Khyber Pakhtunkhwa
Climate Change Diagnostic Study
&
NDC-linked Climate Investment Plan

JUNE, 2022

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LIST OF ACRONYMS

ADB	Asian Development Bank
AEDB	Alternative and Renewable Energy Development Board
AFOLU	Agriculture, Forestry and Other Land use
ARE 2019	Alternative and Renewable Energy Policy 2019
BAU	Business as usual
BRT	Bus Rapid Transit
BTAP	Billion Trees Afforestation Project
BTR	Biennial Transparency Report
CBDRM	Community Based Disaster Risk Management
CCA	Climate Change Adaptation
CCGAP	Climate Change Gender Action Plan
CDWP	Central Development Working Party Meeting
CGPI – 2019	Clean Green Pakistan Index 2019
CIACA	Collaborative Instruments for Ambitious Climate Action
CID	Climate Impact-Drivers
CIF	Climate Investment Fund
COP	Conference of Parties
CPEC	China - Pakistan Economic Corridor
CPI	Carbon Pricing Instrument
CSOs	Civil Society Organizations
DWP	Development Working Party
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESRF	Ecosystem Restoration Fund
ESRI	Ecosystem Restoration Initiative
EV	Electric Vehicle

Introduction

Development of Climate Investment Plan for Khyber Pakhtunkhwa has been supported jointly by Khyber Pakhtunkhwa Planning and Development Department, SEED Project and The Word Bank. The Action Plan follows the sequel of Pakistan's NDC ambition, as submitted in COP 26 during 2021. Among other things, Pakistan's latest NDC ambition sought to build the climate resilience capacities of the people, institutions and vulnerable sectors in all provinces of Pakistan, in face of the adverse impact of climate change through mitigation and adaptation actions. Accordingly, the present Climate Investment Plan for KP province aims to promote notions of de-carbonization, reduced GHG emissions and enhanced resilience for the province of Khyber Pakhtunkhwa which are aligned with Pakistan's NDC ambition as well as the green growth priorities of the Provincial Government.

The Climate Investment Plan for KP province is culmination of rigorous policy research process undertaken for highlighting climate change challenges as well as mitigation and adaptation options to ameliorate these challenges for nurturing a resilient society in KP province. These research papers and briefs provide technically valid and evidence-driven basis in key areas of climate action and climate challenges as relevant to the KP province, by covering the themes of Climate Vulnerability, Growth and Resilient Development; Institutional and Policy Reform context related to Climate Change; Climate Investment & Financing; Climate Change-linked Growth and Employment Opportunities; and Political Economy of Climate Action in KP province. These five policy briefs have succinctly highlighted the key thematic areas, gaps and limitations related to climate action in KP province. The key issues highlighted in these background research papers and policy-based recommendations have been used to develop the Climate Investment Plan for the KP province.

The present document has three distinct sections. Section one deals with contextual background and relevance of the present document in terms of KP Government's pursuit of NDC targets. The second section provides the details of the Climate Investment Plan, including its goal, vision, objective and a list of key mitigation and adaptation measures to enhance resilience and de-carbonize KP's development for achieving reduced GHG emission targets. **The third and last section provides a crucial pipeline of prioritized and context-specific interventions across key sectors in KP for fast track progress towards avowed NDC targets and ambition of KP province in line with Pakistan's NDC submission in COP 26.** Besides a range of government and non-government stakeholders, overall stewardship for rolling out this Plan is proposed to be provided by KP Environment & Forestry Departments as well as P&D Departments. The Plan also includes a "stakeholder mapping" and "stakeholder influence table to highlight their respective role in implementation of this Plan. Intervention under the plan have been assigned a recommended time-frame. Last but not the least, the plan also provides insight in multiple financing options for funding the interventions including recourse to innovative green financing options. Policy and Intervention-based recommendations of the plan cover the period till 2030 and are proposed to

finance through a mix of government resources, donor funding and recourse to green climate funding windows

1. What is Khyber Pakhtunkhwa Climate Change Investment Plan?

KP Climate Investment Plan is designed to provide an actionable roadmap to the KP Government for playing its role in achieving Pakistan's NDC ambition through a mix of mitigation and adaptation efforts. Government of Pakistan has submitted its revised and updated NDCs at COP 26 to realize its vision of a sustainable, low carbon, and climate-resilient Pakistan. Pakistan's revised NDC submission assigns central important and pivotal role to the "Provincial Governments" in terms of furthering its overall objectives and goals. In this regard, Chapters Four (4) and Five (5) clearly identify the sectors and supporting initiatives where provincial governments/departments have been assigned lead role or supportive role in the area of mitigation and adaptation through development of climate actions plans. The present plan is accordingly an instrument to achieve the overall objective of nurturing a resilient and sustainable developmental future for the province in face of the climate challenges facing the province and the country. By pursuing the plan, KP Government shall implement measures and actions for achieving a low carbon and environmentally resilient growth trajectory. Additionally, the pursuit of the plan will help address and reduce the climate change-driven vulnerabilities in the key developmental sectors with a focus on more vulnerable and marginalized segments of the society.

2. Climate Change Diagnostic for the KP province

KP P&D Department in collaboration with FCDO-funded SEED project and The World Bank undertook a climate change diagnostic as a precursor to designing Climate Investment Plan. As part of this effort, five, individual research papers and briefs have been developed by the sector experts to provide technically valid and evidence-driven basis in key areas of climate action and climate challenges as relevant to the KP province. These five diagnostic policy papers have been developed to cover the themes of Climate Vulnerability, Growth and Resilient Development; Institutional and Policy Reform context related to Climate Change; Climate Investment & Financing; Climate Change-linked Growth and Employment Opportunities; and Political Economy of Climate Action in KP province. These five policy briefs have succinctly highlighted the key thematic areas, gaps and limitations related to climate action in the province. Additionally, the research has provided comprehensive coverage to the technical, economic, financial, institutional, governance and the legal/policy aspects of climate action as relevant to the KP province. The key issues highlighted in these background research papers and policy-based recommendations have been used to develop the Climate Investment Plan for the KP province.

The robust analytical basis provided by the above-mentioned thematic research papers are designed to highlight the linkages and dependencies between climate ambition and development priorities of the province. These evidence-based findings can be used by the policy-makers to sharpen the focus and understanding around key climate change challenges faced by the province besides helping design and prioritization of key mitigation and adaptation measures. Implementation of the policy and intervention-based recommendations of this plan are expected to enhance climate-related resilience, achieve de-carbonization of the development while at the same time contribute toward meeting NDC ambition of the country. Equally importantly, the plan also envisages consensus building among key stakeholders for roll out of much-needed policy and institutional reforms in the **province as corollary to the climate ambition of the leadership.**

3. Climate Risks and Sources of Vulnerability

The diagnostic phase leading to development of the present investment plan has been used to understand the existing as well as prospective climate risks and critical sources of the vulnerability as relevant to the KP province. For this purpose, reliance has been placed on multiple sources of data and information, including primary as well as secondary sources. From the outset, the challenges of limited and at times zero baseline information about climate change vulnerabilities pertaining to KP province have been strongly felt. However, an effort has been made to overcome this hurdle through reliance on secondary sources of information as well as holding of rigorous consultations with the key stakeholders for seeking maximum clarity on province's climate challenges. Based on the above strategy, major climate risks and sources of vulnerabilities as well as the most relevant sectors for priority climate action have been identified and short-listed as follows

Major Climate Risks and Sources of Vulnerability in the KP province

Climate Risks	Key Sources of Vulnerability
Increasing temperature patterns	Fragile Ecosystems & Depleting Natural Resource Base
Unpredictable and uncertain changes in rainfall patterns	Marginalized livelihood and multi-dimensional poverty
Frequent risks of extreme weather events (droughts, floods, landslides)	Food security issues; unsustainable and divided land titles and holdings
SMOG & Ambient Air Quality Issues resulting from unclean industrial processes	Poor asset base and undiversified livelihood opportunities
Water Scarcity and Quality Issues	Unplanned population migration from rural to the peri-urban and urban areas; slums and shanty towns with poor civic amenities
GLOF and Glacial Melt	Problem-ridden drinking & agriculture water supply regime
Health Hazards	Prevalence of diseases leading to unbearable out of pocket expenses on healthcare in face of emerging health challenges

Given its rich endowment of forestry, large base of rural population, and reliance on agriculture, Khyber Pakhtunkhwa province is exposed to higher levels of climate risks, while bearing the impacts from climate change. KP has demonstrated strong indicators of vulnerability to climate change due to diversity of fragile agro-ecology systems and land-forms but also because of changing regime in temperature and precipitation, impacting agriculture and livelihood in multiple ways. Changes noticed in KP are likely to affect water and agriculture directly since these are highly sensitive to climatic conditions in a reciprocal relationship. Despite the challenges and impacts on development, climate change also presents an opportunity for transitioning to a sustainable development path. Appropriate interventions covering the spectrum of mitigation and adaptation can help address these constraints, while ensuring that adverse impacts of climate change are not allowed to hold back economic development trajectory in the KP province during the coming years.

4. Climate Risks in key Growth & Livelihood Sectors of the KP Province

Agriculture: Climate is key to crop productivity in the rain-fed areas; thus droughts, floods or extreme temperatures could devastate agriculture sector in these areas, which could result into poor and unsustainable livelihood of the communities depending on rain-fed agriculture. Nearly half of the cultivatable land of the KP province is dependent on rain-fed agriculture (around 47.2% or 764,315 hectares), which makes rain-fed agriculture in KP most vulnerable to changes in climate conditions.[1] Specifically, climate variations affect growth duration, soil moisture, nutrient levels and water availability for crops, which in turn can increase the chances of reduced yields or even crop failure. A recent study shows that each °C increase in global mean temperatures, would on average, reduce global yields of wheat by 6.0%, rice by 3.2%, and maize by 7.4%.[2] In addition, climate change is also threatening the livestock sector of KP, another key economic contributor. It is highly likely that extreme temperatures could increase animal mortality while leading to increased prevalence of pathogens, thereby threatening pasture and feed supplies.

Water: Climate change is likely to increase water demand for cultivation and other uses in the KP province. Similarly, climate change induced glacial melts and shifts in precipitation patterns (snowfall and rainfall) are likely to increase the stress on existing water resources. In addition, changes in the hydrology are likely to increase the intensity,

[1] Ahmad, R. and M. Zulfiqar. 2019. Climate change-farmers' perception, adaptation and impact on agriculture in the Lakki Marwat district of Khyber Pakhtunkhwa. Sarhad Journal of Agriculture, 35(3): 880-889. http://dx.doi.org/10.17582/journal.sja/2019/35.3.880.889

[2] Zhao, C., Liu, B., Piao, S., Wang, X., David B., Lobell., et al. 2017. Temperature increase reduces global yields of major crops in four independent estimates. Proceedings of the National Academy of Sciences. https://www.pnas.org/ content/114/35/9326

frequency and cost of extreme events (e.g., floods and droughts). The above challenges are aggravated by poor resource management regime in the province especially in terms of mitigation and adaptation actions. Where irrigated water is available, improper field drainage, over-irrigation, and water leakage often lead to waterlogging and salinization.[3] The reduction of water supply and increase in water demand in KP collectively will have significant negative impacts on agriculture, livestock, industrial and domestic sectors, which may result in income losses and induce migration, which will also have severe spill-over effects on the neighboring provinces.

Industry: The manufacturing sector is facing many challenges in KP province, including, lack of infrastructure and shortage of electricity. The climate change impacts can further intensify the issues associated with industrial sector productivity and performance. Extreme weather events and climate related natural disasters could negatively impact the labor productivity and safety, damage or destroy industrial infrastructures and assets. Further, considering its overall GHG footprint, it is clear that manufacturing sector will be significantly impacted by any future climate change mitigation regulatory regime and must now, as a sector, begin to confront the risks and opportunities that climate change presents. Manufacturers that produce highly efficient consumer products will also gain a competitive advantage over producers of similar, but more energy intensive goods and services.

Energy: On account of continued and rapid growth in population, urbanization and industrialization in recent years, the demand for electricity has increased more than its production resulting in a serious energy crisis. The increase in the air conditioning demand due to the increasing temperatures caused by climate change has the potential to add to the GHG emissions in the coming years. The electricity need of Pakistan have already increased to 40,000 Megawatt in 2020.[4] Further, electricity consumption is expected to increase by 78 percent between 2019 and 2030, reflecting population growth and higher per capita consumption.[5] Hence, proper planning is critical to minimize the energy shortage issues and GHG emissions which could result in sustainable and affordable energy for everyone.

Health: With increase in temperatures and frequency of natural disasters, disease prevalence is likely to rise particularly for the water-borne (e.g., diarrhea) and vector-borne diseases (e.g., malaria, dengue) in the province. In addition, heat strokes, respiratory diseases, skin diseases, eye infections, and mortality due to extreme weather

[3] World Bank, 2019. Khyber Pakhtunkhwa Irrigated Agriculture Improvement Project, Environmental and Social Management Framework. World Bank, Government of Khyber Pakhtunkhwa. http://documents.worldbank.org/curated/ en/599841555582551704/pdf/Environmental-and-SocialManagement-Framework.pdf

[4] Pakistan Water and Power Development Authority (WAPDA) cited in Economic Survey 2014-2015 by Ministry of Finance.

[5] IMF Working Paper (2021). Pakistan: Spending Needs for Reaching the Sustainable Development Goals (SDGs).

events are also likely to increase in severity, frequency and intensity. Furthermore, climate change can force people to migrate from rural to urban areas, which can have spill-over effects such as lack or absence of housing, public health, water and sanitation facilities and services.

Poverty: The percentage of people living below the poverty line in KP is estimated to be 39%, which is much higher than the national level. Poverty is concentrated in rural areas where more than 80% of the province's population lives. A large proportion of the population lives on or slightly above the poverty line, and the vulnerability of this group worsens in the event of a natural disaster, resulting from climate change. An internal or external crisis including impacts of changing climate may push these people deeper below the poverty line.

5. Over-arching and Strategic Context for the KP's Climate Investment Plan as per KP Climate Change Policy (existing and the proposed – 2022)

KP Climate Change Policy envisions a sustainable development and climate resilient province for the people of Khyber Pakhtunkhwa. The policy seeks to ensure that the climate action is mainstreamed in developmental planning, especially in the economically and socially vulnerable sectors to steer Khyber Pakhtunkhwa Province towards green growth and climate compatible development. The policy aims to pursue multiple objectives in furtherance of the overall vision, such as, undertaking measures to enhance awareness of the impacts of Climate Change among all stakeholders for necessary adaptation/mitigation measures to combat and minimize these impacts; Integrate adaptation and mitigation measures into the key relevant sectors' policies, strategies, and plans; Facilitating action in Khyber Pakhtunkhwa on climate adaptation and mitigation, while, promoting long term sustainable development; Enhancing interdepartmental coordination and cooperation for effective actions against Climate Change phenomenon; and Ensuring water, food and energy security for Khyber Pakhtunkhwa province in the face of a changing climate; Addressing Climate Change risks particularly those arising from climate induced disasters; Ensuring that interests of vulnerable groups and communities are adequately addressed in climate development strategies and planning; and Developing bases to secure sufficient financial and technological support, and strengthen institutional and human resource capacities to achieve policy objectives; and to be able to tap financial and technological opportunities available internationally. Very importantly, KP Climate Change Policy also aims to "Integrate adaptation and mitigation measures into key relevant sectors policies, strategies, and plans" to "ensure water, food and energy security for KP province in the face of climate change". In addition to adaptation for agriculture, water resources, forestry, and disaster preparedness, the KP

Climate Change Policy also recognizes climate change mitigation measures for energy, transport, waste, industries, and urban planning.

Similarly, National Climate Change Policy of Pakistan also identifies similar range of objectives to guide the climate action in provinces by placing focus on a) pursuing sustained economic growth by appropriately addressing the challenges of climate change; b) integrating climate change policy with other interrelated national/provincial policies; c) sharpening focus on pro-poor gender-sensitive adaptation, while also promoting mitigation to the extent possible in a cost-effective manner; d) ensuring water security, food security and energy security of the country in the face of the challenges posed by climate change; and e) minimizing the risks arising from the expected increase in frequency and intensity of extreme weather events such as floods, droughts, and tropical storms.

6. Present Scenario of Climate Change Sector Investments in KP province

The following table and diagrams highlight the investments which are presently being made by KP Government to address climate change challenges in various sectors from its own resources.

Table 1: Baseline Estimates of Climate Finance and Investments in KP

FY2021	**Amounts Disbursed (PKR Million)**	**Amounts Disbursed (USD Million)**
Provincial Government through ADP	53,576	302.7
Federal Government through PSDP	4,739	26.8
Private Sector Financing	20,000*	112.9
ODA (Multi-lateral and Climate Funds)	23,755	134.2
Total	**102,070**	**576.6**

*Disbursement assumed as a lower bound estimate

Table 2: KP ADP 2021 Expenditure Distribution in key Climate Change Categories

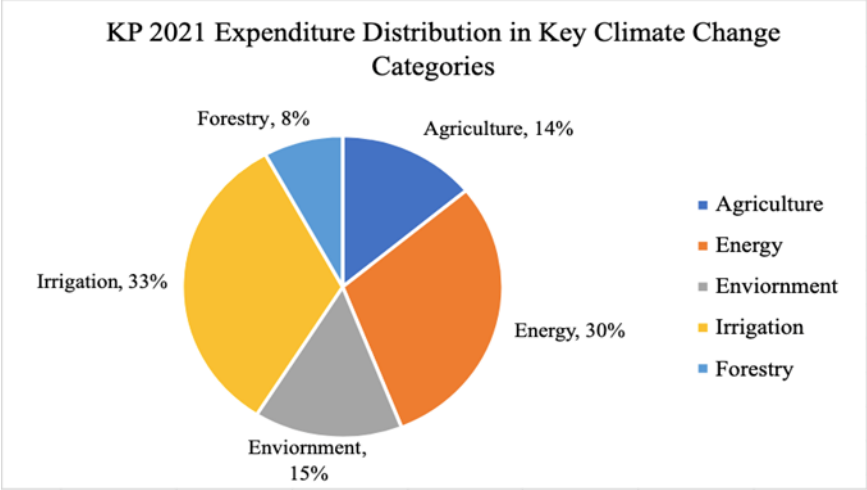
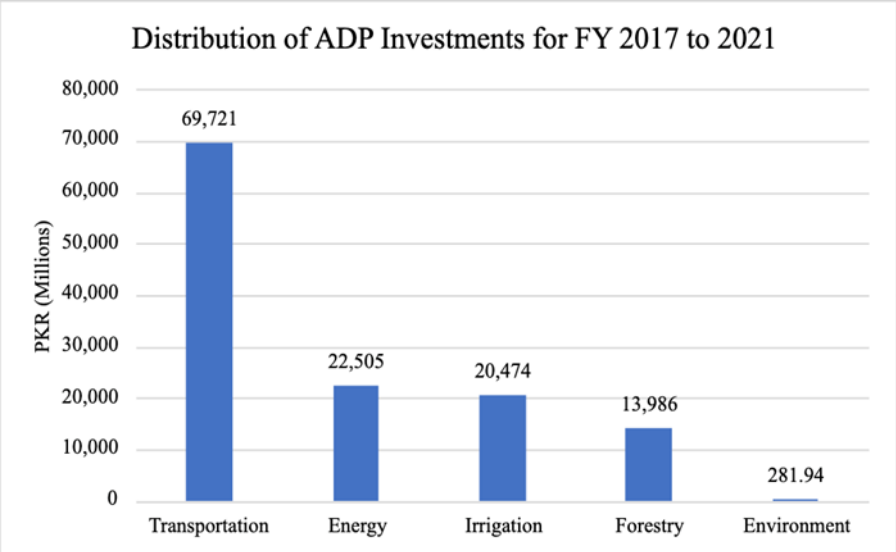


Table 3: Distribution of ADP Investments in key Climate Change Categories



7. Potential Areas for Climate Action Investment

According to the 2017 CPEIR report, 5.5 per cent of the national GDP is needed for climate mitigation while 1.5- 3.0 per cent is needed for adaptation annually. For KP in particular, the report also illustrates that from 2011 to 2015, climate change-related projects represented 78% of total projects. This section of the report aims to highlight investment potential that can be mobilized in sectors that are aligned with provincial priorities. Through stakeholder consultations within the GoKP, potential areas of financing for both climate mitigation and adaptation projects. The departments consulted include Local

Government and Rural Development, Forestry, Environment & Wildlife, Irrigation, Agriculture, Public Health Engineering, Planning and Development and Tourism.

The sectors highlighted below have the potential to leverage international public finance commitments, such as from the GCF, GEF and Adaptation Fund. It may be mentioned that international climate funds commitments and disbursements are made on a first-come, first-serve basis and without any limitations on quota or country-specific commitments. For KP to line up investments in priority sectors, efforts must be made to ensure comprehensive efforts for project preparedness, backed by sound feasibilities and implementing partners that build projects and create transparency around them. With GCF and GEF, Pakistan has already worked in agriculture, flood protection, transportation, forestry and industrial efficiency and there is every chance that with sound project preparedness and execution, KP can attract even larger amounts of climate change adaptation and mitigation funding. In the context of KP, additional international public finance can be mobilized under these thematic areas related to climate action:

- Energy efficiency (cogeneration, smart grid)
- Environmental protection (pollution control, prevention, and treatment)
- Flood and drought protection
- Green buildings
- Green transport (urban rail/metro, electric, hybrid)
- Renewable energy (solar, wind, hydro,)
- Sustainable food system (research, production, processing, distribution & consumption)
- Sustainable land management, (sustainable agriculture, forestry, urban forestry)
- Waste management (recycling, waste management, waste to energy)
- Water (water efficiency, wastewater treatment, water harvesting)
- Forestry, protected areas' management and bio-diversity promotion

Table: Climate Finance Instruments

Climate finance instruments	Description
Equity	The provision of public finance in the form of equity stake/shareholder investment to support an enterprise or one of a series of discrete projects.
Debt	The provision of public finance in the form of loans to government projects, an enterprise, or a series of discrete projects.
Grants	The provision of public finance in the form of cash, goods, or services, for which no repayment is required.
Guarantees	The provision of support by a public actor to transfer certain risks from investors or national governments to the public actor.
Results-based financing (RBF)	The provision of funds to a recipient is linked to the achievement and independent verification of a pre-agreed set of results from an investment or policy, including prizes, competitions, and payments for investment and policy outcomes.
Policy-based financing	The provision of public finance is conditional on the borrower fulfilling their policy commitments.

Trade finance	The provision of finance to bridge the gap in time between import payment and export receipt of payment.
Technical assistance (TA)	The provision of finance in the form of grants or non-financial assistance provided by specialists, to finance or provide support in the form of information sharing, expertise, skills training, knowledge sharing, or other consulting-type services.

Source: Adapted from the World Bank study: Transformative Climate Finance

KP Climate Investment Plan

Over-Arching Goal, Pillars & Objectives

8. Over-Arching Goal, Pillars & Objectives

KP Climate Investment Plan – Over-Arching Goal

To build the climate resilience capacities of the people, institutions and vulnerable sectors in Khyber Pakhtunkhwa province to the adverse impacts of climate change through mitigation and adaptation actions

Vision

To develop a KP climate investment plan for the province of Khyber Pakhtunkhwa which is aligned with Pakistan's NDC ambition as well as green growth priorities of the Provincial Government

Pillars of KP Climate Investment Plan

- Enabling Institutional and Policy Architect
- MEASUREMENT, REPORTING AND VERIFICATION PLUS (MRV+) - Evidence-based Assessment of Climate Change Challenge and Climate Action
- Climate Investment Pipeline
- Climate Action – Mitigation Interventions
- Climate Action – Adaptation Interventions
- Climate Financing Milieu
- Stakeholder Management
- Implementation Arrangements, M&E

Overarching Objective

To develop a vision for KP to achieve net zero emissions and enhance climate resilience in line with the NDC commitments of Pakistan through implementation of prioritized adaptation and mitigation interventions in the selected sectors

<table>
<tr><td>Main Objective</td><td colspan="2">Climate Change Resilience through Mitigation & Adaptation</td></tr>
<tr><td rowspan="2">Targets</td><td colspan="2">Ecosystem Resilience</td></tr>
<tr><td>Economic Resilience</td><td>Livelihood Resilience</td></tr>
<tr><td rowspan="2">Inputs</td><td colspan="2">Sector Support Systems of Provincial Government</td></tr>
<tr><td colspan="2">Planning and Financing, Capacity Building, Knowledge Management, Monitoring and Evaluation</td></tr>
</table>

Key Sectors of Focus

Environment, Forestry & Wild life, Agriculture, Livestock, Local Government, Industries, Transport, Water & Irrigation, Disaster Management, Energy, Health & Education, Social Welfare, WASH, PFM,

Climate Investment Plan for Khyber Pakhtunkhwa

Prioritized, context-specific mitigation and adaptation interventions in aid of Climate Investments

9. GHG Emissions' Measurement and Reporting for KP province

During Pakistan's latest NDC submission at COP 26, a commitment was made for voluntary contribution of 50% reduction of country's projected emissions by 2030. The target of 50% comprised, 15% as unconditional and 35% as conditional, subject to provision of global financing. The Government has also committed to follow the GHG emissions trajectory of 1603 million tons of carbon dioxide equivalent (Mt CO2e.) for 2030 as communicated in Pakistan's initial NDC submission in 2016. It is important for Government of Khyber Pakhtunkhwa (alike other provincial governments) to clearly understand the GHG emission baseline and targets as relevant to the provincial context. For this purpose, the present plan aims to operationalize a comprehensive MRV+ (measurement, Reporting and verification Plus mechanism) as a starting point for Evidence-based Assessment of Climate Change Challenge and GHG emission profile of the province through following activities.

- Put in place a mechanism in collaboration with GCSIS to work out GHG emission scenario for KP province, disaggregated for the key sectors, both as a starting baseline as well as futuristic projections till 2030
- Ensure working out annual emission and removal of GHG estimates by sector and source in KP expressed in units of mass per year. For each source, description of methodology, source of data, description of uncertainties to be provided while ensuring the features of transparency, consistency, comparability and completeness
- Establish the Monitoring and Evaluation system for mitigation and adaptation action
- Establish the MRV system for climate action, including development of the greenhouse gas inventory and tracking of the implementation of country's Nationally Determined Contribution as relevant to the KP province
- Establish a system to track and report on land-based greenhouse gas emissions across key priority sectors of relevance for climate action in the province

Implementation Responsibilities: KP Environment/P&D Departments/GCISC

Time Frame: Six Months

9 (a) Policy & Institutional Reforms to Support Climate Investments

i. Greater Inter-Departmental Coordination

Provincial Government will lead the efforts for better coordination between all the provincial-level departments dealing with issues of climate change and environment protection. This is proposed to be achieved through harmonization and positive interaction between the various departments located all over the province. Similarly, steps will be taken for ensuring greater provincial-federal coordination, with the objective of information sharing and enabling access of provincial government to the development resources available within federal government. For this purpose, lead roles are proposed to be assigned to KP Environment and P&D departments.

Implementation Responsibilities: KP Environment/P&D Departments

Time Frame: Six Months

ii. Climate Units with KP Government

In order to facilitate greater inter-sectoral and inter-departmental coordination, and benefitting from the experience of once-established, dedicated "Green Unit", within P&D department, it is proposed to establish a dedicated "Climate Change Cell "within KP Environment Department. Climate Change Cell is expected to provide technical lead in pursuit of climate action agenda of the provincial government. Similarly, for improved planning and financing mobilization, KP P&D department is proposed to be assigned lead role. Such a role will be the main instrument for highlighting and mainstreaming the notions of adaptation and mitigation with sector interventions under provincial ADP and any donor funding. Such a unit within P&D department could act as a hub of climate sector planning and coordination besides facilitating collaboration with international development partners. The unit will also lead Monitoring and Evaluation (M&E) regime related to measuring the impact of climate action. In summary, the Climate Change Cell at the KP Environment Department may therefore be seen as the technical lead node on issues of climate change while the Climate Unit housed at P&DD may lead on inter-departmental planning and coordination for mitigation and adaptation action.

Implementation Responsibilities: KP Environment/P&D Departments

Time Frame: Six Months

iii. Data collection, Research & Development

Assessing the impact of climate-relevant projects will require data collection for supporting the Monitoring and Evaluation (M&E) objectives. KP P&D department and Provincial Bureau of Statistics are proposed to provide leadership on collection of relevant data on climate change aspects, vulnerability and any remedial actions through mitigation and adaptation. For this purpose, these entities are proposed to collaborate with lead academic research institutions (Climate Change Research Center at University of Peshawar) or with GCISC so that baseline and progress information on all relevant aspects is made available to all stakeholders. In addition to the lead role by BOS and P&D, all key departments and sectors will also be

assigned roles and responsibilities on data collection and information sharing. Such forms of collaboration on climate action could bridge gaps between policy practice and academic knowledge, for a win-win scenario on climate action measurement and reporting in the KP province.

Implementation Responsibilities: KP P&D Department

Time Frame: Six Months

iv. Targeted Capacity Building

With climate change being a relatively newer public policy sector, the importance and need for targeted capacity building needs to be given sharp focus. Climate change trainings of the relevant government functionaries will be specifically tailored to the gaps identified in climate priority areas. Targeting of training programs would be critical for placing the emphasis on the right government personnel being trained for their specific sector needs on climate action and reporting. For this purpose, the right kind of international level lessons learned through best practices can be utilized through appropriate local level contextualization. Specialized climate-trained human resources pool can be developed as a critical mass having KP-specific local knowledge on climate change themes. The key themes could likely include, climate change impact measurement, GHG emission inventory, climate finance, climate risk and vulnerability assessments, disaster preparedness, legislative capacity for climate change, climate public private partnership tools such as the Environment and Social Management System (ESMS) guidelines.

Implementation Responsibilities: KP P&D Department
Time Frame: Six Months to Nine Months

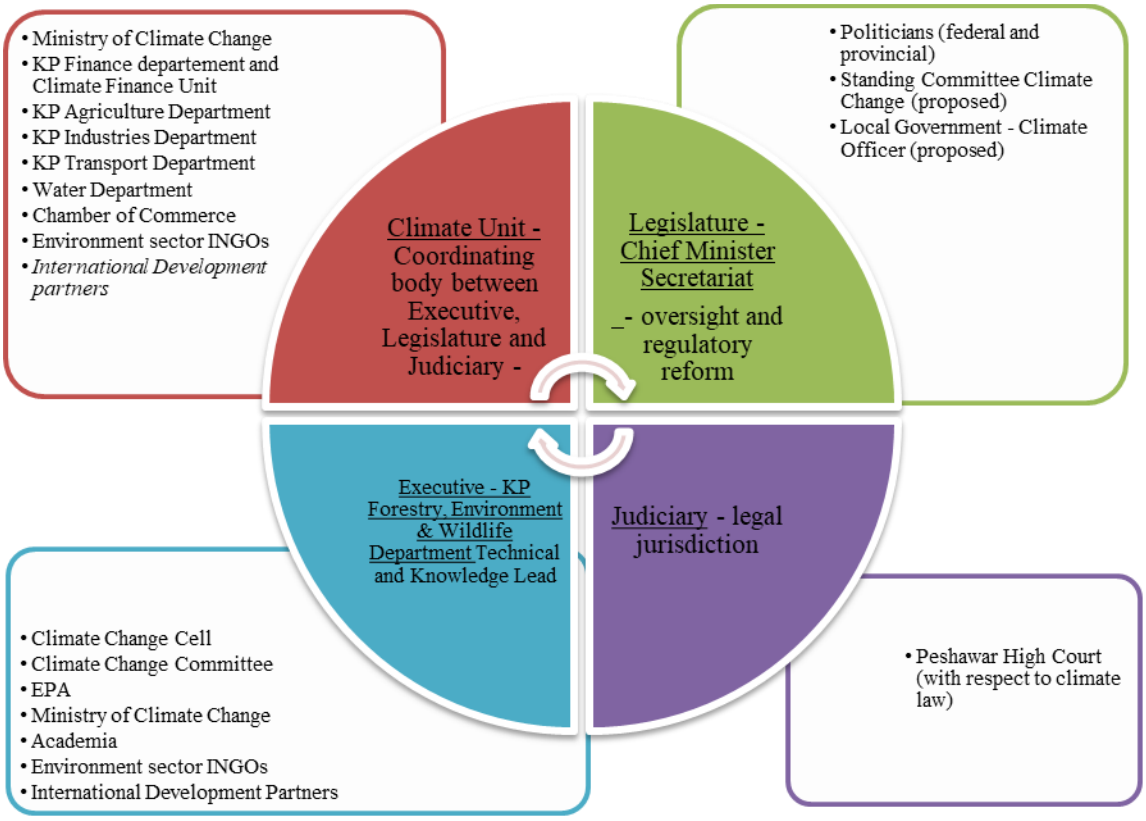
v. Public-Private Sector Partnership (PPPs): Developing mechanisms for greater public-private partnerships will be essential to meeting climate targets. PPPs may be able to jointly develop their financial resources and include private investment and expertise. Risk-sharing may also help, especially in greater climate infrastructure investments. The private sector has traditionally been viewed with mistrust and seen as profit-centric entity with little regard to public interest. The private sector views the red-tape and bureaucratic hurdles in the public sector to be a barrier to public-private partnership. However, with climate change dialogue increasingly gaining momentum in the private sector, there are great incentives for the private sector to partner with the public sector. At present there are Environment and Social Management System (ESMS) guidelines that are underway for approval and may serve as a good starting point for public-private partnership in climate action.
Implementation Responsibilities: KP P&D Department/PPP Cell
Time Frame: One Year

Table: Stakeholder Influence Table

Stakeholder	Nature of Interest in CC Reforms	Power in CC Arena		Influence in CC Sector		
		In terms of Resources	**Decision Making & Agenda Setting**	**Legitimate Authority**	**Expert Knowledge & Understanding of Issues**	**Political & Administrative Influence to ensure coordinated efforts**
Politicians (Federal & Provincial)	Medium (Derived from & linked to highest level reform interest)	High	Medium	High	Low	Medium
Ministry of Climate Change (MOCC)	High	Medium	Medium	Medium	Medium	Medium
Climate Finance Unit	Medium	Low	Low	Medium	High	Low
KP P&D Department	Medium	High	High	High	Low	High
KP Environment & Forestry Department	High	Medium	Low	High	High	Low
KP Finance Department	Low	High	High	Medium	Low	Medium
KP Energy and Power	Medium	Medium	High	Medium	Low	Medium
KP Agriculture Department	Medium	High	High	High	Medium	High
KP Irrigation	High	Low	Medium	Medium	High	Low
Water Department						
KP Transport Department	Medium	Low	Low	Medium	High	Low

KP Industries Department	Medium	High	Medium	Medium	High	Medium
KP Local Government Department	Low	Low	Low	Medium	Low	Low
KP Public Health Department	Medium	Medium	Low	Medium	Low	Medium
Chambers of Commerce & Industry in KP	Low	Medium	Low	Low	Low	Low
International Development Partners (WBG, ADB, FCDO, UNDP, EU, GIZ,IC)	High	High	Medium	Medium	High	Medium
Environment Sector INGOs (WWF, IUCN)	High	Low	Medium	Low	High	Low
Academia	Medium	Medium	Low	Medium	Medium	Low

Stakeholder Mapping-KP Climate Action



9(b) Mitigation Interventions to Support Climate Investments

The proposed investment plan will work to make progress on key mitigation and adaptation measures which are relevant and are assigned to the provinces as per Pakistan's latest NDC submission. These measures will cover energy, transportation, agriculture, industrial processes, land use, livelihood and forestry as well as waste management.

Action One: Ensure efficient, affordable and renewable energy supply through improved mechanisms and procedures to provide for effective conservation and efficient use of energy

- Promotion in usage of efficient irrigation motors/pumps (electric), fans, boilers/furnaces, stoves, water heaters and LEDs, etc. for energy conservation and reducing GHG emissions.
- Development and implementation of green building codes and certification for new and refurbished buildings, including revolving guarantee mechanism for energy efficient appliances
- Periodic conduct of mandatory energy audits of large energy consuming sectors, industries and companies for introducing notions of energy efficiency
- Exploring and adopting cap and trade schemes and carbon levies to manage industrial emission efficiency with a focus on incentivizing low carbon processes

Implementation Responsibilities: KP Energy Department
Time Frame: Six to Nine Months

Action Two: Promote climate smart inputs and management practices in agriculture and livestock management

- Piloting and roll out of Improved irrigation practices and water management techniques, suited to different agro-ecological zones of KP province and suited to irrigation requirements of crops in the changed climate scenario
- Mainstreaming the notions of climate resilient agriculture/agroforestry practices within KP agriculture extension sector and departments
- Design and pilot implementation of interventions for developing climate resilient seed varieties, suited to high value crop producing areas in the KP province
- Strengthening and expansion of ongoing bio-gas initiatives coupled with introduction of pilots for promotion, storage and management of green manure

Implementation Responsibilities: KP Agriculture/Livestock Department
Time Frame: Three to Six Months

Action Three: Promote energy efficient practices in local industries

- Pilot level introduction of the globally-acclaimed practice of Polluter Pays Principle (PPP) through agreement and forging partnership with major industrial groups and chambers in the KP province
- Piloting and targeted introduction of Refrigeration and Air Conditioning (RAC) standards, and labels for reducing the GHG emissions as well as for promoting energy efficiency in domestic and commercial sectors
- Piloting and rolling out zig-zag Brick kiln technology for mitigating adverse environmental impacts from traditional working of the brick-kiln sector in the province

Implementation Responsibilities: Industries Department
Time Frame: Nine Months to One Year

Action Four: Promote conservation and sustainable management of area under cover

- Augmentation of mass afforestation interventions through the involvement of government agencies, provinces, local governments and civil society organizations
- Conservation and management of existing forests by controlling deforestation, protecting forest reserves, and controlling other anthropogenic disturbances
- Maintaining forest inventories and increasing capacity for monitoring and modeling carbon changes as a result of forestry-based mitigation efforts and measures
- Developing a comprehensive management system for protected areas with a primary focus on wild life management and preserving transboundary ecological corridors

Implementation Responsibilities: KP Forest & Environment Department
Time Frame: Six to Nine Months

Action Five: Promote 3Rs and improve waste management practices

- Enacting by-laws on land use (landfills, sewage treatment plants and power plants, waste-to-energy schemes and recycling) through local government department and civic agencies for facilitating sound Solid Waste Management systems and practices
- Augmentation of on-going infrastructural development initiatives across major urban areas of the province for efficient waste collection, transfer station development and treatment facilities
- Promoting a culture of recycling and reuse
- Design of projects for installation of hospital and other on- site waste incineration devices alongside promotion of recycling and reuse practices in key climate related sectors

Implementation Responsibilities: KP Local Government/Environment Protection Department
Time Frame: Six to Nine Months

9(c) Adaptation Interventions to Support Climate Investments

Action One: Cross-Sectoral Action for Adaptation

- Approval, roll out and financing of KP's provincial climate change policies/action plans/strategies for supporting NDC ambition of Pakistan as relevant for the province
- Design and piloting of climate screening appraisal mechanism for major public/private funded projects with a view to mainstream climate change considerations in key sectoral planning systems

Implementation Responsibilities: KP Environment/P&D Departments
Time Frame: Six to Nine Months

Action Two: Disaster Management

- Implementation of KP-specific, Provincial Multi-Hazard Vulnerability and Risk Assessment (MHVRA) model at district level across the province and development of Disaster Risk Grading and Profiling of the districts across the province
- Exploring the options of disaster risk financing for vulnerable communities residing the fragile ecosystems of the province

Implementation Responsibilities: KP PDMA/KP P&D Department
Time Frame: Three to Six Months

Action Three: Social Protection

- Piloting the development of climate change insurance products, with a primary focus on highly vulnerable sections of the society across KP province

Implementation Responsibilities: KP Finance/Social Welfare Departments
Time Frame: Six to Nine Months

Action Four: Education

- Collaboration with relevant departments and organizations for inclusion of the subject of climate change in the curriculum of schools alongside development of specialized courses and modules at higher education institutions for sensitizing students and youth on climate change challenges facing the province

Implementation Responsibilities: KP School Education/Higher Education Departments
Time Frame: Three to Six Months

Action Five: Climate smart Agriculture Promotion for climate smart inputs and management practices in the sector

- Development of crop varieties and livestock breeds resistant to heat and water stresses, peculiar to various agro-ecological zones of KP province
- Development of sustainable soil fertility improvement practices' regime through agriculture research and extension organizations
- Adoption of mechanical and biological control methods to keep pest populations under control and to protect soil fertility and nutrient value agricultural produce
- Design and roll out of awareness campaigns through mass media/social media to regularly provide farmers weather updates and advisory services with a primary focus on climate related events

Implementation Responsibilities: KP Agriculture Department
Time Frame: Six Months

Action Six: Improved irrigation and water management

- Promotion of demand management measures across key water consuming sectors in the province to increase water-use efficiency and productivity
- Development of a multi-year program for construction of large and small reservoirs, rain harvesting and storage structures, groundwater recharge, groundwater management, etc. with the objective to improve inter-seasonal water availability across the province as a result of changed climatic conditions
- For enhanced urban resilience, urban flooding risks to be addressed through a program aiming to promote sponge cities, improving urban drainage, undertaking studies to address urban drainage problems in major cities of KP province for enhanced urban resilience, and undertaking non-structural measures, as per NFPP
- Piloting of realistic water pricing mechanisms, reducing subsidies and water revenue collection systems for the province to deal with water shortages resulting from climate change
- For groundwater recharging and water quality improvements, establishing ground water extraction regulatory institutions and mechanisms, modernize irrigation and drainage system, accelerate program for canal and water course lining

Implementation Responsibilities: KP Irrigation/Water Resource Management Department
Time Frame: Nine Months to One Year

Action Seven: Promoting Biodiversity and Securing Vulnerable Ecosystems

- Developing wildlife corridors for preservation and protection of key wildlife species of KP province with development of community-focused management plans for notified protected areas and biodiversity hotspots

- Adoption of good practices of rangeland and grassland management for promoting goods and services from livestock sector in the province
- Development of Management Plans for notified protected areas in collaboration with local communities under the Protected Areas Initiative, already in implementation in the province

Implementation Responsibilities: KP Environment & Forest/Livestock Departments
Time Frame: Six Months to One Year

Action Eight: Disaster Preparedness

- Design of a hydro-meteorological monitoring system for developing an operational system on water-related DRR products and effective dissemination through in vogue departmental systems and processes
- Establishment of a credible provincial level water, weather, and climate database to tackle natural disasters and to enhance resilience of the vulnerable communities across the province
- Design and piloting of cost-effective innovative disaster risk management solutions to reduce the loss of life, infrastructure, and livelihoods in fragile and vulnerable ecosystems of the province
- Development of a province-level Multi-Hazard Vulnerability and Risk Assessment (MHVRA) Framework in a Spatio-temporal format, covering the province including detailed and location-specific assessments to providing comprehensive risk information

Implementation Responsibilities: KP PDMA/P&D Departments
Time Frame: Six Months to Nine Months

Action Nine: Health

- Design of a comprehensive research program regarding adverse impacts of climate change on individual and community health in the province
- Increased and effective monitoring of climate-sensitive diseases and introduction of forecasting systems to increase effective planning prior to pandemic and disease outbreaks in the province
- Establishment of mechanisms to facilitate collaboration between health, nutrition, environment and energy sectors, for forging multi-sectoral collaborations so that adverse climate change impacts on health of citizens are managed and minimized
- Piloting initiatives for obtaining reliable data on health co-benefits of climate ambition in Pakistan, as relevant to KP province to inform policies in various sectors covering energy and carbon pricing

- Development of Geographic Information System (GIS) mapping to identify climate change/ health impacts hotspots and implement specified health adaptation prevention and control programs

  Implementation Responsibilities: KP Health Department
  Time Frame: Six Months to Nine Months

Action Ten: WASH - Improving climate resilience of communities through improved development outcomes in WASH sector

- Conduct of Vulnerability analysis for potential adaptation options targeted and designed for specific needs of communities in the WASH sector
- Piloting of a program for adopting low cost, climate resilient technology available for WASH infrastructure, especially for the urban centers of the province

  Implementation Responsibilities: KP PHED Department
  Time Frame: Six Months to One Year

9 (d) Interventions for SDG Alignment and Support

SDG Target 13.1 - Strengthen resilience and adaptive capacity to climate-related disasters

- Improve capacities to mitigate risks and respond to climate-related disasters through development of district level multi-hazard vulnerability assessments

SDG Target 13.2 - Integrate climate change measures into policies and planning

- Integration of climate consideration in development planning processes, covering Annual Development Program and Current Side Budgeting within key sectors in the province

SDG Target 13.3 - Build knowledge and capacity to meet climate change

- Design and conduct of action research studies to assess major climate risks and vulnerability patterns in the province alongside identification of sectoral de-carbonization pathways for meeting GHG ambition of the KP province

SDG Target 13-B - Promote mechanisms to raise capacity for planning and management

- Design and implementation of strategies to build human and institutional capacity development on climate-sensitive planning and resource management across key sectors in the KP province

  Implementation Responsibilities: KP P&D Department/SDG Unit
  Time Frame: Three to Six Months

KP Climate Investment Pipeline

(List of high impact climate investment interventions, based on stakeholder consultations and geared to support KP provinces' progress towards de-carbonized and climate resilient future)

10. KP Climate Investment Pipeline

1. Solarization of KP Economic Zones

Entry Point Title:	Solar Energy Park Development in Pilot KP Economic Zones		
Department/Line Agency	KPEZDMC, KP	**Focal Person**	Adil Salahudin, CCO, KPEZDMC
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP & PSDP, PPP Mode

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

Industrial activity leads to an influx of GHG emissions, air pollution, environmental degradation, and health hazards. As GoKP aims to mobilize investment for key climate change projects, the solarization of new economic zones in KP will be aligned with this diagnostic study's target outcomes. In a meeting with the Chief Commercial Officer of Khyber Pakhtunkhwa Economic Zones Development Management Company (KPEZDMC), solarization was discussed for upcoming economic zones as a way through which to mitigate industrial emissions.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

The industrial tariff in the country is peaking with an average B2/B3 industrial tariff at Rs. 20-25/unit depending on the applicability of monthly fuel adjustment. Rising electricity tariff is hurting industrial competitiveness with an evident demand from industries willing to sign long-term solar energy PPAs. There is also policy support for this intervention, both by the KP Department of Industries, KPEZDMC, and KP Energy and Power Department. As the development of economic zones is currently in progress, this is an opportune moment to embed sustainable energy into the framework of the economic zones.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

KPEZDMC has two operational economic zones, while there are eighteen (18) economic zones that are under construction or in the planning stages. For economic zones that are in the design/planning stage, the solarization project can be proposed as an inbuilt solar park design. For instance, KPEZDMC, in coordination with technical consultants for detailed design, can allocate a portion of the land to the development of a solar park within the industrial area. KPEZDMC can subsequently call for an Expression of Interest (EOI) from private solar developers to develop a solar park and provide solar electricity based on industrial demand in the area, through bilateral, long-term PPAs. Bannu, Salt and Gypsum Karak, and Jalozal are three economic zones for which 10 MW of electricity through solarization is being considered. The tentative cost is 10 million USD per economic zone.

The entry-level activity would be, i) an integration of solar parks into the economic zone design and ii) marketing and solicitation of interest from solar developers to set up the proposed solar parks. With this arrangement, KPEZDMC will facilitate the offtake of solar electricity within their industrial zones, while the solar developer will remain responsible for business development, bilateral contracts, installation and maintenance. As the upcoming economic zones are in their design stages, the inclusion of solar parks could be performed seamlessly through technical consultants. As such, now is the best time to tackle this activity.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results will look like an embedded solar park design in all industrial zones with EOIs getting issued for solar developers. As there are 18 total economic zones, based on the performance of the pilot project, the solar park can be scaled up to the remaining economic zones too.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* KP is rich in Renewable Energy (RE) sources and as per the World Bank ESMAP study, the yearly sum of horizontal irradiation is around 1,775Kwh/m^2 in KP. A new cluster of RE projects in the emissions-intensive industrial sector will open employment as well as economic opportunities that are aided by clean power, lesser emissions and higher ESG impacts in the long run.

2. Combined Effluent Treatment Plant

Entry Point Title:	Combined Effluent Treatment Plant (CETP) for KP Industrial Economic Zones		
Proposed By:	KPEZDMC, KP / Consultant	**Date:**	Adil Salahuddin, CCO, KPEZDMC
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP & PSDP

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?* Effluents released from industrial processes into water impact public health, irrigation water quality, food security, water security, water pollution, and air pollution. From the perspective of economic and sustainable development, a Combined Effluent Treatment Plant (CETP) project in KP presents a lucrative opportunity for development partners. In a meeting with the Chief Commercial Officer of Khyber Pakhtunkhwa Economic Zones Development Management Company (KPEZDMC), a CETP project was discussed for upcoming economic zones to manage industrial waste. Additionally, CETP is being considered for the Hattar Industrial Estate composed of 392 industries which dispose of industrial waste directly into open drains and the Peshawar Industrial Estate which is composed of 432 industries.
Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?* The KPEZDMC has already initiated a technical feasibility assessment on the project from the ADP resources. It is also under discussion with other development partners, such as the IFC on a proposed financing mechanism, most likely in a PPP modality with GoKP as a VGF support provider. The Public Health and Engineering Department (PHED), Department of Industries, and KPEZDMC are key stakeholders in the offtake of a CETP project in KP's economic zones. PHED's mandate aligns directly with the proposed CETP project. Meanwhile, the Department of Industries and KPEZDMC have direct responsibility for the effluents released due to industrial activity in KP.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?* The feasibility of a CETP component in the upcoming two economic zones should be assessed with technical assistance to KPEZDMC to complete the feasibility study for the proposed intervention. As this could be the first project of its kind in KP, technical backstopping support to the PPP Unit, Finance Department and KPEZDMC may be provided. To create ownership within the Government, it is recommended that a team headed by a senior Government staff, ideally project manager or an equivalent level be notified and assigned to the project. The consulting team should be involved in discussions between the stakeholders and its advisors to support transaction structure for finalization. This will help build capacity at KPEZDMC as they will be involved in the project design and structuring from the beginning, which will help demonstrate strong interest in the success of this first CETP project in KP's industrial/water sector. For the Hattar Industrial Estate and Peshawar Industrial Estate, the tentative cost is PKR 1063.466 Million and PKR 805.603 Million respectively. As the upcoming economic zones are in their design stages, the inclusion of the CETP could be performed seamlessly. As such, now is the best time to tackle this activity.
Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results will look like a detailed design of a CETP plant embedded in industrial zones design finalization of specific feasibility studies. As there are a total of 18 economic zones, based on the performance of the pilot project, the CETP plant design can be scaled up to the remaining economic zones too.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* KP's water supply and quality are under strain. A new cluster of CETP projects will decarbonize industrial effluent use, will clean up water supplies for consumption and provide improved social and livelihood opportunities for nearby areas.

3. Mitigation of Brick Kiln Emissions

Entry Point Title:	Utilizing Zig-Zag Technology to Reduce Pollution in Brick Production		
Proposed By:	Forestry, Environment and Wildlife Department, Environment Protection Agency, KP / Consultant	**Focal Person**	Afsar Shah, EPA
Intervention Type (Short, Medium, Long-term)	Long-Term	**Funding Source**	ADP, GCF/GEF

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?* In consultation with the EPA from the Forestry Environment and Wildlife Department (FEW&D), a problem regarding brick kilns was highlighted to address the degradation of natural resources like air, water and soil. There are 881 kilns in KP however only 2 have adopted zig-zag technology due to limited capacity in terms of HR and technology. A lack of fiscal incentive for kiln owners along with a lack of monitoring of kilns has led to a delay in the adoption of zig-zag technology. As such this presents an opportunity where investment for emissions reduction can be mobilized along with a TA for capacity building and regulatory support system.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?* There is a clear demand for this initiative. The EPA has engaged development partners across the board to help existing kiln owners convert to new technology and have requested financial as well as TA support for the same. The emissions reduction potential is high, and EPA is committed to continue allocating funds from ADP for conversion of the old brick kilns to newer technology. However, the ADP funding is not adequate and therefore development partner support is solicited. The Forestry, Environment & Wildlife Department is the specific owner within the government. Other stakeholders include the Environmental Protection Agency, owners of the brick kilns as well as zig-zag technology experts.
Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?* There is already a PC1 document for zig-zag technology adoption in KP. The targets set are to convert two brick kilns that serve as model units across the country. There are also planned funding allocations under ADP for continuous conversions of the same. EPA estimates that conversion of one brick kiln to Zig Zag technology costs PKR 4.8 million with an overall project size of PKR 4.33 billion. Therefore, an entry-level activity could be i) Project preparation facility by development partners to EPA, GoKP for international climate funding mobilization (GCF, GEF) for conversion of existing kilns as an emissions mitigations project, ii) dedicated TA support by development partners to strengthen regulatory and policy support around conversion of existing kilns.
Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results for this investment look like a dedicated i) project preparation facility to coordinate with GCF, GEF for emissions reduction project and ii) dedicated TA support to EPA for provision of technical, financial, legal, policy support to convert existing kilns to Zig Zag technology.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* KP's air quality is under strain with emissions resulting from brick kilns resulting in health and environmental hazards. The adoption of zig zag technology throughout the province will make a significant improvement to air quality which will help reduce net emissions and help KP transform from method changes the way coal is loaded, which leads to better, more efficient fuel combustion and increases energy efficiency. A zig zag kiln can reduce the coal needed by 20 percent and reduce the presence of PM2.5 levels considerably.

4. Rehabilitation of Barani Lands

Entry Point Title:	Revival of Barani (rain-fed) Lands in KP		
Proposed By:	Agriculture Department, KP / Consultant	**Focal person**	Secretary Agriculture
Intervention Type (Short, Medium, Long-term)	Long-Term	**Funding Source**	ADP, GCF/GEF

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

The melting of glaciers, floods, droughts, and uneven rainfall is threatening agricultural output across KP, keeping its net food importer below potential. As such, there is an urgent need to convert barren lands into productive agricultural lands to revive yield and participate in the green economy. Overall, 52% of agricultural land in KP is rainfed, whereas the remaining 48% is irrigated. Successful conversion of barren lands to fertile lands using productive use of energy technologies (PUE), HEIS etc. can usher an improved productivity cycle of KP making it climate resilient and food secure in the long run.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

The Secretary Agriculture raised the project of converting rain-fed land into fertile lands using modern Ag-tech tools. The GoKP has been spending PKR 15 billion per annum from its ADP resources on agriculture and has offered investor incentives to participate in KP agriculture economy, including fiscal incentives on off-grid solar, land-leveling, installation of HEIS etc. With rising population and lack of economic opportunities, a sustainable Barani land development project can execute projects at the ground level, prepare an integrated development plan, and provide technical assistance to uplift poor and vulnerable communities from the impact of climate change through employment and sustainable opportunities for the future.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

The development partners can work together to provide an entry point through preparation of an *Integrated Development Plan for the Barani Areas of KP* while engaging technical consultants to conduct research on landscape mapping and specific project identification. This would provide valuable information for the formulation of an integrated development plan for KP for converting rain-fed areas into fertile lands. A later entry point could be the execution of projects identified through international climate finance funds by extending project preparation facilities and ensuring projects are identified and executed at the ground level.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?*

Early results look like completion of an i) Integrated Development Plan for the Barani Areas, ii) Specific project identification in Barani areas, iii) Reaching out to international climate funds for project execution. Development partners can support through provision of technical consultants at each of the stages above.

Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?*

Agriculture and livestock have been the traditional sources of revenue for the people living in Barani areas. With the increasing fragmentation of landholding due to population growth and little progress in improving agricultural productivity, a vast portion of the population has been gradually moving to the off-farm sectors for livelihood opportunities, mainly through temporary migration abroad or to the cities, resulting in vicious poverty traps and subsistence agriculture practices.

5. Rehabilitation of KP Irrigation System

Entry Point Title:	Rehabilitation of KP Irrigation System		
Proposed By:	Irrigation Department, Agriculture Department, KP / Consultant	**Focal Person**	Secretary Irrigation
Intervention Type (Short, Medium, Long-term)	Long-Term	**Funding Source**	International Climate Funds

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

Smallholder farmers in KP are increasingly challenged by the uncertainty and variability of climate change. Crops are predominantly irrigated and dependant on water availability from melting snow and glaciers. Although 52% of land in KP is irrigated, most facilities remain in poor condition, due to inadequate maintenance and limited storage capacity. In addition, poor water governance leads to unequal access between upstream and downstream users. With water theft and losses at the top of irrigation canals being increasingly more common, farmers at the bottom of canals are left without sufficient water for their crops. As new projects often get prioritized, resources for the rehabilitation of old irrigation infrastructure are overlooked. As per our background discussions, the scope of the rehabilitation of irrigation projects in KP amounts to 15 lac acres.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

The improvements in irrigation systems can reduce seepage from the canals, allowing water conservation during both the wet and dry seasons. That, in turn, enables farmers to use seasonal flood water for irrigation at other times of the year, ensuring more consistent access to water throughout the year. With rising population and increasing demand for food, investments in rehabilitation of irrigation/canal works can yield instant dividends. There is also a significant demand from all quarters since any improvement in canal irrigation will usher in new improvements in KP's agriculture system and result in better productivity and improved agriculture yields of small-scale farmers.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

Development partners can formulate a dedicated project preparation facility with the following interrelated objectives: (i) apply for irrigation/canal rehabilitation funding proposal to GCF/GEF, (ii) strengthen capacity and institutional frameworks to manage irrigated agriculture and water resources for improved productivity, (iii) mobilize development partner funding for rehabilitation and modernization of irrigation and water resources infrastructure, and (iv) enhance the enabling environment for improved agricultural productivity through dedicated capacity building efforts.
The TA could prepare a sector investment program that includes the following: (i) studies and plans for civil works for projects seeking immediate repairs, (ii) institutional frameworks, (iii) implementation arrangements, (iv) capacity development programs, (v) service delivery mechanisms, and (vi) M&E and safeguard procedures.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results for this endeavor take the form of TA through which KP can work on project preparation facilities. Depending on the performance and achievements of this project, the rehabilitation project could be scaled up to more remote areas of KP as well as other provinces.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* The overall goal is to improve rural livelihoods and reduce rural poverty through improved irrigation service delivery, enhanced agricultural practices, and strengthened water resources and environmental management to increase the productivity of irrigated agriculture in KP.

6. Small Dams and Channel Pathways

Entry Point Title:	Small Dams and Channel Pathways for Agricultural Land KP		
Proposed By:	Irrigation Department, Agriculture Department, KP / Consultant	**Focal Person**	Sahibzada Shabir Ahmed, DG small dams
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	International Climate Funds

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?* Water for irrigation is the single most important input for ensuring increasing and sustainable agriculture production. The Small Dams (SD) department was given the mandate to develop irrigation to areas where water resources were scarce. The SD department constructed seventeen (17) dams in KP and twenty-two (22) dams in merged areas to irrigate agricultural areas. After construction of physical civil works, however, the SD department did not undertake further follow up works on command area development. Only the dam operations and water releases were continued as a routine activity. Consequently, irrigation channels were not being maintained and farmers who were entirely reliant on barani areas, could not reap the benefits of agriculture through continued supply of water from the command area development. As per the projects identified by the agricultural department in Annex 1, the tentative cost is estimated to be PKR 2738.285 million.
Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?* Defining command areas for existing dams and creating channel pathways for agricultural land are key areas of interest for both agriculture and irrigation departments. The farming community would benefit greatly if the command areas are developed and proper irrigation works are undertaken, including repairs and rehabilitation of existing small dams.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?* The project activities are ripe for international climate finance projects. The development partners can extend a project preparation facility for GCF/GEF/AF to i) ensure that repairs and rehabilitation works are undertaken for 17 small dams in KP and 22 small dams in merged areas, ii) command areas are developed for each of these dams so proper irrigation could take place, providing increased climate change adaptation benefits to local communities. TA support can be provided in parallel with the civil works program on the following line: (i) to solidify the policy making around small dams development in Government, (ii) to facilitate the formation of an appropriate water use organization for greater community involvement, (iii) to assist the Irrigation Department to become as functional as possible in the management of operation and maintenance of command area development with an emphasis on improved agriculture practices, (iv) to formulate and execute on pilot basis, a social organization model led by community participation to take O&M of command area under their own social participation model.
Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results will look like: i) development of concept note preparation/project preparation facility for international climate finance project (GCF/GEF/AF), approval of concept note and detailed design of the SD project and project preparation with all stakeholders on board (MOCC, P&D department, KP Irrigation Department, KP Agriculture Department) with finalization of project for civil works and TA capacity plan.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* Agriculture is a key source of economic activity in KP. As such, defining command areas of existing dams and creating micro dams in agricultural areas will expand the irrigation system in the province, resulting in improved yields and greater adaptation benefits. This will create improved agricultural yields, more jobs as well as strengthening the agricultural community against climate change-related weather events such as droughts and desertification.

7. Hydel Opportunities in KP

Entry Point Title:	Mobilizing Investments for Hydel Opportunities in KP		
Proposed By:	Department of Energy and Power, KP / Consultant	**Focal Person**	CEO, PEDO
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	Private Investors, PPP mode

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

Assistance is needed in GoKP in mobilizing investments for future project transactions, such as:

1. Two projects under competitive bidding - Akari Gor (99 MW) and Shigo KAS (102 MW) that qualified for NEPRA tariff after completion of feasibility. However, their existing sponsors have shown unwillingness to proceed further.
2. Support transaction finalization for Lower Spat Gah to be constructed by Korean Hydro Nuclear Power (KHNP). Term sheet for funding has been signed by the KHNP with the provincial government for financial close.
3. Support Kari Mushkur HPP (496 MW): The project has been pitched under Dubai expo with completed feasibility. The project is being spearheaded by WAPDA and can be pitched to local and international investors for financial close.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

The Energy and Power Department of GoKP is the specific owner within the government. The Energy and Power Department, Korean Hydro Nuclear Power, WAPDA, NEPRA, are stakeholders in the highlighted projects above.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

The GoKP project pipeline can supported in the following ways:

- Akari Gor (99 MW) and Shigo KAS (102 MW): Provide necessary support to obtain investment support for Akari Gor and Shigo KAS. Market the transaction through potential investor solicitation and road shows and support PEDO for transaction close.
- Naran (188 MW), Ghorban (20.6 MW), Nandhiar (12.3 MW), and Batakundi (96 MW): Naran's investment mandate is with IFC. Assistance is needed to remove major obstacles in the other three transactions through support for tariff and regulatory approvals, including support for IGCEP inclusion for Ghorban, Nandhiar and Batakundi.
- Lower Spat Gah – KHNP (496 MW): Support PEDO and KHNP for financial close after the term sheet has been signed. Work with PEDO to remove regulatory and policy hurdles (including IGCEP inclusion) and aim for financial close with KHNP.
- Kari Mushkur (446 MW): Help GoKP push the case for Kari Mashkur under the IGCEP arrangement and follow up discussions from recently held road-show Dubai Expo post MOU signing. Project details need to be revisited with NEPRA/NTDC and liaise with them in revisiting IGCEP to ensure early evacuation of Kari Mushkur HPP. Consult with other development partners to prepare Kari Mashkur for market and sale.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?*

Early results will take the form of (i) preparing potential investor marketing program for Akari Gor and Shigo KAS, Kari Muskur (ii) assessment of major obstacle regulatory hurdles at Naran, Ghorban, Nandhiar, Batakundi, Lower Spat Gah, Kari Mushkur.

Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* The mobilization of the above investments in hydro power will impact all areas of economic and social development in KP due to the relationship between energy and economy. Additionally, investment in these projects will help achieve Pakistan's NDCs.

8. Mini and Micro Hydel Potential

Entry Point Title:	Implementation of Mini and Micro hydel projects in KP		
Proposed By:	Department of Energy and Power, KP / Consultant	**Focal Person**	Imran Haleem, PEDO
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP/PSDP, GCF

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?* KP is among the energy poor regions in Pakistan despite having abundant natural resources, such as hydropower. As per estimates, only half of the province's total households have been electrified, while in certain areas, such as the ex-FATA region continues to have only 25% access to grid electricity. Most of these unelectrified villages are generally in remote mountainous locations with difficult access, and provision of electricity from local renewable energy sources (especially hydropower and solar) remains the only viable option. Lack of access to clean and affordable electricity implies that people resort to deforestation and use of harmful fuels, such as bio-wood and kerosene for energy.
Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?* Ownership of communal run micro/mini hydropower (MHP) generation reflects the importance of electricity in village life. There is a strong need to continue developing environmentally friendly, affordable, safe and sustainable generation facilities to provide electricity to those in remote areas without electric power and relying on firewood for their energy needs. Promoting MHP is a priority because (i) solar panels are used for domestic use; (ii) use of biomass is less known in GoKP; (iii) unsuitability of large hydel project extensions to remote locations; and (iv) the ability of MHP to provide electricity to small industries and enterprises.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?* GoKP is developing 1,028 MHPs (87.8 MW) across 21 rural districts with the aim of providing affordable electricity supply to off-grid areas. The project is divided into two phases – Phase 1 (365 MHPs – 34.7 MW) and phase II (672 MHPs – 53.1 MW). However, effective implementation is required for execution, which has become challenging due to technical issues, damage from floods/disasters, T&D issues, and lack of community support etc. Assist GoKP for MHPs project implementation in (i) preparation of an execution strategy for tariff setting (including debt service component), (ii) assistance in procurement of sound O&M contractors; (iii) preparation of a suitable community empowered strategy for O&M use and (iv) preparation of the necessary documentation for Clean Development Mechanism (CDM)/voluntary market registration for carbon credits that would serve as a model for replication by phase II MHPs. This will be in line with GoKP Strategy and NDCs, which encourages the development of environmentally friendly generating facilities to tackle climate change and promote clean energy.
Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* Early results will look like execution of phase 1 projects and handing over of MHPs to local communities. The community members will be provided technical training and assistance by development contractors with clarity on the amount of tariff to be charged with clearly laid out guidelines on provision of new connections, line losses, revenue collection and ability to run local projects on their own.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* The impact of the project will be for the private and public sector to provide clean and renewable electricity generated at medium, small, and mini hydroelectric power plants to rural communities in remote areas of KP. The outcome of the project can be a project design, with CDM/voluntary market registration, of the hydroelectric power plants that the GoKP uses as a model for further replication of other small-scale hydropower projects.

9. Solid Waste Management for Yasinabad

Entry Point Title:	Solid Waste Management System for Yasinabad		
Proposed By:	Local Government and Rural Development, Public Health and Engineering Department, KP / Consultant	**Focal Person**	Secretary LG&RD
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP/PSDP, GCF

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

As Peshawar's dumpsites lack modern, engineered environmental systems, they can cause significant, long-term adverse impacts to the environment. A mismanaged waste site can create dust, generate odors, and are ideal breeding sites for diseases. They also can generate contaminated liquids (leachates) that pollute lands and water resources, and landfill gas that is toxic, explosive, and contributes substantially to atmospheric degradation. Most of the dumped MSW in Peshawar is left uncovered: accentuating these impacts and exposing humans to direct waste contact. These facilities are vulnerable to climate change threats, particularly to heavy precipitation and health hazards. In our stakeholder consultation with the Local Government and Rural Development Department (LG&RD), creating a solid waste management system for Peshawar (around Yasinabad) was discussed for early completion and execution.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

LG&RD has submitted a PC-1 for a solid waste management project in Yasinabad. Currently, SWM services are provided by municipalities, however, the service provision is weak, with municipal administrations struggling to provide basic levels of SWM service. Overall, PC-1 reflects that the project feasibility is under consideration and that the political ownership of the project is present for development and execution.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

Help execute SWM project at Yasinabad by providing technical assistance and project preparation facilities around the following areas, such as: (i) enacting a SWM strategy and related government resolutions; (ii) creating SWM service zones in Peshawar (or multiple cities) that can be pitched for public-private-partnerships (PPPs); (iii) establishing a transaction structure for SWM off-take around Yasinabad; (iv) mobilizing recyclers; (v) introducing best-practice SWM technologies; and (vi) incentivizing additional revenue stream for LG through revenue sharing formula.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?*

Early results may look like the following: (i) an initial phase to strengthen the regulatory framework, rationalize and operationalize SWM service delivery institutions and have a transaction structure in place for Yasinabad project on PPP modality; address acute collection deficiencies, and improve dumpsites; (ii) a second phase could be to achieve SWM collection coverage around Peshawar, and transition from existing dumpsites to a modern landfill; and (iii) a third phase to accelerate waste reduction and recycling initiatives, and incorporate alternative technologies.

Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?*

A solid waste management system will help create sustainable cities in KP, it will also drive economic growth through its cascading impacts on human health, food production, and water quality. The SWM project will create jobs which will also contribute to KP's economy and align with development partner's target outcomes. It can also identify and prioritize PPP opportunities wherever appropriate in waste segregation and recycling, MSW collection services, SWM vehicle and equipment maintenance, and MSW disposal services.

10. Formulation of an Energy Service Company

Entry Point Title:	Preparation of Bankable Transaction Structures for ESCO Off-take		
Proposed By:	Department of Energy, KP / Consultant	**Focal Person**	CEO, PEDO
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP/PSDP, PPP Mode, GCF

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?*

GoKP has historically paid insufficient attention to energy efficiency measures. This stems primarily from the reliance on widespread government subsidies for fuels and electricity, which kept energy tariffs low for all consumers. The potential for energy savings in GoKP is substantial. NEECA puts it at 10%–30% for industrial users, at 15%–35% in commercial buildings, and at 10%–30% for households. NDCs targets also set a national target to reduce energy consumption by 2030. Other constraints on energy efficiency include a lack of enforced energy conservation guidelines; limited expertise among ESCOs to conduct energy audits and develop bankable investment proposals, and poor understanding of their services among public and private facility owners; policy and financial barriers for large-scale ESCO deployment.

Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?*

PEDO has carried out solarization of CM house, CM secretariat and civil secretariat in the past and can play the role of optimizing solar potential by introducing the Energy Service Company (ESCO) Model for large industrial and commercial consumers with guaranteed energy savings. According to the analysis, even during the debt period, an energy purchaser can save up to 41% of electricity cost, resulting in both financial and economic returns.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

The intervention would be successfully identifying and executing pilot projects on the ESCO model, which can be led by PEDO. This will involve hiring of ESCOs through a transparent, competitive process which will help in reducing electricity and O&M costs for industrial/commercial segments. For each transaction, the preparation process will include provision of multiple transaction support, such as: (i) energy audits: top down analysis and unit sampling of selected projects; (ii) energy savings potential: identification of appropriate efficient technology and estimated savings from technology deployment; (iii) demonstration of energy savings: deployment of efficient technology to verify energy savings potential; (iv) financial analysis: estimated cost savings, financial capacity of the distribution utilities, and development of funds flow arrangement; and (v) benefits analysis: evaluation of the impacts to various stakeholder groups.

A TA program can be developed for PEDO that can identify the potential for new business lines such as (i) participation in training and workshops to discuss best practice and new opportunity areas in coordination with NEECA; (ii) energy evaluation to identify major use categories and opportunities for efficiency improvements; (iii) technology evaluation to include in KP and cost-effectiveness; (iv) outreach to consumers to build awareness and (v) demonstration of technology.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?* The outputs of the TA are additional fully prepared subprojects on energy efficiency and evaluation of potential new business lines for PEDO. A successful execution of an early transaction structure, including a pilot project execution on the ESCO model (such as planned Mardan Medical Institute) can help the project successfully.
Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?* Industrial and commercial energy efficiency measures, such as the development of ESCO model on commercial principles, will help consumers reduce their consumption and keep their energy bills low when tariff increases are applied. Mainstreaming the use of ESCOs will assist larger consumers, including the government, to reduce energy consumption and carbon emissions and will help in sustainable energy transition.

11. KP- Specific Climate Model

Entry Point Title:	Informing Policy and Implementation through the Creation of a Climate Model in KP		
Proposed By:	Forestry, Environment, & Wildlife Department, KP / Consultant	**Focal Person**	Afsar Khan, EPA
Intervention Type (Short, Medium, Long-term)	Medium-Term	**Funding Source**	ADP and Development Partners

The Problem: *What specific problem are we aiming to address? Why is this problem significant to GoKP's overall outcomes? How did engagement with stakeholders lead to a definition of the problem?* The province of KP does not have any reliable climate data on the ground that can predict climate change threats. The dearth of data has meant inaccurate forecasts and poor or nonexistent early-warning systems for people increasingly experiencing deadly cyclones, prolonged droughts and intense floods. EPA believes that the lack of data has led to challenges in measuring the extent of climate change in the province. For policy makers, the absence of hard numbers could make it difficult to design programmatic interventions or approach international climate funds on the back of evidence and reliable climate data. A climate change model would provide up to date predictions for the short term, medium term, long term expected impacts and therefore will allow government personnel to allocate appropriate resources and planning.
Demand: *Is there clear demand from the government (political leadership and/or bureaucracy)? Is there a specific owner within the government? Who are the other stakeholders that GoKP should engage with, and how important is the problem to them?* With growing awareness of climate change impacts and with KP on the forefront of adverse impacts, policy makers realize the importance of having evidence-based data that can lead to specific interventions and prioritization of efforts in agriculture, irrigation, local government, water, and sanitation. Some of the reasons for the data gap include lack of government funding, staffing and technological infrastructure that can house large frame computers to model climate with specific reference to the whole of KP.

Activity/Intervention: *What is the entry activity for tackling this problem? Why is now a good time to tackle it?*

GoKP can take the lead in developing an independent climate change model for KP. For example, a data driven climate model could be prepared that acts as an online tool that gives non-expert users/policy makers simple access to provincial climate projections for all districts in KP. The model could provide projections on five common climate indicators: temperature, hot extremes, precipitation, wet extremes and 5-day wet extremes. Key features could include the ability to access projections not just at the provincial but also at the district and tehsil levels. The tool could give quantitative information on projected changes because of climate change, which will strengthen the climate rationale of projects that focus on the climate impacts from ADP. Such information can also enhance the vulnerability discussion by identifying exactly how much sea level rise is projected which can in turn inform about which areas and populations will be affected as a result.

Proof of Concept: *What would early results look like? What opportunities for iteration and scale-up does the activity offer?*

A proof of concept could be a partnership with a local/international academia for collaboration on development of a KP specific climate model. Development partners can provide a dedicated TA component that can ensure a free flow of ideas, capacity building workshops, and evidence-based climate research that can help policy makers make informed decisions.

Evidence Base *What is the evidence base for (i) this contributing to economic and social outcomes in KP? (ii) the entry point case above?*

Economic and social outcomes in KP are directly impacted by extreme weather events such as droughts and floods. The development of policy and planning as a result of a climate model will impact the work completed by each governmental department in KP. This change will assist KP in meeting climate action goals, take informed decisions and prioritize projects as per local needs and requirements.

11. POTENTIAL CLIMATE FINANCING INSTRUMENTS

Market and non-market-based approaches are proposed to be employed for exploring financing options for the KP Climate Investment Plan. These instruments can help in diversifying the funding sources for commissioning capital-intensive projects as well as less costly reform interventions. Some of the green financing instrument that KP Government may consider and which are already under usage in Pakistan include:

- **GREEN BONDS:** Water and Power Development Authority (WAPDA) has launched 10-yearGreen Bonds and has raised $500 million for a hydro-energy project. Given the encouraging market response, WAPDA is considering launching additional green bonds. Provincial Governments may consider to launch additional bonds in other sectors. Securities and Exchange Commission of Pakistan (SECP) has approved national guidelines for green bonds that will encourage innovative financing mechanisms in several sectors for both adaptation and mitigation.
- **NATURE PERFORMANCE BONDS (NPB):** Building on an earlier experience with the Government of Italy, Pakistan is engaged with several bilateral and other development partners to channel outstanding payments into conservation and climate-related investments via NPB. If successful in implementing the first pilot project, Pakistan will capitalize from country's performance shown in the last few years through various flagship projects. KP Government may learn from this experiment.
- **CARBON PRICING INSTRUMENT:** Under the Collaborative Instruments for Ambitious Climate Action (CIACA) program, Pakistan has received support to establish Carbon Pricing Instrument (CPI). A range of activities have commenced including capacity building on carbon pricing, national consultation on carbon pricing, and scoping of pricing instruments in Pakistani context. The aim is to explore options for the introduction of domestic CPIs to manage the cohort of large-scale emitting installations, representing around 27% of domestic emissions, as well as an opportunity for similar or related economic instruments for the transport sector that. A National Committee on the Establishment of Carbon Markets (NCEC) oversees the development of potential architecture of a carbon market landscape in Pakistan.
- **SUSTAINABLE FINANCE FRAMEWORK:** The creation of a Sustainable Finance Framework (SFF) would allow the Government to issue green, social and sustainability bonds, as well as loans, through endorsement from Ministry of Finance (MoF). SFF will provide guidance on identifying eligible expenditures, share best practices on setting up required systems to implement the framework and organize a Second Party Opinion (SPO) on the SFF.
- **PUBLIC-PRIVATE PARTNERSHIPS** Government of Pakistan has been encouraging the involvement of private sector in implementing its climate ambition across sectors and the

development of nature-based solutions (NbS) that address Pakistan's mitigation and adaptation potential. Private investors may participate in transactions involving the transfer of mitigation outcomes through the instruments of Article 6 of the Paris Agreement or using voluntary markets where in the recent development, 26 private sector entities have pledged significant emission reduction targets. Pakistan plans to promote bottom-up actions by the private sector, and develop plans for emission reductions form major sectors, particularly cement and textile. Government of KP may collaborate with federal government to benefit from these potential green financing windows.

12. IMPLEMENTATION MECHANISM

KP Climate Investment Plan covers a wide range of sectors and departments alongside a wide array of outside-government entities, such as private businesses, NGOs/CSOs, / Industry leaders, elected representatives, international development partners and the common citizens. The policy-based reforms as well as intervention-based inputs would require collaboration and synergies among this stakeholder base. In terms of NDC leadership, Ministry of Climate Change is the designated lead agency at the federal level for leading the processes for preparation, updating, coordination, and implementation of NDCs. Mainstreaming of climate change at the provincial level in Khyber Pakhtunkhwa is proposed to be assigned to P&D as well as Environment and Forestry Departments. KP P&D department is the focal agency for inter-departmental and donor coordination on all aspects of development planning. Similarly, KP Environment and Forestry department is the lead technical entity for leading the environment and climate change sector reforms. For this purpose, the present plan suggests Environment and Forestry department to provide stewardship as lead technical department; similarly, P&D department is also proposed to provide leadership in coordination, liaison, donor support and development planning areas. It may be mentioned that KP P&D department already has a green cell while KP Environment department houses environment and climate change unit.

Alongside, these lead departments, the relevant provincial government departments are expected to lead on such parts of the climate investment plan as are relevant to their respective mandates in terms of rules of business. **For rolling out and stock taking of the implementation of this plan, an implementation committee of all relevant provincial secretaries, to be co-chaired by Secretaries of P&D and Environment departments is proposed to be notified.** *Implementation Committee will be responsible for operational level implementation and progress tracking of the climate action across various departments and sectors.* **The strategic guidance and direction setting for implementation of Climate Investment and Action Plan in KP is proposed to be provided by a higher level Steering Committee to be headed by Additional Chief Secretary, P&D and comprising all relevant secretaries in addition to donors, academics, private sector and CSOs/NGOs.** *Climate Action and Investment Plan steering committee will have the mandate to provide strategic level ownership to climate action and allied reforms in addition to agenda setting. Steering Committee will also act as the apex entity in the province to ensure buy-in from political leadership as well as to secure collaboration from federal government, non-government partners and international development organizations in aid of climate action in the province.* Both the implementation committee and steering committee will be required to meet on quarterly basis and ensure smooth implementation of the plan. The steering committee will also ensure regular liaison, coordination and technical collaboration with NDC Secretariat in Ministry of Climate Change, GCSIS and any other relevant federal government organization. These committees will ensure reflection of the priorities set out in this plan within operation and development planning of the various relevant provincial government department. Steering

Committee will work closely with international development partners and private sector financing entities to secure and mobilize funding for the implementation of this investment plan (alongside, current and ADP budgets of the respective departments). Last but not the least, both committees will also take steps and decisions to sensitize provincial PFM forums alike PDWP and DDWP on the importance of mainstreaming the contents of the plan in operational and development planning decisions of the federal government.

ANNEXURES

Summary of Climate Change Diagnostics for Khyber Pakhtunkhwa

The World Bank and Sustainable Energy and Economic Development Programme (SEED), funded by FCDO, commissioned a team of experts to develop a climate change investment plan for KP, based on a climate diagnostic study in partnership with Government of Khyber Pakhtunkhwa (GoKP). The overall vision for this plan seeks to align this strategic document with Pakistan's NDC (Nationally Determined Contributions) as well as the World Bank's global climate action plan. Government of Pakistan has submitted its revised and updated NDC targets at COP 26 to realize its vision of a sustainable, low carbon, and climate-resilient Pakistan. Pakistan's revised NDC submission assigns central important role to the "Provincial Governments" in terms of furthering its overall objectives and goals. In this regard, Chapters Four (4) and Five (5) of NDC submission clearly identify the sectors and supporting initiatives where provincial governments/departments have been assigned lead role or supportive role in the area of mitigation and adaptation through development of climate actions plans.

The present report provides a synthesis of five, individual research papers and briefs which have been developed by the sector experts to provide technically valid and evidence-driven basis for finalizing Climate Investment Plan for the KP province. These five diagnostic or policy papers have been developed to cover the themes of Climate Vulnerability, Growth and Resilient Development; Institutional and Policy Reform context, related to Climate Change; Climate Investment & Financing; Climate Change-linked Growth and Employment Opportunities; as well as Political Economy of Climate Action in KP province. These five policy briefs have succinctly highlighted the relevant thematic areas, for climate action in KP, existing gaps and limitations related to climate action, covering areas such as technical, economic, financial, institutional, governance, policy aspects, followed by actionable recommendations to be reflected in the Plan.

Deliverable One (1) provides the summary of **climate-related vulnerability aspects** as relevant to the KP province. The climate of KP has immense regional variation and experiences all four seasons, corresponding to four Agro-Ecological Zones (AEZs) based on rainfall, temperature, altitude, climate, and topography. In recent years, KP has witnessed erratic increase in temperatures and fluctuating precipitation levels. In line with national trends, the annual mean temperature for KP is rising and the recorded annual rainfall has also increased. Changes in precipitation levels have also been recorded across Pakistan and in KP, with 2020 being the fourth wettest year in the national history since 1961. The mountainous regions of the province are more prone to glacial outburst and flash flooding due to severe rainfalls, whereas the central and southern floodplains are affected by the riverine floods. Moreover, drought has adversely impacted the crop yield in the southern region of the province, as these regions receive less rainfall.

KP is projected to experience higher annual mean temperatures and an increase in annual precipitation. A seasonal change in rainfall patterns is also expected, with the province experiencing higher than average rainfall in the spring and summer, and relatively less precipitation in the fall and winter months. Climate variability and climate change will likely have varying impacts for the different regions of KP. Flash floods will become more common during the spring and summer seasons in northern and central KP, with the south experiencing droughts in fall and winter months. Increased frost during the dry, cold winters may impact agricultural patterns and productivity, requiring the province to invest in techniques such as rainwater harvesting as well as structural and biological measures to reduce disaster risks. Although the exact provincial contribution of KP province to Pakistan's overall GHG emissions is yet to be worked out, the pattern of rising GHG emissions (at 1.39 ktCO2e per million $ GDP) is also likely to impact KP alike rest of provinces. The leading contributors to energy related emissions include electricity/heat, transport, manufacturing, and buildings while the other contributors include agriculture and livestock. Overall GHG projections can be seen to increase climate change vulnerability of KP province in near future unless robust mitigation and adaptation measures are fully operationalized.

Deliverable Four (4) under this assignment provides a **snapshot of the KP province in terms of growth and employment opportunities and the way adverse impacts of climate change can potentially disrupt the development trajectory in the province**. As the third-largest provincial economy in Pakistan, KP's share of Pakistan's GDP has historically comprised 10.5%, amounting to over US$ 30 billion. In 1999-2000, KP had the lowest per capita income of all the provinces of Pakistan; however, today it has overtaken Balochistan, and its per capita income is closer to that of Punjab. Moreover, the province accounts for 11.9% of Pakistan's total population, with the per capita income of the KP enhanced from Rs. 94,276 in 2015-16 to Rs. 125,018 in 2019-20, reflecting an increasing average of income and productivity of the people. The key economic sectors that KP contributes to are livestock and forestry in agriculture, manufacturing in industry, and tourism in the services sector. The two primary sources of GDP growth in KP are (i) domestic and foreign remittances, and (ii) growth stimulated by developments in the Afghan War after 2001. In terms of productive sectors, the highest contribution to the GNP is from agriculture and forestry. Despite its economic importance, KP is one of the least-developed and crisis-prone provinces in Pakistan. It is on a downward economic trend with high unemployment rates at 8.8%, incidences of conflict along the porous border with Afghanistan and minimal female participation in the mainstream economic activities. The social and economic development in the region has been chronically constrained by difficult terrain, scant infrastructure, limited income generation opportunities and weak institutions.

In terms of development strategy, the KP government has placed an emphasis on NFC transfers to support human development in the region, including a focus on health and education. The provincial government's development priorities cover (i) economic growth, (ii) social development, (iii) social protection, (iv) food and water security, (v) climate change and (vi) human development. However, the Government of Khyber Pakhtunkhwa's strategic focus

remains on its regional advantages in trade, tourism, mines and minerals and remittances as drivers for growth. Similarly, KP Government also looks up to Labour markets to contribute to poverty alleviation and development through the creation of more and better job opportunities in the province.

Given its rich endowment of forestry, large base of rural population, and reliance on agriculture, Khyber Pakhtunkhwa is exposed to a high level of climate risks and bears the impacts from climate change. KP has demonstrated strong indicators of vulnerability to climate change due to diversity of agro-ecology and landforms but also because of changing regime in temperature and precipitation, inevitably significant for agriculture. Changes noticed in KP are likely to affect water and agriculture directly since these are highly sensitive to climatic conditions in a reciprocal relationship. Despite the challenges and impacts on development, climate change also presents an opportunity in terms of transitioning to a sustainable development path. Appropriate interventions covering the spectrum of mitigation and adaptation can help address these constraints, while ensuring the adverse impacts of climate change are not allowed to hold back economic development trajectory in the KP province in the coming years.

Deliverable Two (2) of this assignment seeks **to look at the policy and institutional milieu within which climate action and climate change dialogue in the KP province is contextualized**. Luckily, climate action has been assigned higher priority by the successive governments in the KP province during last decade or so. The umbrella of Green Growth defines the strategic vision of the KP Government based on multiple sectoral efforts such as, tackling climate change, promoting low-carbon growth, valuing natural capital, strengthening communities and habitats, and promoting equitable development. The province has also seen the role out of one of the largest mitigation interventions in the history of Pakistan in the shape of Billion Tree Afforestation Program, in line with high prioritization of climate agenda by the government. KP's Climate Change Policy highlights climate adaptation measures required in agriculture and livestock, forestry, human health, water resources, biodiversity, Land and Vulnerable Ecosystems (Mountain Areas, Pastures, Arid and Semi-Arid Areas and Wetlands), disaster preparedness and socio-economic measures (poverty and gender). In addition, it also demonstrates mitigation measures required to de-carbonise key sectors that include energy, transport, wastes, industries, urban planning, Carbon Sequestration, Forestry, Agriculture and Livestock.

In terms of institutional landscape, the climate action in KP province is led by Environment and Forestry Department while overall sector coordination is the mandate of Planning and Development Department. In addition to these two leading entities, other important departments such as Irrigation, Agriculture, Transport, Energy and Industries also play varied and relevant roles on various aspects of climate change agenda in the province. Policy formulation on climate change is led by the Climate Change Cell within the Environment Protection Agency (EPA), which is under the KP Environment Department. The KP Environment Department's Climate Change Cell can be seen as the technical powerhouse on climate change action. The Forestry, Environment & Wildlife Department has led on the process for developing the Climate Change Policies. The P&DD's role will be critical in establishing coordination between departments and in the allocation of resources. In this respect, KP Government Officials

suggested the creation of a dedicated coordinating Climate Unit with the Climate Change Cell at the Environment Department serving as a technical resource.

Climate Policy and Climate Action Plans also require support from legislatures at the provincial and federal level. It is promising that political will is also supportive of accountability checks and relevant oversight. However, the multiplicity of the roles and responsibilities in the climate action sector has also resulted in duplication of efforts and turf wars between competing departments at the provincial level. Important complexities which need to be addressed for the successful implementation of climate change strategy include, clear inter-departmental roles with respect to climate change; consultative process for mainstreaming climate change; incentives towards climate reforms; Climate finance platforms. Other policy and institutional measures such as improved inter-departmental coordination and capacity building, knowledge sharing and stakeholder management can enhance impact of climate action in the province on sustainable basis.

Deliverable Five (5) provides **political economy analysis of climate action in the KP province** while identifying reform blockers as well as reform champions and suggests a way forward to support climate agenda in the province. As part of the political economy analysis, the relevant institutions for climate change in the province were identified. This was followed by analysis of the political economy landscape, including an assessment of power structures and incentives in the context of climate action, for different stakeholders including political representatives, government officials, development partners, the private sector, and international non-governmental organization. The World Bank's Problem-Driven Political Economy in Action framework was applied for the political economy (PE) analysis in this diagnostic study which integrates governance and political economy and aims for higher efficacy of development programs through greater understanding of risks.

Being the third largest province by economy and population, and the smallest geographically, KP is under pressure to perform economically, address fiscal challenges, and strengthen it performance in public service delivery. Economic growth remains a key objective for the province, and climate priorities will be effective only if these align with KP's Green Growth Initiative. While climate change has been a priority area for KP since 2013, the scope of action is not well-defined. The KP government has worked on climate related strategies including the 100-day plan, the Azm-e-Nau (KP Economic Recovery Plan 2020-23) and an action plan for the Sustainable Development Goals (SDGs) linked to the province's afforestation plans. KP's Climate Change Policy 2016 (updated in 2022) focuses on climate adaptation and mitigation measures and highlights the need for capacity building in government departments to ensure credible and successful implementation of policy measures. This policy can form the first seeds for identifying the direction of the provincial CCAP.

The PE analysis indicated that provincial efforts on climate change were characterized by departmental projects operating in silos with little interdepartmental coordination. Over 25 different stakeholders were identified during the mapping exercise including politicians, federal ministries, government line departments, development partners, academia and INGOs. The PE analysis confirmed that the most influential players for climate action in KP are the relevant government departments. Based on the understanding of political and institutional landscapes,

a proposed scope of stakeholder roles and responsibilities for KP's Climate Change Investment Plan has been suggested. Additionally, key recommendations for supporting role out of the Plan have also been made, including, stakeholder incentivization for improved services in the climate sector; enhanced coordination; multi-level capacity building; involvement of local governments in support of climate action; forging public-private partnership; mainstreaming economic impact of climate change as well as robust, M&E and transparent reporting regime.

Deliverable Three (3) of the assignment looks at **climate investment scenario in the KP province by exploring the baseline of current investments in climate-resilient projects in KP**, including FY2021 flows from domestic public sources (ADP and PSDP schemes), international public finance sources (GCF, GEF, others etc.), private sector sources, and multi-lateral partners. Estimation of climate-focused investments clarifies the levels of project funding mobilized in climate adaptation and mitigation projects besides indicating how these flows can be improved to ensure low-carbon resilient development in KP. The report also captures evidence directly from budgetary sources as well as publicly available information on websites while shedding light on carbon offsets markets, including KP's plans to participate in voluntary markets and some of the activities it is participating in from its own Nature-Based Solutions (NbS) offerings. In terms of future resource mobilization, the findings explore potential areas of investment (such as wastewater, forestry, irrigation and climate-smart agriculture) that have experienced upscaling in the global public finance landscape. Lastly, the findings highlight the types of projects that can be initiated in KP by various departments besides suggesting steps to ensure that climate finance is leveraged in KP through investing in human and technical capacities, governance structures and strong project preparation facilities.

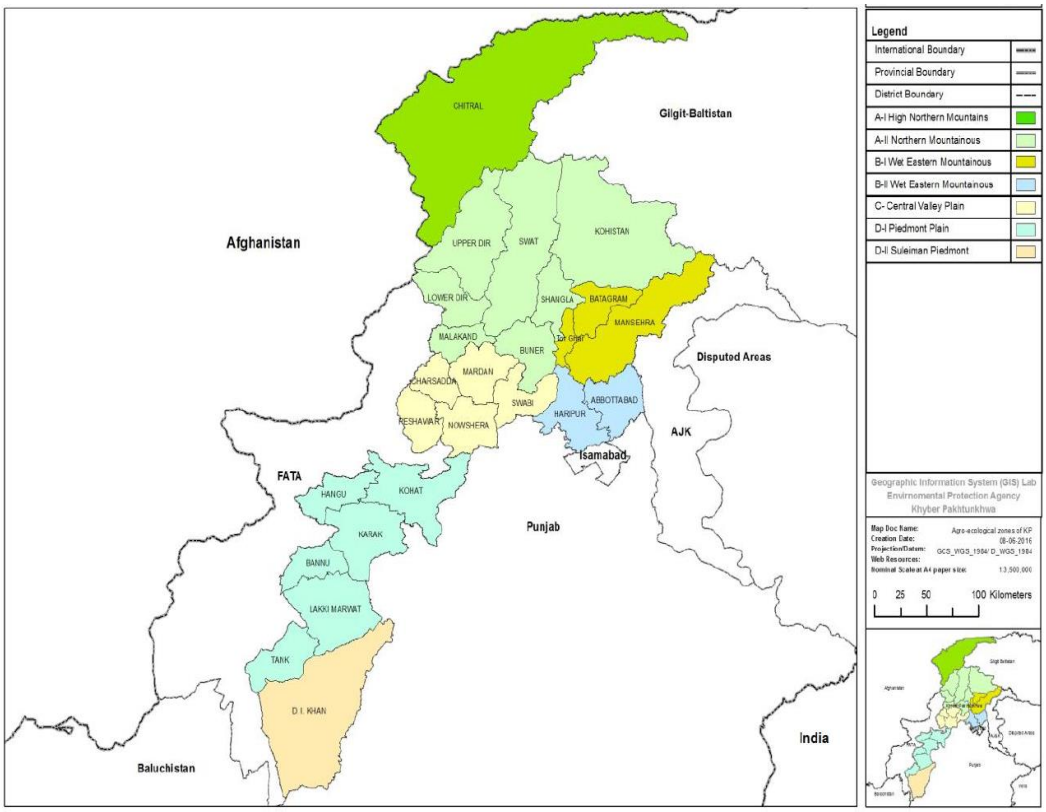
In terms of baseline estimates of climate finance and investments in the KP province, an amount of PKR 102,070 million has so far been disbursed during 2021 in shape of ADP, PSDP, ODA (from multi-laterals and climate funds) and private sector financing. The prospects of Voluntary Carbon Markets as conduits of climate financing offers an emerging alternative for Pakistan and KP which has also been explored as an additional source of climate funding. There are clear indications that KP can beneficially capitalize on voluntary carbon markets' potential, especially in lieu of its initiatives entailing Nature-Based Solutions (NBS) in forestry (flagship schemes like Billion Tree Tsunamis and Ten Billion Tree Tsunami). Forestry initiatives of these nature have incredible potential to provide sale of *additionality* and *permanence,* which are central to any credible Voluntary Emission Reductions (VER) being sold globally and can provide an alternate revenue stream for GoKP.

According to the 2017 CPEIR report, 5.5 per cent of the national GDP is needed for climate mitigation while 1.5- 3.0 per cent is needed for adaptation annually. For KP in particular, the report also illustrates that from 2011 to 2015, climate change-related projects represented 78% of total projects. Based on KP's historic pattern of climate sector investments, the report identifies the areas where mitigation and adaptation initiatives can be launched through additional green sector financing. These areas include, Energy efficiency (cogeneration, smart grid), Environmental protection (pollution control, prevention, and treatment), Flood and drought protection, Green buildings, Green transport (urban rail/metro, electric, hybrid), Renewable energy (solar, wind, hydro) , Sustainable food system (research, production,

processing, distribution & consumption), Sustainable land management, (sustainable agriculture, forestry, urban forestry) , Waste management (recycling, waste management, waste to energy) , Water (water efficiency, wastewater treatment, water harvesting). Besides identifying potential sources and areas for climate financing, the report also highlights importance to strengthen the laws and framework of public climate financial framework in KP. Streamlining of laws and systems that govern the allocation, management, and reporting of climate finance is essential to ensure effective and transparent flow of international and national sources towards climate action. A well-defined implementation strategy has also been suggested to ensure critical steps for roll out of climate financing reforms in the province. These steps include, improved project governance and transparency; investing in project preparation facilities; and capacity-building for greater climate finance off-take. Last but not the least, the report also shares a climate finance investment pipeline for the KP province to provide an idea of present scenario on climate action from the provincial government.

Annexure – II

Agro-Ecological Zones of Khyber Pakhtunkhwa Province



Annexure – III

National Historic GHG Emission Data (1990-2018) & Sectoral Assignment