing agencies in the office and field, provide support to implement activities related to the project components for compliance to social safeguards and mitigation measures.

Main responsibilities are:

- Deal with social aspects of the project and provide feedback to the Project Director on implementation of RPF, GRM and social safeguards under the activities of the project.
- Support in compliance of the conditions and covenants pertaining to Social Safeguards.
- Oversee social monitoring of the ESMF and site specific ESMPs
- Provide technical support to works consultants in the development of site specific ESMPs
- Coordinate with implementing agencies and works contractors for onsite implementation of ESMPs.
- Organize and conduct the trainings on ESMF and ESMP compliances as proposed in mitigation plan.
- Prepare monthly, quarterly progress reports of Environment and Social Management Framework (ESMF) and RPF
- Coordinate and conduct Social Field Monitoring visits of Project Areas.
- Review and revision of documents and ensuring timely delivery of outputs as agreed between The World Bank and PIU, PMD.
- As and when required contribute to the ongoing activities of the safeguard unit.
- To carry out the screening of the sub-projects with respect to the social aspects as defined in the ESMF;
- Monitor and check the proper implementation of all social mitigation measures as suggested in ESMF/ESMP;
- Monitoring and evaluation of social related matters of the project and maintain a social complaint register to document social issues;
- Top supervise the Contractor's activities and make sure that all the contractual obligations related to the social compliance are met;
- Review of periodic environmental and social reports being prepared by the investor/contractor
- Ensure inclusion of ESMP guidelines in project designs.
- Screen sub-projects for Involuntary Resettlement
- Ensure Resettlement Policy Framework (RPF) is implemented and RAP is prepared if required

Academic Qualification:

Post Graduate degree in Social Sciences with 5-8 years of relevant work experience in dealing with Environmental management and implementation in development projects.

Salary and Benefits:

PMD and NDMA will decide as per their rules and regulations for the project

Duration: Till project duration