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GOVERNMENT OF THE PUNJAB
LAW AND PARLIAMENTARY AFFAIRS DEPARTMENT

NOTIFICATION
(132 of 2024)

03 SEPTEMBER 2024

Policy No.SOG/EP&CCD/7-42/2024, dated 29.08.2024 issued by the Environment Protection and Climate Change Department, is hereby published in the Punjab Gazette (Extraordinary) for general information:

"GOVERNMENT OF THE PUNJAB
ENVIRONMENT PROTECTION AND
CLIMATE CHANGE DEPARTMENT

Dated Lahore the 29th August, 2024

NOTIFICATION

POLICY NO.SOG/EP&CCD/7-42/2024

EFFECTIVE DATE: Environment Protection and Climate Change Department, Government of the Punjab is pleased to notify the following policy approved by the Provincial Cabinet in its 14th meeting held on 28.08.2024

POLICY TITLE: CLIMATE RESILIENT PUNJAB VISION & ACTION PLAN 2024

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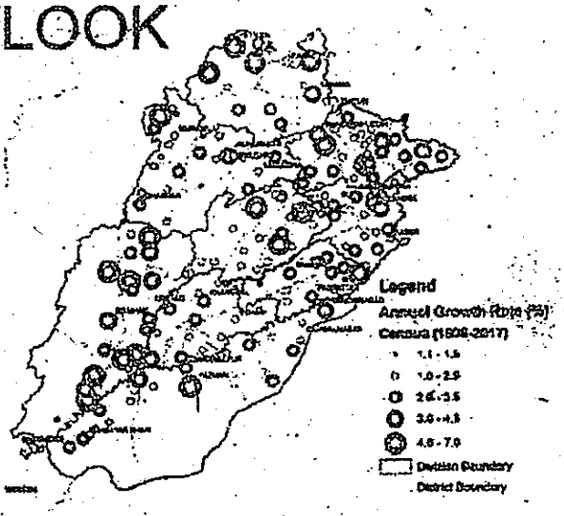
PUNJAB'S CLIMATE OUTLOOK

Punjab, the most populous province of Pakistan, has a strong economic record and contributes about 54.2 % to the national GDP, facing a unique set of challenges and opportunities in the context of climate change (PGS, 2023). Understanding the province's demographic trends, land profile, and key climate parameters is essential for developing effective strategies to mitigate and adapt to the impacts of climate change, such as floods, droughts, and heat waves.

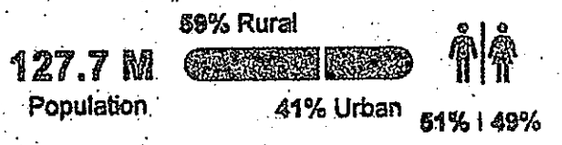
Punjab has tremendous potential; its large population, extensive agricultural resources, vibrant SME sector, sound manufacturing base, and rapidly growing service industries form the foundation of future growth and prosperity. The current challenge is to streamline priorities, enhance governance, and strengthen institutional, financial, and technical capacities while focusing on climate-compatible development & green economy and ensuring transparency to unlock Punjab's full potential.

This document, developed through extensive consultations and aligned with provincial & national policies and global commitments, presents a strategic call to action. It outlines a comprehensive approach to addressing the province's challenges through a blend of structural and non-structural measures, framed within short-, medium-, and long-term scenarios.



Intercensal Analysis of Punjab 1998 – 2017
Source: (Population Census: 1998 – 2017, prepared by Urban Unit)

Punjab is undergoing a rapid urban transition!



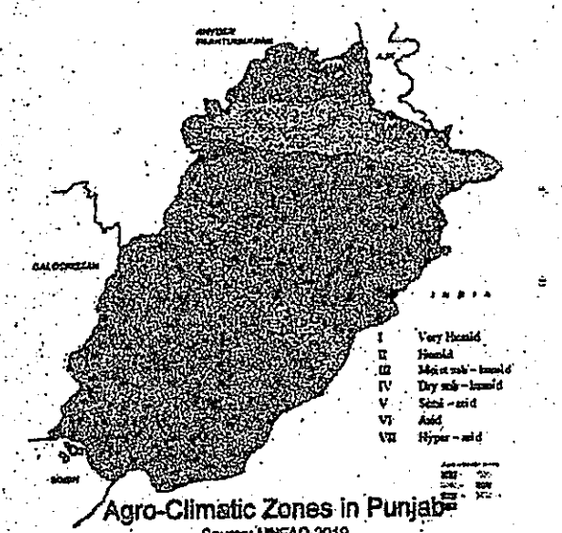
LAND PROFILE

The variety of agroecological zones and the rivers flowing across the province exhibit a unique combination of landform, land cover, soil, and climatic characteristics.

25% of the total area of Pakistan (205,345 sq. km)

58%	29%	8%	5%
Arid Land	Semi-Arid Land	Sub-Humid Land	Other

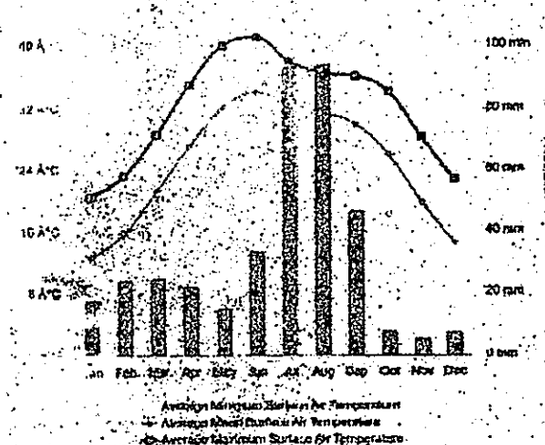
Source: Punjab Forest Policy 2019



Agro-Climatic Zones in Punjab
Source: UNFAO 2019

CLIMATE PARAMETERS

Punjab is witnessing rising temperatures and increased variability in precipitation, which have intensified in recent years.



24.8°C
Mean Annual Temperature (1991-2022)

Extreme Weather Events in Punjab in 2023

January	33 inches	Highest Snowfall in Murree
June 25	70 knots	High Wind Speed in Lahore
June 26	226 mm	Wettest Day in Lahore
July	659 mm	Wettest Month in Lahore

Decembe r	Up to 30 days	Overall Punjab

49.8 mm
Mean Annual Precipitation
(1991-2022)

Source: World Bank Climate Knowledge Portal
Pakistan Meteorological Department (2022)

Source: Punjab State of the Environment Report 2023

SECTORAL OVERVIEW

AGRICULTURE

Largest share of the crop production in Pakistan
- 71% Cotton
- 76% Wheat
- 90% Maize

48% Punjab's Labor Force

Source. Agriculture Department

INDUSTRY

48,000 Industrial units (~39,000 cottage industries & SMEs)

68% polluting industries lie within city boundaries

78% Punjab's non-agricultural workforce

Source: Urban SMEs

TRANSPORT

21.1 million Vehicles registered (Up till 30 June 202

83 % Two-Wheeler Vehicles Share

Source: Punjab Development Statistics, 2023

ENERGY

68% Power Consumption

6-8% per annum Energy Demand

Source: Energy Department PMU

WATER RESOURCES

5 river tributaries

10 inter-river link canals

24 main canal system with several distributaries and minors

30,646 canal miles irrigation system

FOREST

3.1% Forest Area of the total land area

- 41% Scrub Forests
- 27.4% Irrigated Plantations
- 14.4% Rangelands
- 8.6% Riverain Forests
- 8.6% Coniferous Forests

Source: Punjab Forest Policy 2019

BIODIVERSITY & ECOSYSTEMS

3 RAMSAR Sites
- Taunsa Barrage
- Chashma Barrage,
- Uchali Complex

Protected Areas:
- 11 wildlife parks
- 37 wildlife sanctuaries
- 24 game reserves

Key Species:
- 80 Mammals Species
- 670 Birds Species
- Vulnerable Species: Urial
- Endangered species: white-headed duck, Indus Dolphin
- Critically endangered: Great Indian Bustard

Source: RAMSAR Annotated Summary of Pakistan, Punjab Forest, Wildlife & Fisheries Department, IUCN Red

WASTE AND WASTE WATER

Solid Waste: 115 (DG Khan) **to 5,000 tons/day** (Lahore) Average waste generation in Divisional HQs

434 Wastewater Treatment Plants

56.4% Primary Treatment
43.6% Secondary Treatment
1.8% Tertiary Treatment

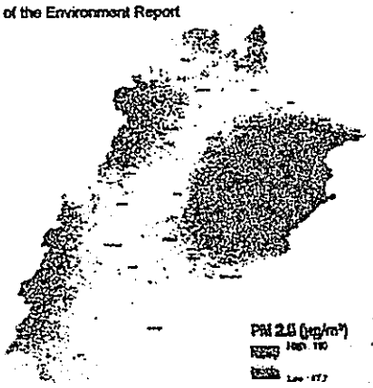
Source: Punjab State of the Environment Report 2023

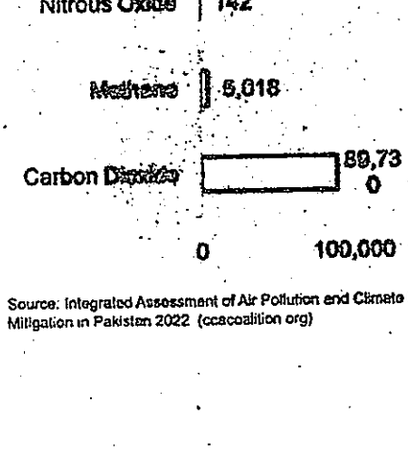
EMISSION SHARE OF PUNJAB

7.01 Kilotonnes/year (kt/y)

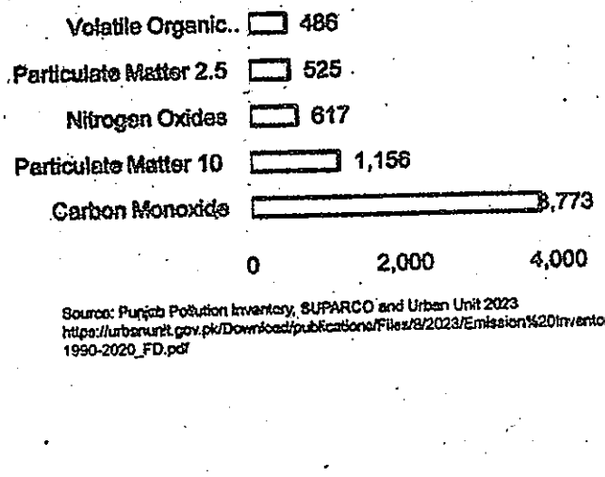
Total GHG Emissions
CO_2, CH_4 and N_2O

Total Air Emissions
PM10, PM2.5, SO2, NOx, CO, VOC





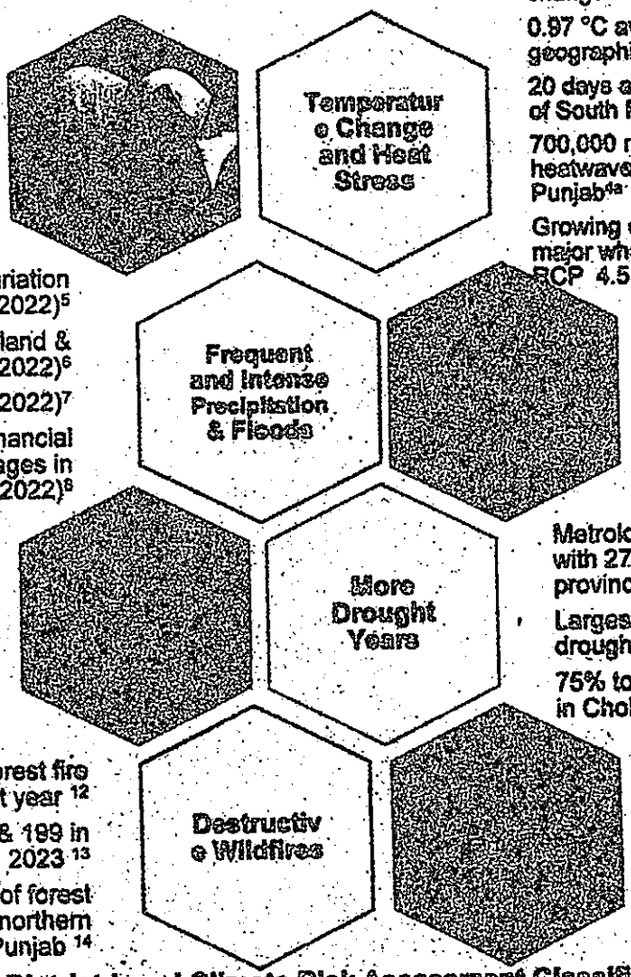
Source: Integrated Assessment of Air Pollution and Climate Change Mitigation in Pakistan 2022 (ccacoalition.org)



Source: Punjab Pollution Inventory, SUPARCO and Urban Unit 2023
https://urbanunit.gov.pk/Downloads/publications/Files/8/2023/Emission%20Inventory%20of%20Punjab%20-1990-2020_FD.pdf

KEY CLIMATIC IMPACTS IN PUNJAB

Climate Change is manifesting in the shape of extreme climate events in the Punjab.



(1-3) Punjab - State of Environment Report, 2022; (4a) World Bank (2022). Pakistan Country Climate and Development Report - (4b) Climate Risk Profile of Punjab (2024). GIZ, & other partner agencies(5) Pakistan Meteorological Department (2022). State of Pakistan Climate in 2022; (6) The Urban Unit. (2022). Flood Damage Assessment; (7) Situation Report No. 12, 2022 (UN-OCHA); (8) Pakistan Floods 2022, Post Disaster Needs Assessment, Ministry of Planning and Special Initiatives, Government of Pakistan; (9) M. Waseem, et al. (2022) "Impact of meteorological drought on agriculture production at different scales in Punjab, Pakistan" Journal of Water and Climate Change 13 (1): 115-125; (10) World Bank (2022). Pakistan Country Climate and Development Report; (11) The Urban Unit 2022. Drought Management Plan of Cholistan 2022 – 2025; (12-14) Punjab Emergency Services Punjab faced a spike in forest fires (https://tribune.com.pk/story/2469348/punjab-faces-spike-in-forest-fires)

District-Level Climate Risk Assessment Classification

The district-level climate risk and hazard assessment indicate that flood risks are most acute in Punjab's major cities, whereas drought risks are particularly critical in Central and Southern Punjab.

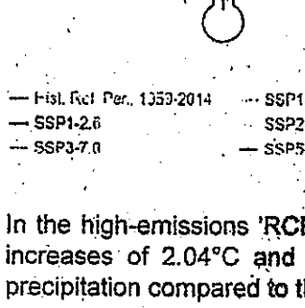
#	Districts	Floods	Cyclone	Drought	#	Districts	Floods	Cyclone	Drought
1.	Rawalpindi				2.	Toba Tek Singh			
3.	Sheikhupura				4.	Sialkot			
5.	RY Khan				6.	Sahiwal			
7.	Multan				8.	Narowal			
9.	Gujranwala				10.	Jhang			
11.	Okara				12.	DG Khan			
13.	Nankana Sahib				14.	Gujrat			
15.	Mianwali				16.	Rajan Pur			
17.	Mandi				18.	Lodhran			
19.	Gujrat				20.	Layyah			
21.	Faisalabad				22.	Khushab			
23.	Chiniot				24.	Bhakkar			
25.	Vehari				26.	Kasur			
27.	Pakpattan				28.	Jhelum			
29.	M. Baharudin				30.	Lahore			
31.	Bahawalnagar				32.	Hafizabad			
33.	Bahawalpur				34.	Attock			
35.	Chakwal				36.	Bhakkar			

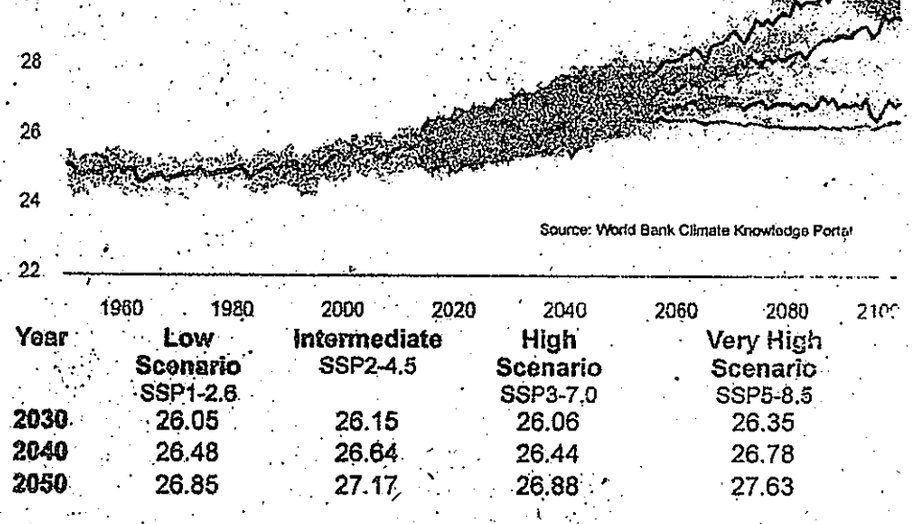
Scoring Key

Source: Chaudhry, Q. 2017. Climate Change Profile of Pakistan. Asian Development Bank, Philippines. doi.org/10.22617/TCS178761

CLIMATE CHANGE IMPACTS PROJECTIONS

Historical and projected average annual temperature in Punjab under different scenarios shows a notable increase in temperature.



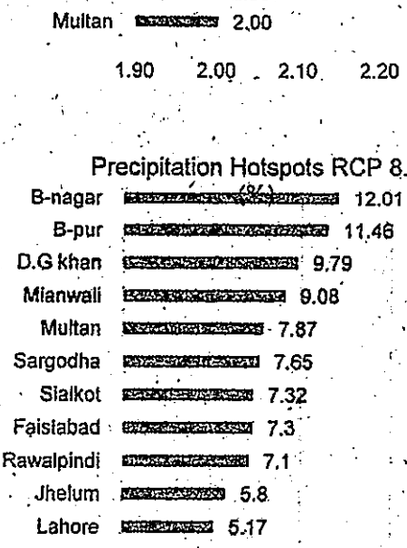


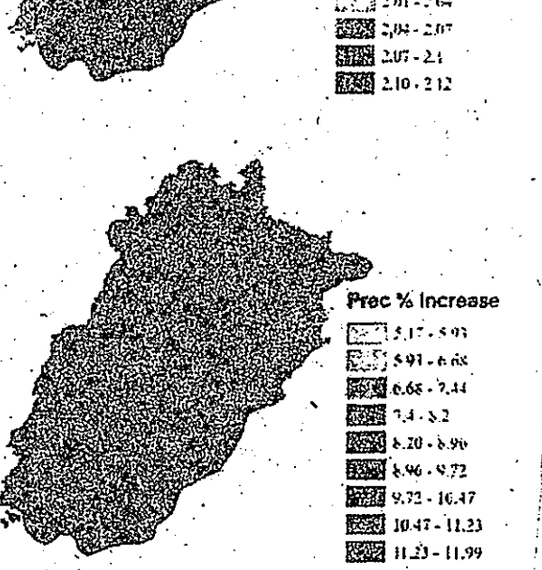
— Hist. Ref. Per. 1959-2014 — SSP1-1.9
— SSP1-2.6 — SSP2-4.5
— SSP3-7.0 — SSP5-8.5

Year	Low Scenario SSP1-2.6	Intermediate SSP2-4.5	High Scenario SSP3-7.0	Very High Scenario SSP5-8.5
2030	26.05	26.15	26.06	26.35
2040	26.48	26.64	26.44	26.78
2050	26.85	27.17	26.88	27.63

In the high-emissions 'RCP8.5', by 2050, the northern Punjab could see maximum and minimum temperature increases of 2.04°C and 2.16°C respectively, while the southern region might experience a 9.3% rise in precipitation compared to the 1975-2005 baseline.

62%
Urban Population (11 cities)
Temperature Change In worst-case scenario





34%
Urban Population (9 cities)
Precipitation change

Source: Source: Global Climate Models (GCMs) The Urban Unit. 2020. Strategic Environmental Assessment – Punjab Spatial Strategy 2047.

VISION

"A Climate Resilient Punjab"

GOAL

"Promoting sustainable growth in Punjab based on low-emissions development and enhancing capacity to manage, adapt and recover from climate events"

OBJECTIVES

The strategic objectives to achieve the policy vision are;

- Establish evidence and research-based cross-sectoral baseline for climate-resilient developments.
- Embed climate adaptation and mitigation in the planning and development framework.
- Prioritize green investments and promote a green economy with a special focus on vulnerable and affected sectors and communities.
- Promote low-emission green development that yields social, environmental, and economic benefits and improves the air quality index.
- Enhance the resilience of vulnerable and marginalized populations through climate justice and responsive approaches for equitable benefits.
- Encourage and include youth, media, civil society, women, persons with disabilities, and other vulnerable and marginalized groups in calls for action, training, and capacity building.
- Making Punjab a regional role model in Resilience, Recovery, Rehabilitation, and Reconstruction against climate-induced events.
- Include and integrate climate change topics in curricula (formal, informal, and skill development) and enhance institutional, technical, and knowledge capacities of stakeholders.
- Engage in climate diplomacy to address transboundary challenges and advance provincial and regional sustainability.

PRINCIPLES

The Policy is guided by seven integral principles:

1	2	3	4	5	6	7
Leadership	Integration & Inclusivity	Evidence-based	Climate Justice	Reliance on Nature-based solutions	Abiding by International Commitments	Transparency and Accountability

POLICY AREAS

Three Policy Areas (PAs) are defined for strategic planning and goal setting for a Climate Resilient Punjab.

Adaptation		**Mitigation**		**Cross-Cutting**	
Action to bear the climate shocks		Actions to reduce the GHG emissions		Adaptation & Mitigation synergies	
Water Resources	Biodiversity & Ecosystems	Energy	Industry	Forestry & Green Spaces	Climate-integrated Planning

Climate-induced Disaster Management	Health & Climate Justice	Transport	Waste & Wastewater	Agriculture & Livestock	Climate Financing

PA 1: CLIMATE CHANGE ADAPTATION

The adaptation policy area focuses on the sectors that can enhance Punjab's capacities to manage and recover from exacerbating climate shocks by protecting the province's green and blue systems and minimizing the impacts on (vulnerable) populations.

Targets

	5%	Increase in protected areas and ensure conservation and ensure its management
	100%	Map high-risk areas and develop land use plans for climate-induced disaster-prone districts
2027	100%	Prepare flood management plans for high-risk areas
	100%	Prepare and implement heatwave and drought management plans for hotspot areas
	100%	Establish baseline and evidence-based research and policy interventions on post-disaster mapping of health impacts.
	100%	Re-assess and remodel the flood-carrying capacity of riverine hydraulic structures including bridges and demarcation floodplain zones
030	100%	Establish an early warning system in flood-prone areas
	100%	Ensure the provision of shelter places and water filtration plants in heatwave hotspot areas
	100%	Regulate 100% of groundwater
2035	100%	Construct water harvesting structures in all barani areas and flood zones
	15%	Increase in protected areas and ensure its management

aptive Measures to Achieve Policy Targets

1. Water Resources: Enhance water security by conserving and protecting water resources. Improve integrated water resource management and ensure water quality via regulatory and technical measures. Promote climate-resilient water storage and distribution infrastructure such as recharging wells, rainwater harvesting, and community ponds.
2. Biodiversity: Formulate and implement integrated biodiversity conservation programs to conserve and protect high conservation value areas. Rehabilitate degraded habitats through ecosystem-based adaptation, and establish new protected areas to ensure the survival of threatened ecosystems. Improve the health of wetlands (i.e. RAMSAR sites) that act as floodgates, rangelands, pastures, & deserts and conserve aquatic diversity and habitat conditions.
3. Improving Response against Climate-Induced Disasters: Strengthen climate-induced disaster management capacity by prioritizing disaster-resilient infrastructure, effective forecasting, early warning systems and services, zoning, and investing in cost-effective nature-based solutions. Conduct scientific studies and assessments for climate-induced disasters and prepare action plans.
4. Health & Climate Change: Mainstreaming climate adaptation in the healthcare system for effective response to climate-induced disasters and diseases. Focus on mapping post-disaster health impacts and establish a baseline for policy interventions.

5. Climate Justice: Integrate gender-responsive adaptation in sectoral development/investment plans, and uplift the climate-hit population groups through poverty alleviation initiatives by offering social and financial protection schemes. Promote and ensure active participation of women in all adaptation & mitigation efforts.

PA 2: MITIGATION AND LOW CARBON DEVELOPMENT

The Mitigation Policy Area focuses on the reduction of GHG emissions and low-carbon development in Punjab to meet national and global commitments.

Targets

2027		Establishment of a carbon/emissions trading system for GHG emissions reduction
	[illegible]	Renewable Energy Generation (solar, wind, biomass, etc.)
	[illegible]	Public Buildings, Schools, & Hospitals Solarization
2030	[illegible]	Reduction in energy consumption through energy efficiency measures
	[illegible]	Share of electric vehicles in new car sales
	05	Waste treatment facilities (waste to energy, waste segregation & processing facilities)
	[illegible]	Reduction of provincial GHG emissions
	65%	Renewable Energy Generation (solar, wind, biomass, etc.)
	35%	Public Buildings, Schools, & Hospitals Solarization
	15%	Reduction in energy consumption through energy efficiency measures
2035	500	Industries adopting RECP technologies
	40%	Share of electric vehicles in new car sales
	10%	Industrial wastewater treatment capacity
		Plan and develop sufficient fuel-efficient mass transit systems across Punjab

Mitigative Measures

1. Energy Generation: Introduce cleaner power generation technologies using alternative fuels and energy resources. Promote off-grid renewable energy in rural and remote areas, expand smart grids, and prioritize the transition of public sector buildings to renewables. Focus on energy security, energy transition, domestic market creation, and global commitments to ensure low-emission development.
2. Energy Efficiency: Enforce energy efficiency audits, standards, and labeling to enhance energy performance and reduce reliance on fossil fuel consumption.
3. Industry: Establish and implement incentive-based systems to reduce GHGs & air pollutants. Implement Resource Efficiency and Cleaner Production technologies. Make planned investments in installing Combined Effluent Treatment Plants in key polluting industries in the shortest possible period. Ensure that the Emission Control System (ECS) covers the polluting industry through regulations and incentives.
4. Transport: Ensure the provision of a fuel-efficient public transport system (addressing gender-specific travel needs) and encourage non-motorized modes of travel. Enforce vehicle emission standards, and certification, and promote electric vehicle adoption in the public and

private sectors. Enhance the capacity and mandate of the Vehicle Inspection and Certification System (VICS) for private vehicles including two/three-wheelers.

5. Waste & Wastewater: Promote an integrated waste management system that includes solid waste and wastewater treatment facilities, waste-to-energy projects, and methane-capturing systems at waste disposal sites. Implement plastic waste management regulations and strategies.

3. CROSS-CUTTING (ADAPTATION & MITIGATION)

This policy area focuses on the measures that require a combination of adaptation and mitigation strategies in different sectors.

Targets

2027	100%	Develop Cities Climate Action Plans focusing on GHG inventory, pathway projections, risk assessment, and action plans for large cities
	100%	Establish a baseline for agricultural productivity to assess the impacts of climate-smart interventions in the agriculture sector across different crop zones.
2030	100%	Develop climate-resilient master plans for large cities to enhance climate resilience
	10%	Enhance carbon sinks through tree plantation and urban green/forest cover in major cities
	100%	Introduce green building codes and implement them for all new public buildings
	3%	Increase annual growth in agricultural productivity through climate-smart interventions
2035	100%	Develop Cities Climate Action Plans focusing on GHG inventory, pathway projections, risk assessment, and action plans for intermediate cities
	15%	Enhance carbon sinks through tree plantation and urban green/forest cover in major cities
	15%	Introduce green building codes and implement them for all new private buildings
	5%	Increase annual growth in agricultural productivity through climate-smart interventions

Adaptive & Mitigative Measures:

1. Forestry & Green Spaces: Support the preservation and development of carbon sinks through integrated forest management focusing on afforestation, reforestation, community-based forestation, agroforestry, green spaces, REDD+, corporate forest initiatives, and protecting them from wildfires and deforestation. Effectively implement 'Plant for Pakistan' to counter the climatic impacts through a reforestation drive.
2. Climate-integrated Planning: Develop climate-resilient master plans and action plans that entail climate-informed urban land use planning incorporating green spaces, urban parks, and permeable surfaces as natural buffers for heatwaves, floods, & droughts while ensuring low carbon footprints. Align development planning with Sustainable Development Goals (SDGs), Multilateral Environmental Agreements (MEAs), NDCs 2021 and NAP 2023. Focus on developing resilient infrastructure to withstand climate shocks by maintaining reliable service delivery and adopting net zero/green building codes in cities.
3. Agriculture: Stimulate climate-smart agricultural practices that focus on crop diversification, resilient varieties, and better soil health coupled with progressive & modern irrigation systems for water efficiency, conservation and improved food security. E-mechanization under the 'Transforming Punjab Agriculture' initiative to enhance agricultural productivity, control air pollution, and promote climate-smart practices.
4. Livestock: Develop climate-resilient livestock breeds to maintain animal health and productivity under changing climate conditions. Reduce livestock-related GHG emissions through effective solutions like manure management, and specialized feed mix. Increase women participation in Agriculture & Livestock.

5. Climate Financing: Institutionalize and leverage green financing, promote green technologies, and climate-sensitive governance in collaboration with national and international organizations, and local communities. Align public finance with climate change mitigation and adaptation goals, and create an enabling environment for private sector investments.

IMPLEMENTATION FRAMEWORK

Time-bound actions

A concrete action plan delineates time-bound actions with defined roles & responsibilities, and targets (Ref: Pg 13).

Institutional and legal pre-requisites for effective implementation:

Establish Climate Change Cells in key provincial departments, to strengthen each department/sector with sound knowledge of policies and actions required by that department.

- Revise rules of business and relevant legislation, where necessary, to mainstream climate change through a legislative process, starting from EP&CCD and EPA as an immediate action.
- Make necessary amendments to the Punjab Environmental Protection Act Amended 2017 and Punjab Local Government Act 2022, and formulate the Punjab Climate Change Act under the Pakistan Climate Change Act 2017.
- Improve and expand capacities for climate change applied research at the provincial and regional levels in different public sector organizations.
- Integrate the Planning Commission's "Handbook on Climate Risk Screening" into project planning for risk assessment across the project lifecycle.
- Add linkages with adaptation and mitigation actions as a mandatory part of ADP performas and PC-Is.
- Ensure that women have a leadership and decision-making role in climate response, adaptation, and mitigation measures.
- Develop robust coordination mechanisms for integrated climate change management efforts with government departments and stakeholders.
- Strengthen liaison between provincial departments and the federal government, particularly with the Ministry of Climate Change (MoCC), to ensure alignment in climate-related action planning, financing, and adherence to global commitments. Establish regular communication channels, joint working groups, and integrated policy frameworks to enhance coordination and collaboration.
- Immediate implementation of all the actions related to sectoral baselines and GHG Inventories, followed by a strategic updation of the policy document and action plans to ensure it functions as a dynamic and evolving document.

Climate Diplomacy

- Promote regional and provincial climate diplomacy by fostering collaboration, knowledge exchange, and joint initiatives between provinces and regions to strengthen climate action, address transboundary climate challenges, and drive sustainable development across borders.

Climate Education, Awareness, and Outreach

- Create a comprehensive communications strategy covering all key sectors, with a strong focus on the role of youth, media, civil society, women, persons with disabilities, and other vulnerable groups for a call for action.

- Implement education on climate change across the province by integrating climate science, research, and awareness in schools, colleges, and universities at all grade levels (school curriculums, degree programs, diplomas, awareness, and training).
- Engage the youth to promote climate awareness and provide leadership and dynamism to climate change programs.
- Launch a well-coordinated and comprehensive awareness program using modern media platforms and engaging with Academia, NGOs, and CBOs, to gather support and validation for climate change policy actions.
- Enhance the expertise of emerging professionals in climate services, equipping them to provide essential research and technical support to policymakers.

Capacity Building and Data Sharing

- Improve technical capacities of government departments in climate-compatible developments, with a special focus on GHG emissions data collection/inventorying, forecasting, and sharing of critical data sets among different levels of the government for effective evidence-based actions.
- Forge strategic partnerships with provincial and national entities dedicated to climate change, pooling human, technological, and financial resources for maximum impact.

Technology Transfer

- Indigenize climate-smart technologies for both mitigation and adaptation purposes.
- Harness the potential of IoT technology and artificial intelligence for climate modeling, monitoring, and evidence-based decision-making.
- Establish and manage a centralized digital climate change database at the provincial level.
- Promote gender mainstreaming by ensuring equitable access to technology and providing training on the use of various technologies for climate change mitigation and adaptation.

Research and Development

- Encourage high-level research for inclusive climate resilience focusing on innovation, technology transfer, and data management. Focus on climate scenarios, modeling, and projections.
- Conduct scientific research on transboundary climate risks; their nature, timescales, transmission modes, and impacts from wider to local scale. Develop regional indicators to monitor them, and develop adaptation strategies to address these cross-border challenges.
- Satellite-based monitoring of GHG emissions and carbon fluxes in coordination with SUPARCO and the National Space Agency.
- Foster collaboration with international scientific organizations to enhance research on climate change-related issues and employ gender-sensitive vulnerability assessment tools and methodologies to evaluate the impact of climate change on economically vulnerable sectors in Punjab.
- Downscale the climate projections at the district & city level in collaboration with reputable local and international partners.

Climate Financing & Green Economy

- Develop and implement Punjab Green Fiscal Reforms/Punjab Green Finance Strategy in multiple sectors of the economy for carbon emission reductions.
- Create a provincial Climate Finance Unit and establish/notify a climate fund to support research in climate-smart technology and solutions.

- Enhance robust Climate Budget Tagging to map the priorities and actions of the provincial government and to identify the requirements for adaptation and mitigation initiatives/projects/programs.
- Develop mechanisms for tracking climate expenditures.
- Leverage investments and developing market-based instruments for reducing GHG emissions e.g. in the upgradation of industrial processes and technologies, green energy mix, low-carbon fossil fuels/greener transportation, etc.
- Establish and integrate a carbon market mechanism to promote the trading of carbon credits, driving investment in low-carbon technologies and sustainable practices.
- Boost private sector investments for both mitigation and adaptation sectors, and support small and medium enterprises.
- Foster partnerships with the local private sector and emphasize public-private partnerships to develop and finance climate change projects.
- Open avenues for green jobs and livelihoods for all through creating equal employment opportunities in multiple sectors, such as climate-smart agriculture, renewable energy, green manufacturing, cleaner technologies, innovation, eco-tourism, etc.
- Implement gender-responsive climate budgeting within Punjab's fiscal policies. Strengthen institutional capacity within the public sector to plan, administer, and monitor climate finance, ensuring optimal utilization of resources for climate action. Allocate a specific percentage of funds for women's participation in climate projects and initiatives.
- Link climate finance, revenue and expenditures, aid flows, budget allocations, procurement, and distribution processes to climate Change Dashboard to ensure transparency in the policy implementation.
- Conduct a comprehensive assessment of key supply chains in Punjab to identify areas with significant economic activity and evaluate the impacts of climate change on these sectors. Strategically, this will redirect the province's growth trajectory towards green growth by fostering the creation of sustainable employment opportunities based on natural resources, promoting long-term sustainability, and enhancing competitiveness within a climate-conscious market thereby ensuring the protection of social values and public interests.
- Prioritize and implement mitigation and adaptation measures to advance the green economy. Focus on the supply chain sectors most affected by climatic extremes, and prioritize initiatives, schemes, projects, and programs that can effectively address these impacts.
- Increased capacity of the government departments to tap Bilateral and Multilateral Climate Finance opportunities such as Green Climate Fund, Adaptation Funds, Climate Investment Funds, etc.

Provincial Climate Change Policy Implementation Committee (PCCPIC)

The Provincial Climate Change Policy Implementation Committee (PCCPIC) will oversee the smooth execution of the policy and its action plan. The Environment Protection and Climate Change Department will serve as its secretariat and coordinate with national and international organizations. The committee will meet biannually to review policy implementation and recommend any necessary corrective measures to achieve the policy's objectives and targets.

Senior Minister Punjab	Chair
Chief Secretary Punjab	Co-chair
Secretary Environment Protection and Climate Change Department	Member/ Secretary
Secretaries to the Government of the Punjab, Finance Department Planning & Development Board Agriculture Department	Members

Transport Department	
Forest, Wildlife and Fisheries Department	
Irrigation Department	
Local Government and Community Development	
HUD and PHE Department	
Energy Department	
Industries, Commerce, and Investment Department	
Emergency Services Department	
Higher Education Department	
School Education Department	
Information and Culture Department	
Youth Affairs, Sports, Archeology & Tourism	
Women Development Department	
Director General, Provincial Disaster Management Authority, Punjab	Member
Chief Meteorologist, Pakistan Meteorological Department	Member
Chief Executive Officer, The Urban Unit	Member
Chief/Deputy Chief, SUPARCO	Member

The PCCPIC will include integral federal representation from the Ministry of Climate Change (MOCC) as a co-opted member (or any other relevant member) to ensure alignment with national objectives and commitments.

Committee of Experts

A Committee of Experts will be swiftly constituted by the EPCCD that will advise PCCPIC through its expert insights and technical guidance to ensure that the climate change adaptation & mitigation strategy and policy actions are based on scientific evidence and best practices. The committee will also advise on new and innovative strategies and interventions aligned with the latest climate data and trends. EPCCD will serve as the secretariat of the Committee of Experts.

Monitoring and Evaluation

The M&E process of climate policy will enhance effectiveness by ensuring goals and resources are optimized. Transparency in decision-making, policy implementation, and resource allocation will be ensured through clear accountability mechanisms to track progress, report on results, address any shortcomings, and allow for the adaptation of policies and respective actions per the given timelines. Moreover, it will support mapping the alignment with the NDCs, NAP, SDGs, MEAs, and other national/provincial/local policies and guiding frameworks.

Establish a Climate Change Dashboard, an integrated monitoring portal, to provide access to information regarding the policy targets, progress, sectoral initiatives, alignment, and key achievements. Climate finance elements such as revenue and expenditures, aid flows, budget allocations, procurement, and distribution processes would be part of the dashboard to ensure transparency in the policy implementation. The key data will be compiled into the annual State of Climate Change Report, which will be considered by the PCCPIC for strategic and informed decision-making and placed before the Cabinet.

A complaint hotline at the CM's Secretariat will be established/notified where complaints can be made through telephone, email, websites, or in writing to prevent corruption and make climate action more effective and transparent increasing citizens' trust. This will help in reducing the possibility of conflict of interest and undue influence situations.

EPCCD will ensure regular audits of climate-related projects to contribute to improvements in governments' response to climate change. It will establish Inclusive vigilance committees or coordinate with other similar committees established by different departments at the district levels comprising multi-stakeholders and affected communities to review/monitor progress on the Punjab

Climate Change Policy and action plan. This will increase public participation and provide accountability at the community level.

Reporting, Review and Updation

Provincial departments and attached departments relevant to the sectors identified in the policy will regularly report on the progress of policy implementation to the EPCCD. This policy document will remain a 'living' document and undergo review and updating as and when necessary.

PUNJAB CLIMATE CHANGE ACTION PLAN

Policy Area 1: Climate Change Adaptation and Resilience

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	Adaptive Measure (AM.1)				
	Water Resources: Enhance water security by conserving and protecting water resources. Improve integrated water resource management and ensure water quality via regulatory and technical measures. Promote water storage and distribution infrastructure such as recharging wells, rainwater harvesting, and community ponds.				
1.1	Set up rainwater harvesting systems in public buildings in high-potential districts.	HUD&PHED, DAs, WASAs, LGCDD			
1.2	Install water quality monitoring stations at major surface water bodies	EPCCD/EPA, Irrigation			
1.3	Deploy floating trash barriers to prevent waste and plastics from accumulating in water bodies	WASAs, Irrigation, EPCCD/EPA			
1.4	Effective and immediate implementation of the Punjab Water Act 2019 for sustainable groundwater governance.	Irrigation, HUD&PHED, EPCCD/EPA			
1.5	Conduct feasibility to identify strategic water storage across Punjab such as watershed storage, small dams, dispersion structures with downstream storage, etc.; Identify areas and locations for large-scale groundwater recharging	Irrigation, WARDA			
1.6	Develop and implement a participatory irrigation management mechanism that empowers farmers in water management by establishing water user associations, facilitating capacity-building programs, ensuring transparent decision-making, and fostering collaboration between government agencies, local communities, and agricultural stakeholders to enhance water efficiency and sustainability.	Irrigation & Agriculture Depts.			
1.7	Develop contingency plans for immediate adaptive measures to address water shortages and ensure sustainable water management during critical periods.	Irrigation Dept., DAs, WASAs, LGCDD			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
1.8	Deploy ecosystem-based adaptation and green infrastructure, such as riverbank filtration and wetland restoration, to secure groundwater and ecosystem services. *Scale these efforts through programs like GoP's Recharge Pakistan Program, seeking investment from Multilateral Development Banks, GCF, and the private sector.*	Irrigation Dept.			
1.9	Introduce regulations for controlling groundwater depletion	HUD&PHED, Irrigation, LGCDD			
1.10	Implement on-farm rain harvesting systems, including conservation tillage and bed-sowing, to optimize water use, adopt advanced soil moisture measurement techniques to refine irrigation schedules, and explore nano-technology for more efficient water application.	Irrigation & Agriculture Depts.			
1.11	Develop and implement a tiered water pricing structure that charges users based on their level of consumption, ensuring that basic needs are met at a lower cost.	HUD&PHED, WASAs, LGCDD			
1.12	Promote the use of smart meters to reduce water demand; enabling industries to abstract less water and optimize existing resources to support future growth and climate adaptation.	HUD&PHED, WASAs, LGCDD, ICI&SDD			
1.13	Ensure measurement and monitoring of irrigation water delivery through innovative and digital solutions at various points of the supply system for effective planning and management.	Irrigation Department			
1.14	Construct small dams and community ponds, especially in the Pothwar region flood zones and hill torrent areas.	ABAD, Irrigation, C&W, WASAs, LGCDD			
1.15	Restoration of degraded water storage capacity of reservoirs/ponds/dams	HUD&PHED, WASAs, LGCDD, C&W			
1.16	Enforce water re-use and recycling in water-dependent industries, artificial wetlands, agriculture, and groundwater recharge through regulatory instruments	EPCCD/EPA, ICI&SDD, WASAs, Agriculture			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
1.17	Implement the water accounting system at the canal command scale	Irrigation, EPCCD/EPA			
1.18	Introduce a water quality ranking system for natural water bodies and barrage-barrage channel reach for cleansing of contaminants	Irrigation, EPCCD/EPA			
1.19	Install constructed wetlands to naturally treat agricultural and urban runoff breaching out to natural water bodies	HUD&PHED, WASAs, LGCDD, WASAs			
1.20	Establish aquifer storage and recovery technology in canal command and rain-fed areas	Irrigation, WASAs, Agriculture, EPCCD/EPA, C&W			
1.21	Introduce a water rights trading system to optimize water allocation	Irrigation Department, EPCCD/EPA			
1.22	Allocate water budget for conservation and rehabilitation of threatened wetlands	Irrigation, F W&FD, EPCCD/EPA			

Adaptive Measure (AM.2)

Biodiversity & Vulnerable Ecosystems: Formulate and implement integrated biodiversity conservation programs to conserve and protect high conservation value areas. Rehabilitate degraded habitats through ecosystem-based adaptation, and establish new protected areas to ensure the survival of threatened ecosystems. Improve the health of wetlands (i.e. RAMSAR sites) that act as floodgates, rangelands, pastures, and deserts (arid and hyper-arid areas) and conserve aquatic diversity and habitat conditions.

2.1.	Conduct a baseline survey and demark protected areas, and vulnerable & degraded habitats, and develop a dashboard.	FW&FD, EPCCD/EPA			
2.2.	Establish a legal framework at the provincial level to implement the international conventions and commitments for biodiversity.	FW&FD, EPCCD/EPA			
2.3.	Identify and notify new protected areas across the province and prepare their ecosystem management plans. Ensure women's participation in the management of protected areas.	FW&FD, EPCCD/EPA			
2.4.	Initiate community-led ecosystem rehabilitation programs	FW&FD, EPCCD/EPA			
2.5.	Create new biodiversity reserves along the Indus Basin while also revitalizing and supporting existing national parks and protected areas to boost biodiversity.	FW&FD, EPCCD/EPA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
2.6.	Organize training and manage resources to empower communities to actively participate in biodiversity monitoring, habitat restoration, and sustainable resource management.	FW&FD, EPCCD/EPA, Emergency Services Department			
2.7.	Develop a living Indus health platform to measure the Basin's health.	Irrigation, Indus River System Authority (IRSA)			
2.8.	Develop a comprehensive master plan for the restoration and rehabilitation of all (old and new) protected areas, incorporating community-driven management plans tailored to each area's unique ecological and biodiversity needs, and implement Punjab Protected Areas Act 2020.	FW&FD, EPCCD/EPA			
2.9.	Implement measures to maintain vegetative cover in arid and semi-arid lands to prevent desertification. Promote the United Nations Convention to Combat Desertification (UNCCD)/Sustainable Land Management (SLM) agenda to assess and support traditional land management systems; conduct scientific research and initiate activities/projects to address desertification.	Agriculture, FW&FD			
2.10.	Set up Biodiversity Centers to reduce/manage biodiversity loss and meet global goals and targets by ensuring alignment and mutual support between the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and other international agreements and processes.	FW&FD			
2.11.	Implement measures to prevent topsoil erosion in rangelands and pastures, particularly in the Pothwar region. Encourage and promote rangeland management, reclamation, and restoration practices and advocate for soil conservation practices in rangelands to combat desertification.	Agriculture, FW&FD			
2.12.	Prepare City Biodiversity Index and Action Plans, with a focus on migratory species.	FW&FD, EPCCD/EPA			
2.13.	Develop Wetlands and RAMSAR site conservation and management plan to improve the health of wetlands by conserving aquatic diversity and protecting habitat conditions, and promoting cooperation & research for the protection of Ramsar Sites.	FW&FD, EPCCD/EPA			
2.14.	Design and implement ecosystem-based adaptation projects.	FW&FD, LG&CDD & other re ated			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
2.15.	Establish gene banks, seed banks, zoos, and botanical gardens to conserve the biological diversity of valuable species	entities			
2.16.	Establish a Center of Excellence on forestry & biodiversity for international-level research and basic-advance level training focusing on climate change.	FW&FD, EPCCD/EPA			
2.17.	Coordinate with the federal government and the international community to get assistance for developing biodiversity projects.	FW&FD, EPCCD/EPA			

Adaptive Measure (AM.3)

Climate-Induced Disasters: Strengthen climate-induced disaster management capacity by prioritizing disaster-resilient infrastructure, effective forecasting, early warning systems and services, zoning, and investing in cost-effective nature-based solutions. Conduct scientific studies and assessments for climate-induced disasters and prepare action plans.

3.1.	Develop district-wise hazard maps highlighting areas prone to floods, droughts, heatwaves, and other hazards	PDMA, EPCCD/EPA, DAs, LG&CDD, HUD&PHED			
3.2.	Reassess and remodel the flood-carrying capacity of riverine hydrologic structures including bridges	PDMA, LGCDD			
3.3.	Carry out a fresh demarcation of high-risk areas, floodplain zones and develop an adaptation district plan, and also provide city-wise resilient municipal infrastructure.	PDMA, LGCDD, PHED			
3.4.	Install/strengthen early warning systems in each flood/flash flood zone and develop communities' evacuation plans	PDMA, PMD, C&W, DAs, Irrigation. Emergency Services Department			
3.5.	Adopt a proactive approach toward disaster risk management	PDMA, EPCCD/EPA, DAs, LG&CDD, HUD&PHED			
3.6.	Provide shady/shelter places on heatwave hotspots	LGCDD, PDMA, EPCCD/EPA, DAs,			
3.7.	Launch drought management programs for Southern Punjab	CDA, PDMA, EPCCD/EPA, LG&CDD			
3.8.	Retrofit public buildings and infrastructure to withstand climate-induced disasters	PDMA, EPCCD/EPA, DAs, LG&CDD, HUD&PHED, C&W, Energy			
3.9.	Conduct multi-hazard vulnerability assessments at the district/city level, set actionable targets, and update every 3 years	PDMA, Emergency Services Department			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
3.10.	Expedite and expand flood works and hill torrent management projects to enhance flood-resilient infrastructure in flood-prone areas	PDMA, Irrigation			
3.11.	Construct flood-resistant housing in vulnerable areas, incorporating raised foundations and water-resistant materials	PDMA, C&W, DAs			
3.12.	Construct building resilient infrastructure e.g. Redesign and upgrade storm drainage capacity of major cities of Punjab	WASA, PDMA, LGCDD,			
3.13.	Develop an institutional setup and regulatory framework for the management of climate-induced migrations	PDMA, EPCCD/EPA, DAs, LG&CDD, IOM			
3.14.	Install soil moisture sensors and drought indices to monitor and forecast drought conditions	PDMA, PMD, C&W, DAs, ICI&SDD, Irrigation, Soil Survey of Punjab			
3.15.	Ensure early rehabilitation, remodeling, and up-gradation of the existing irrigation infrastructure in Punjab	PDMA, Irrigation			
3.16.	Develop projects to tap foreign assistance in strengthening the disaster management regime	PDMA			
3.17.	Establish a mechanism to assess transboundary climate risks that can be linked with early warning system.	Met department, EPCCD			
3.18.	Enhance livelihood opportunities and entrepreneurship options for local communities to opt for during and post-disaster period	PDMA			
3.19.	Redesign/construct disaster-resilient buildings starting from public hospitals, dispensaries, and schools.	PDMA, LGCDD, PHED, C&W, P&SHC			

Adaptive Measure (AM.4)

Health & Climate Change: Mainstreaming climate adaptation in the healthcare system for effective response to climate-induced disasters and diseases. Focus on mapping post-disaster health impacts and establish a baseline for policy interventions.

4.1.	Integrate appropriate measures of climate-related disasters and diseases in the health sector policy and plans.	Health Department			
4.2.	Conduct studies to assess the health vulnerability of communities (focusing women and children) with respect to climate change and develop management plans to reduce vulnerability.	Health Department			
4.3.	Prepare and implement Climate Sensitive Diseases monitoring and forecasting system	Health Department			
4.4.	Designate special wards and OPDs in each hospital to deal with the patients affected by air-, heat-and water-borne diseases during peak	Health Department and related entities, PDMA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	seasons				
4.5.	Enhance the fleet of mobile health units to ensure rapid deployment to areas affected by climate disasters, maintaining uninterrupted access to healthcare services for the impacted population	Health Department and related entities, PDMA, Emergency Services			
4.6.	Apply a 'climate lens' approach while framing the WASH sector strategies and plans	Health Department and related entities, LGCDD, PHED			
4.7.	Prioritize the assessment of climate risks to Water, Sanitation, and Hygiene (WASH) infrastructure, seeking sustainable and climate-resilient solutions.	Health Department, LGCDD, PHED, WASAs, MCs			
4.8.	Dedicate a comprehensive segment in future health strategies to the prevention and management of climate-related diseases including post-disaster trauma, anxiety/depression, heatstroke, etc.	Health Department and related entities			
4.9.	Organize training of phase-wise 100,000 healthcare professionals on climate-related health issues.	Health Department and related entities			

Adaptive Measure (AM.5)

Climate Justice: Integrate gender-responsive adaptation in sectoral development/investment plans, and uplift the climate-hit population groups through poverty alleviation initiatives by offering social and financial protection schemes.

5.1.	Establish microfinance schemes with low or zero-interest loans to support small businesses and entrepreneurship in climate-impacted areas.	PDMA, SPA, P&DB			
5.2.	Engage non-governmental organizations and civil society organizations to initiate schemes to support climate-hit populations at the district level, particularly in south Punjab	PDMA, EPCCD/EPA			
5.3.	Develop district-level emergency relief action plans and funds with a gender lens to ensure that women and vulnerable groups receive timely and adequate support during climate-induced disasters.	PDMA, EPCCD/EPA, WDD, Emergency Services Department			
5.4.	Implement actions outlined in Pakistan's Climate Change Gender Action Plan 2023 and Punjab Women Development Policy 2018.	WDD and other related entities			
5.5.	Create training modules specifically designed for women that address climate change issues, sustainable practices, and adaptation strategies and provide training to empower women in rural and urban areas.	WDD as a lead entity			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
5.6.	Launch awareness campaigns to educate women and communities about the effects of climate change and the importance of sustainability. Create informational materials and resources, focusing on climate change and women's roles and organize community events and campaigns.	WDD as a lead entity			
5.7.	Develop a comprehensive database of eligible (climate) beneficiaries, ensuring data accuracy and inclusiveness.	PDMA, P&DB, SPA, WDD			
5.8.	Use efficient and transparent disbursement mechanisms such as mobile banking, digital wallets, or community banking systems to ensure timely and secure delivery of funds and charity to the target groups.	PDMA, P&DB, FD, Private Sector			
5.9.	Develop and fund programs specifically aimed at improving women's livelihoods in climate-affected areas, such as agriculture training, and access to markets	PDMA, P&DB, WDD			
5.10.	Collect and disseminate data on climate change that specifically affects women and marginalized groups, and establish platforms for sharing climate-related data and research with women's organizations and community leaders.	WDD as lead entity			
5.11.	Promote collaboration with research institutions to gather and analyze data on gender-specific climate impacts and solutions.	WDD as lead entity			
5.12.	Introduce specialized insurance programs tailored for vulnerable and affected people populations	PDMA, P&DB, SPA, WDD			
5.13.	Launch during and post-disaster social protection schemes for poor population groups (with an emphasis on women).	PDMA, P&DB, SPA, WDD			

Policy Area 2: Mitigation and Low Carbon Development

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	Mitigative Measure (MM. 1)				
	Energy Generation: Introduce cleaner power generation technologies using alternative fuels and energy resources. Promote off-grid renewable energy in rural and remote areas, expand smart grids, and prioritize the transition of public sector buildings to renewables. Focus on energy security, energy transition, domestic market creation, and global commitments to ensure low-emission development.				
1.1	Formulate a provincial energy action plan (generation and efficiency) aligning with the measures outlined in the Alternate & Renewable Energy Policy 2019, National Energy Efficiency and Conservation Policy 2023, updated NDCs 2021, and, tailored to provincial and local contexts.	Energy Dept, PEECA			
1.2	Develop mechanisms for the provision of clean energy to vulnerable communities across the Indus Basin and other vulnerable areas.	Energy Dept, PEECA			
1.3	Support major industrial units for phasing out coal and inefficient boilers.	Energy Dept, EP&CCD/EPA, ICI&SDD			
1.4	Harness opportunities for renewable and solar energy generation by fostering partnerships with the private sector, and stimulate renewable energy markets through incentivization and supportive frameworks.	Energy Dept, PEECA			
1.5	Initiate projects/programs to advance the transition towards renewable energy, especially in Southern Punjab.	Energy Dept, PEECA			
1.6	Initiate a program for home-based solar systems for low-income households in Punjab.	Energy Dept, PEECA			
1.7	Initiate wind power projects/programs along the wind corridor of northern Punjab.	Energy Dept, PEECA			
1.8	Establish biogas plants in potential areas.	Energy Dept			
1.9	Carryout feasibility studies for installation of smart grids in rural centers and decentralized urban centers	Energy Dept, PEECA			
1.10	Explore cleaner power generation technologies to diminish reliance on coal-based electricity production, ensuring coal-fired power plants operate at peak efficiency and are adaptable for CO_2 capture and storage retrofitting.	Energy Dept, Punjab Thermal Power (Private) Limited (PTPL)			
1.11	Solarization of existing public buildings and mandate the solarization	Energy Dept, PEECA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	of new buildings in the public sector.				
1.12	Modernize existing grid infrastructure to support smart grid technologies	Energy Dept, PEECA			
1.13	Improve the energy mix by increasing the share of renewable energy	Energy Dept, WAPDA			
1.14	Eliminate inefficient boilers from all industries through legislative support; and expand the use of biofuels/biomass in the industrial and power generation sector.	Energy Dept, EP&CCD/EPA, ICI&SDD			
	Mitigative Measure (MM. 2)				
	Energy Efficiency: Enforce energy efficiency audits, standards, and labeling to enhance energy performance and reduce reliance on fossil fuel consumption.				
2.1	Map out the energy-intensive industries and update the database periodically	Energy Dept, EP&CCD/EPA, ICI&SDD			
2.2	Prompte efficient energy management systems and interventions to encourage the adoption and development of renewable energy sources.	Energy Dept, PEECA			
2.3	Advocate for deploying energy-efficient appliances across households, governmental, and private sectors, as well as irrigation, agricultural zones, and industries.	Energy Dept, PEECA, EP&CCD/EPA			
2.4	Develop Minimum Energy Performance Standards (MEPS).	Energy Dept, PEECA			
2.5	Conduct energy audits for energy-intensive industries and commercial buildings and introduce measures to promote sustainable energy consumption and production	Energy Dept, EP&CCD/EPA, ICI&SDD			
2.6	Prepare and implement energy conservation building codes.	Energy Dept, PEECA			
2.7	Develop and execute a comprehensive social media strategy and communication plan to disseminate information on various energy efficiency initiatives (gender inclusive).	Energy Dept, PEECA			
2.8	Collaborate with the Provincial Education Departments and Higher Education Commission (HEC) to integrate energy efficiency and conservation courses, curricula, and training programs at various scales.	Energy Dept, PEECA Higher Education Department, School Education Department, HEC			
2.9	Introduce specialized courses in Energy Auditing, Social Sciences, Policy, and Management in relevant disciplines for government and	Energy Dept, PEECA, MPDD, PRMP			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium-Term (3-5 Years)	Long Term (5-10 years)
	private sectors.				
2.10	Focus on polytechnic institutes to train associate engineers in energy efficiency practices.	Energy Dept, PEECA, Technical Education & Vocational Training Authority (TEVTA)			
2.11	Launch awareness campaigns in schools to educate children on the importance of energy efficiency and conservation measures.	Energy Dept, PEECA, School Education Department			
2.12	Enforce strict adherence to Minimum Energy Performance Standards and labeling requirements for electric and gas appliances and equipment, aligning with National Energy Efficiency and Conservation Policy 2023.	Energy Dept, PEECA			
2.13	Mandate the procurement of energy-efficient equipment in all public sector purchases by incorporating minimum energy performance standards within PPRA regulations.	Energy Dept, PEECA, Punjab Procurement Regulatory Authority			
2.14	Implement artificial intelligence, machine learning, and the Internet of Things in appliances to ensure compliance with standards, facilitate data collection, and enhance energy efficiency and conservation initiatives at the provincial level.	Energy Dept, PEECA			
2.15	Standardize and ensure the availability of energy-efficient appliances, industrial equipment, agricultural machinery, etc.	Energy Dept, PEECA			
2.16	Design the labeling, testing, and verification protocols to introduce an energy labeling system	Energy Dept, PEECA, PCSIR			
2.17	Establish and maintain accredited/enlisted laboratories to conduct tests and analyses to ensure energy efficiency and coordinate with International Testing Laboratories	Energy Dept, PEECA			

Mitigative Measure (MM. 3)

Industry: Establish and implement incentive-based systems to reduce GHGs & air pollutants. Implement Resource Efficiency and Cleaner Production technologies. Make planned investments in installing Combined Effluent Treatment Plants in key polluting industries in the shortest possible period of time. Ensure that the Emission Control System (ECS) covers the polluting industry through regulations and incentives.

3.1	Update the Punjab Industrial Policy 2018 to embed climate change adaptation and greenhouse gas reduction strategies, driving sustainable, climate-resilient industrial growth throughout the province.	ICI&SDD			
3.2	Develop matrices for assessing carbon footprint to develop the ranking	EP&CCD/EPA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	system				
3.3	Develop a result-based framework to support industries for RECP technology adoption	ICI&SDD, EP&CCD/EPA			
3.4	Establish a regulatory framework to implement the concept of a circular economy	EP&CCD/EPA, LGCD, WMCs			
3.5	Assess the feasibility of implementing an AI-based emission monitoring system.	EP&CCD/EPA, ICI&SDD			
3.6	100% installation and operationalization of 30 Air Quality Monitoring Stations (AQMS) and monitoring dashboard and tools in Punjab	EP&CCD/EPA			
3.7	Establish and implement an Emission Trading System (ETS) through a regulatory framework	ICI&SDD, Law Dept.			
3.8	Set emission reduction targets and annual caps on emissions	EP&CCD/EPA, ICI&SDD			
3.9	Install continuous emissions monitoring systems in major manufacturing units	EP&CCD/EPA, ICI&SDD			
3.10	Prepare a negative list of carbon-intensive industries	EP&CCD/EPA, ICI&SDD			
3.11	Phase-wise implementation to Install Emission Control Systems (ECS) starting from polluting industries through regulation and incentives.	EP&CCD/EPA, ICI&SDD			
3.12	100% conversion of conventional Brick Kilns to Zig-Zag or other suitable technology	EP&CCD/EPA, ICI&SDD			
3.13	Support industries to implement RECP technology adoption program	EP&CCD/EPA, ICI&SDD			
3.14	Encourage the corporate sector to create a "Corporate Social Responsibility" (CSR) to create SOPs and funds to cover carbon emission reduction efforts in the industrial sector	ICI&SDD, Private Sector			
3.15	Develop linkages of the domestic ETS with international carbon markets/ETS	EP&CCD/EPA, ICI&SDD			
3.16	Support industries to develop and implement carbon-neutral and net-zero programs	EP&CCD/EPA, ICI&SDD			
3.17	Install combined effluent treatment plants before the disposal point of each industrial estate/cluster/park	ICI&SDD, C&W, WASAs, Irrigation, EPCCD/EPA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	Mitigative Measure (MM. 4)				
	Transport: Ensure the provision of a fuel-efficient public transport system (addressing gender-specific travel needs) and encourage non-motorized modes of travel. Enforce vehicle emission standards, and certification, and promote electric vehicle adoption in the public and private sectors. Enhance the capacity and mandate of the Vehicle Inspection and Certification System (VICS) for private vehicles including two/three-wheelers and implement in close coordination with the federal government.				
4.1	Develop and implement a provincial-level Electric Vehicle Policy and Action Plan in alignment with the National Electric Vehicle Policy 2019 and commitments made under NDCs. (with a special focus on the supply and demand chain and in coordination with the federal government)	Transport and Masstransit Dept.			
4.2	Develop a policy or legal framework or plan of action to promote a clean energy mix, encourage electric vehicles, and embrace low-carbon transportation technologies, including non-motorized modes. *(National EV Policy 2019 directs provinces to update their respective motor vehicle ordinances to allow for EV registration in appropriate categories and reduce taxes and duties)*	Transport and Masstransit Dept.			
4.3	Plan and introduce sufficient fuel-efficient mass transit systems in Large Cities, ensuring accessibility for women, children, and persons with disabilities.	Transport and Masstransit Dept.			
4.4	Append the issuance of fitness certificate with compliance of environmental quality standards for vehicular emissions	Transport, EP&CCD/EPA			
4.5	Develop dedicated lanes and pathways for bicycles and pedestrians and encourage non-motorized modes of travel	Transport, EP&CCD/EPA, C&W			
4.6	Demark vehicle-free zones (emission-free)	Transport, EP&CCD/EPA, C&W			
4.7	Introduce public bicycle-sharing schemes	Transport, WDD			
4.8	Implement intelligent traffic management systems to reduce congestion and enhance traffic flow, thereby lowering fuel consumption and emissions by minimizing congestion and optimizing route efficiency.	Traffic Police Punjab, Transport Dept., Punjab Safe City			
4.9	Coordinate with the federal government for interventions in Lahore as a designated EV model city and prepare & implement the course of action.	Transport and Masstransit Dept.			
4.10	Promote the widespread adoption of electric vehicles (EVs) through	Transport and Masstransit Dept.			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	incentives, infrastructure development, and regulatory support as a key strategy (aligned with national and provincial policies)				
4.11	Configure state-of-the-art vehicular emission testing setup in existing and prospective VICS Stations	Transport, EP&CCD/EPA			
4.12	Expand the network of EV charging stations across urban and peri-urban areas	Transport and Masstransit Dept.			
4.13	Revise and make the environmental quality standards for vehicular emissions more stringent progressively	EP&CCD/EPA			
4.14	Invest in expanding railway, bus, tram, or metro networks to cover more areas within districts and inter-city connectivity.	Transport Dept., Railway Dept.			
4.15	Plan and introduce sufficient fuel-efficient mass transit systems in other potential cities	Transport and Masstransit Dept.			
4.16	Initiate manufacturing of EVs at a local level and provide incentives.	Transport Dept., ICI&SDD			
4.17	Support the private transport sector by providing incentives for reducing emissions and environmentally friendly transport services	Transport, EP&CCD/EPA, Private Sector			

Mitigative Measure (MM. 5)

Waste & Wastewater: Promote an integrated waste management system that includes solid waste and wastewater treatment facilities, waste-to-energy projects, and methane-capturing systems at waste disposal sites. Implement plastic waste management regulations and strategies.

5.1	Develop a methane-specific time-bound strategy of Punjab based on Pakistan's Global Methane Emission Pledge (reduce methane emissions by 30% by 2030).	LGCDD, WMCs, MCs, EP&CCD/EPA			
5.2	Establish scientific landfills in megacities.	LGCDD, WMCs, MCs, EP&CCD/EPA			
5.3	Improve waste collection rate by expanding the collection networks and infrastructure.	LGCDD, WMCs, MCs			
5.4	Prepare a strategy for implementation of the 5Rs (Rethink, Refuse, Reduce, Reuse, Recycle) concept in all sectors, along with quantifiable targets and indicators	LGCDD, WMCs, MCs, EP&CCD/EPA			
5.5	Mainstream Sustainable Consumption and Production National Action Plan (SCPNAP) implementation at the provincial level for achieving sustainable city goals	LGCDD, WMCs, MCs, EP&CCD/EPA			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
5.6	Implement Plastic Management Strategy and Regulations.	EPCCD/EPA			
5.7	Launch "Zero Plastic Waste Cities" initiatives in major cities along the Indus Basin by partnering with the private sector and expanding successful existing programs.	LGCDD, WMCs, MCs, EP&CCD/EPA			
5.8	Launch public awareness campaigns on waste and wastewater management, conservation practices, and the benefits of treating and reusing wastewater, with active involvement of women in dissemination efforts and also at the receiving end.	LGCDD, WASAs, WMCs, MCs, EP&CCD/EPA, WDD			
5.9	Develop and expand recycling programs to ensure that materials like paper, glass, plastics, and metals are recycled efficiently, reducing the volume of waste sent to landfills.	LGCDD, WMCs, MCs,			
5.10	Ensure the inclusion of wastewater treatment plants in all urban sewerage schemes to mitigate pollution and protect water resources.	HUD&PHEDs, WASAs			
5.11	Implement systems to capture and utilize biogas (mainly methane) generated from wastewater treatment processes.	HUD&PHEDs, WASAs			
5.12	Invest in and deploy waste-to-energy technologies that convert non-recyclable waste into energy, thereby reducing landfill use and GHG emissions.	LGCDD, WMCs, MCs			
5.13	Support research and development of new technologies and methods for waste reduction, recycling, and resource recovery to enhance the efficiency and effectiveness of waste management systems.	LGCDD, WMCs, MCs			
5.14	Develop a legal landscape to promote waste reduction, recycling, and proper waste management, including setting targets and providing incentives for waste diversion and energy recovery.	LGCDD, WMCs, MCs			
5.15	Strengthen policies and regulations related to wastewater management to promote best practices, support innovation, and ensure compliance with environmental standards and climate goals.	LGCDD, WASAs, MCs			
5.16	Explore avenues for multilateral negotiations for redressal of water quality degradation through untreated water entering Punjab from cross borders.	LGCDD, and other entities at various scales through competent forums			
5.17	Establish segregation, treatment, and disposal cities in all major cities of Punjab.	LGCDD WMCs, MCs, Urban Unit			
5.18	Upgrade the landfills with gas collection systems, such as vertical	LGCDD, WMCs, MCs			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	wells or horizontal trenches, to capture methane				
5.19	Pilot the use of methane from landfill sites for electricity generation	LGCDD, WMCs, MCs			
5.20	Launch waste-to-energy projects	LGCDD, WMCs, MCs			
5.21	Enforce the phase-wise installation of wastewater treatment plants in industries. (Industrial estates must specify areas for landfill sites, and solid waste management in accordance with provincial environmental policy)	ICI&SDD, EPCCD/EPA			
5.22	Develop a guiding document and plan to control transboundary movements of hazardous wastes and their disposal.	LGCDD, WMCs, MCs			
5.23	Develop technologies and processes for recovering valuable nutrients (like nitrogen and phosphorus) from wastewater.	WASAs, LGCDD, MCs			
5.24	Promote and implement practices for the reuse and recycling of treated wastewater. This includes using treated wastewater for irrigation, industrial processes, or even potable reuse where appropriate, thereby conserving freshwater resources.	WASAs, LGCDD, MCs			

Policy Area 3: Cross-Cutting (Adaptation & Mitigation)

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	Adaptation & Mitigation Measure (AMM. 1)				
	Forestry & Green Spaces: Support the preservation and development of carbon sinks through integrated forest management focusing on afforestation, reforestation, community-based forestation, agroforestry, green spaces, corporate forest initiatives, and protecting natural forests from wildfires and deforestation. Effectively implement 'Plant for Pakistan' to counter the impacts of climate change through a reforestation drive.				
1.1	Map out open areas of designated forest lands and completely restore the affected forests through afforestation and reforestation programs and promoting ecosystem-based adaptation	FW&FD			
1.2	Synchronize the weather forecasting and forest surveillance system, and connect it with the central control room of the disaster management authority to get a real-time monitoring facility to take preventive measures for wildfires	FW&FD, PMD			
1.3	Expand green belts and encourage community-based forestation, farm-forestry through incentives	FW&FD, Agriculture Department, PHA, LGCDD, MCs			
1.4	Launch a nature conservation vocational course and engage them in biodiversity conservation	FW&FD, MPDD			
1.5	Develop urban forests in all cities of Pakistan starting from Large Cities and the Indus Basin.	FW&FD, LGCDD, MCs			
1.6	Survey and map potential carbon sinks for efficient carbon sequestration.	FW&FD, EP&CCD			
1.7	Notify and enforce 100-meter buffer zones around designated industrial estates, dedicated to dense tree planting to reduce pollution in surrounding areas and serve as a local carbon sink to combat greenhouse gases.	ICI&SDD, EP&CCD/EPA			
1.8	Develop all vacant spaces designated for parks in cities and towns into green areas.	FW&FD, LGCDD, MCs, PHA			
1.9	Launch reforestation programs for degraded or deforested lands	FW&FD			
1.10	Encourage public-private partnerships for corporate forest program	FW&FD, PPP			
1.11	Launch land-planning projects to create new green spaces and enhance [illegible]	FW&FD, PHA, MCs,			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
1.12	Develop synergies and enhance departmental capacities to apply for forestry projects in volunteer carbon markets.	FW&FD, P&DB			
1.13	Create a network of biodiversity parks and natural museums	FW&FD			
	Adaptation & Mitigation Measure (AMM. 2)				
	Climate-integrated Planning: Develop climate-resilient master plans and action plans that entail climate-informed urban land use planning incorporating green spaces, urban parks, and permeable surfaces as natural buffers for heatwaves, floods, & droughts while ensuring low carbon footprints. Align development planning with Sustainable Development Goals (SDGs), and Multilateral Environmental Agreements (MEAs). Focus on developing resilient infrastructure to withstand climate shocks by maintaining reliable service delivery and adopting net zero/green building codes in cities.				
2.1	Retrofit existing buildings and infrastructure to improve energy efficiency, reduce air pollution, and greenhouse gas emissions, and enhance resilience to extreme weather.	Energy Department, PEECA, Development Authorities, C&W Department			
2.2	Increase tree cover along main roads, open urban spaces, canals and water bodies, etc. to cool down day temperatures during heatwaves	PHA, Development Authorities			
2.3	Identify open spaces suitable for urban afforestation and maximize the Miyawaki plantation and other techniques of urban ecology in and around urban spaces	PHA, FW&FD			
2.4	Initiate community engagement and awareness campaigns for voluntary plantation on open and free urban spaces to enhance carbon sinks	FW&FD, PHA, EPCCD, Emergency Services Department			
2.5	Expedite the infrastructure upgradation (road rehabilitation, irrigation network upgradation) projects	C&W department, Development Authorities, Irrigation Department			
2.6	Conduct vulnerability assessments of existing infrastructure to prioritize retrofitting and reinforcement	C&W department, Development Authorities, Irrigation Department			
2.7	Integrate the concepts of sponge cities, walkability, densification, green infrastructure, biodiversity, protected areas, and wetland conservation considerations in land-use planning /master plans/action plans.	Development Authorities, EP&CCD/EPA and all other sectors			
2.8	Prepare a baseline emission/GHG inventory of Punjab covering all key sectors	EP&CCD/EPA, Urban Unit			
2.9	Conduct Training Needs Assessments and develop and execute technical capacity-building programs for government and non-	EP&CCD/EPA, Urban Unit, PRMP, MPDD			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	government actors				
2.10	Align SDGs with development paradigm.	P&DB and all departments			
2.11	Prepare MEA action plan in coordination with MoCC&EC and align with climate financing.	EPCCD, P&D, MoCC			
2.12	Form and notify a provincial implementation committee on MEAs and a working group	EPCCD, P&D, MoCC			
2.13	Develop a comprehensive communications strategy covering all key sectors, with a strong focus on the role of youth, media, civil society, women, persons with disabilities, and other vulnerable groups for a call for action.	EPCCD/EPA All sectoral departments Media, Civil Society			
2.14	Integrate climate change mitigation and adaptation in the education sector at all levels (school curriculums, degree programs, diplomas, awareness, and training).	Higher Education and School Education Departments and related entities			
2.15	Engage the youth in promoting climate awareness and provide leadership and dynamism to climate change programs.	YASAT, Higher Education and School Education Departments, WDD, and related entities			
2.16	Launch a well-coordinated and comprehensive awareness program using modern media platforms and engaging with Academia, NGOs, and CBOs, to gather support and validation for climate change policy actions.	EPCCD/EPA as a lead entity			
2.17	Develop a web-based dashboard for disclosure of all climate and disaster response actions, targets and progress, climate finance, revenue and expenditures, aid flows, budget allocations, and procurement.	EPCCD/EPA as a lead entity			
2.18	Appointment of a Public Information Officer (PIO) under the Punjab Right to Information Act, 2013.	EPCCD			
2.19	Establish a complaint hotline at the CM's Secretariat for climate-related grievance redressal.	EPCCD/EPA, PDMA, CM Secretariat			
2.20	Develop city-specific building codes and standards for carbon-neutral buildings	Energy Department, PEECA			
2.21	Update or develop the city's master plans including urban drainage/ urban flooding, drought, and heatwave management systems.	LG&CDD, HUD&PHED, Development Authorities			
2.22	Develop City Level Climate Action Plans based on GHG Inventories,	EP&CCD/EPA, Urban Unit			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	Risks & Vulnerability Assessments and Pathway Scenarios				
2.23	Use the potential of the voluntary carbon market for green buildings through zero-emission and sustainable designs.	EPCCD, P&DB, Development Authorities			
2.24	Implement green building codes for all new public buildings.	Energy Department, PEECA, EPCCD, LG&CDD, HUD&PHED			
2.25	Plant shady trees near bus stops and provide water coolers and fans in waiting areas/bus stops/bus-stands operated with solar energy	PHA, Development Authority, MCs,			
2.26	Install screens at prominent public places displaying temperature, air quality index, and weather forecast for public disclosure.	EPCCD, PMD			
2.27	Research and develop new limits of factors of safety/design criteria for infrastructure to adapt the climate change in future developments.	C&W Department, EPCCD, LG&CDD, HUD&PHED			
2.28	Restrict future developments in flood-prone areas or locations susceptible to flood.	PDMA, Development Authorities, MCs, LG&CDD, HUD&PHED			
2.29	Protect biological corridors and densely vegetated land while planning for new housing schemes in the outskirts of mega urban centers	FW&FD, EPCCD, Development Authorities			
2.30	Implement codes/ certification systems for green infrastructure such as permeable pavements and green roofs to manage stormwater and reduce urban heat island effects.	Development Authorities, Energy Department, EPCCD			
2.31	Integrate net-zero building requirements into urban planning frameworks	Energy Department, PEECA, LG&CDD, HUD&PHED			
2.32	Evaluate and prepare an action plan for the elimination of Persistent Organic Pollutants (POPs) to protect the environment and human health.	EPCCD/EPA and other related entities			

Adaptation & Mitigation Measure (AMM. 3)

Agriculture: Stimulate climate-smart agricultural practices that focus on crop diversification, resilient varieties, and better soil health coupled with progressive and modern irrigation systems that focus on water efficiency and conservation. E-mechanization under the 'Transforming Punjab Agriculture' initiative aims to improve agricultural productivity, control air pollution and smog and promote climate-smart practices. Increase women's participation in agriculture (and livestock); enhance access to information and encourage jobs in these sectors to foster sustainable livelihoods.

3.1	Prepare and disseminate a catalog of high-yielding, heat-resistant, drought-tolerant, and insect/pest-resistant crop breeds suitable for	Agriculture Department, Punjab Seed Corporation			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	relevant agro-ecological zones through special programs				
3.2	Implement mulching, and manuring practices to improve soil structure and water retention	Agriculture Department			
3.3	Introduce a soil health care system, associate it with subsidies offered to farmers	Agriculture Department, Soil Survey of Pakistan			
3.4	Encourage farmers to use precision agriculture techniques to apply fertilizers more efficiently, reducing over-consumption and minimizing nitrogenous emissions	Agriculture Department			
3.5	Develop local guidelines and standards for sustainable rice cultivation practices	Agriculture Department			
3.6	Train farmers on controlled irrigation and alternate wetting/drying techniques, while supporting small businesses in developing alternative income opportunities.	Agriculture Department, Irrigation Department			
3.7	Target small commercial farmers on climate resilience to enhance climate-smart agriculture and empower women and youth as key change agents in agricultural development.	Agriculture Department, WDD			
3.8	Enhance the capacities of Wings and Directorates of Agriculture Department to promote climate-resilient agricultural practices and integrate climate change considerations into public sector service delivery.	Agriculture Department, I/PDD, PRMP			
3.9	Create an enabling environment for accessing climate finance for Climate Smart Agriculture activities.	Agriculture Department			
3.10	Promote the adoption of energy-efficient technologies in water pumping and irrigation systems to reduce GHG emissions and support climate change mitigation efforts.	Agriculture Department			
3.11	Enhance the green tractor schemes to promote Sustainable Farming practices and	Agriculture Department to take a lead			
3.12	Provide subsidies for farmers through special packages.				
3.13	Issuance of crop health advisory concerning climatic impacts and future projections through a well-defined communication strategy for farmers.	Agriculture Department EPCCD, PMD, PDMA			
3.14	Deploy a robust safety net program throughout Punjab to safeguard small and subsistence farmers from potential yield losses caused by	Agriculture Department			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	climate change and other environmental calamities, ensuring their resilience and stability.				
3.15	Scale up and commercialize the production of climate-compatible crop varieties.	Agriculture Department, Punjab Seed Corporation			
3.16	Introduce e-mechanization in all farmlands to promote climate-smart agriculture.	Agriculture Department, EPCCD			
3.17	Introduce a province-wide biochar program for soil health improvement	Agriculture Department, Soil Survey of Pakistan			
3.18	Ensure the use of controlled-release fertilizers that dissolve slowly for GHG emission reduction	Agriculture Department, EPCCD			
3.19	Promote the use of organic fertilizers such as compost, manure, and biochar in combination with synthetic fertilizers	Agriculture Department			
3.20	Upscale alternate wetting and drying and other methane reduction technologies in rice paddies	Agriculture Department			
3.21	Expand the existing (such as precision land leveling) and explore further avenues in precision farming in water-scarce areas	Irrigation, Agriculture, HUD&PHED, WASAs, EPCCD/EPA, C&W, ICI&SDD, LGCDD			
3.22	Establish the Institute for Climate Smart Agriculture (ICSA) with a mandate to evaluate, secure resources for, and promote Climate Smart Agriculture technologies that enhance food security while supporting climate change mitigation and adaptation efforts.	Agriculture Department			
3.23	Expand the soil reclamation program for salt-affected lands	Agriculture Department, Soil Survey of Pakistan			
3.24	Make the water use efficiency at the canal command scale as an indicator of the performance of water management authority	Agriculture Department. Irrigation Department			

Adaptation & Mitigation Measure (AMM. 4)

Livestock: Develop climate-resilient livestock breeds to maintain animal health and productivity under changing climate conditions. Reduce livestock-related GHG emissions through effective solutions like manure management, and specialized feed mix.

4.1	Insulate the roofs with heat-resistant materials and improve ventilation of livestock enclosures	LDD			
4.2	Arrange ventilated transport for livestock	LDD			
4.3	Conduct research on climate-resilient livestock breeds	LDD			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
4.4	Educate the farmers about and incentivize them to use suitable feed mixes and additives	LDD			
4.5	Develop strategies to promote livestock experts and increase their capacities relevant to climate change.	LDD, MPDD, PRMP			
4.6	Establish composting and biogas generation facilities in suitable farmlands	EPCCD, LG&CDD, LDD			
4.7	Build the capacity of farmers, including women, in climate-smart livestock practices through climate-oriented agricultural extension services.	WDD, Agriculture, LDD			
4.8	Incorporate knowledge and experiences of both male and female farmers in livestock research and planning to facilitate adaptation to changing climate conditions.	WDD, Agriculture, LDD			
4.9	Make all the public sector and corporate livestock farms climate-proof.	LDD, EPCCD			
4.10	Establish breeding programs, genomic tools, and breeding technologies to accelerate the development of resilient breeds	LDD			
4.11	Ensure the supply chain of climate-smart livestock feed in the local market, especially for small and landless farmers.	LDD			
4.12	Encourage the private sector to use manure and waste on a commercial level to promote agricultural enterprises	LDD, Agriculture Department,			

Adaptation & Mitigation Measure (AMM. 5)

Climate Financing: Institutionalize and leverage green financing, promote green technologies, and climate-sensitive governance in collaboration with national and international organizations, and local communities. Align public finance with climate change mitigation and adaptation goals.

1.1.	Establishment of Climate Finance Unit in Punjab.	P&D, EPCCD, FD			
1.2.	Promote green jobs and livelihoods for all through creating equal employment opportunities in multiple sectors.	All Sectoral Departments P&D			
1.3.	Develop an Action Plan for Green Budgeting in Punjab. (Along with Climate Budget Tagging for adaptation and mitigation initiatives/projects/programs and a tracking system to monitor climate expenditures)	P&D, EPCCD, FD			
1.4.	Conduct a comprehensive study of key supply chains in Punjab to identify existing and potential climatic risks to advance the green	P&D, EPCCD			

No.	Actions	Responsible Entity	Short Term (Within 1-2 yrs)	Medium Term (3-5 Years)	Long Term (5-10 years)
	economy.				
1.5.	Prioritize initiatives, schemes, projects, and programs that can effectively address climatic impacts on the economy and ensure climate financing to support implementation.	P&D, EPCCD			
1.6.	Incorporate green procurement principles into the Punjab Public Procurement Rules	PPRA, FD			
1.7.	Regular audits of climate-related projects.	EPCCD			
1.8.	Introduce market-based instruments for emission reduction such as green bonds.	EPCCD (WAPDA, SECP, State Bank)			
1.9.	Develop a framework to apply economic incentives for emission reduction.	EPCCD			
1.10.	Develop a policy/regulatory framework to boost private sector investments for both mitigation and adaptation sectors, and to support small and medium enterprises (SMEs).	EPCCD			

Academia and other stakeholders will also be an integral part of this action plan, where relevant.

APPENDICES

RELEVANCE TO NCCP, SDGs, NDCs, AND OTHER FRAMEWORKS

Climate Resilient Punjab Strategy	NCCP	SDGs	SDG Targets	Pakistan's NDCs	Others
PA 1: Climate Change Adaptation					
Water Resources	4.1		6.1-Achieve universal access to drinking water for all 6.3-Improve water quality & materials having the proportion of untreated water wastewater 6.4-water use and water scarcity 6.5-Implement integrated water resources management 6. b- Support and strengthen the participation of local communities in water and sanitation management 13.1-Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters	Reduction of flood risk and enhanced water recharge at six sites in the Indus Basin Focus on a) Surface rainwater harvesting, b) Groundwater recharge, and c) Urban storm-water management.	National Adaptation Plan 4.2 Punjab Water Act 2019 Punjab Water Policy 2018 Punjab Growth Strategy 2023 Living Indus 2022 Chapter 2, Action 1, 8, 9, 10, 16 Recharge Pakistan Program
Biodiversity & Ecosystems	4.5, 4.6		15.1-Ensure the conservation, restoration 15.4-ensure the conservation of mountain ecosystems 15.3-combat desertification, restore degraded land and soil, including land affected by desertification 15. a-a Mobilize and significantly increase financial resources from all sources to conserve biodiversity and ecosystem 15.8-Introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species 15.9-Integrate ecosystem and biodiversity values into national and local planning	By 2023, total protected areas in the country will be enhanced from 12% to 15%, resulting in the preservation of rare fauna and flora, green job opportunities for 5,500 people, and promoting eco-tourism. To build resilience through nature-based solutions and protection of ecosystems and biodiversity	National Adaptation Plan 4.2 Punjab Protected Areas Act 2020 Living Indus 2022 Chapter 2, Action 7, 12 Convention on Biological Diversity (CBD) Convention on International Trade in Endangered Species of

Punjab Sectors	SDGs	SDG Targets	Pakistan's NDCs	Others
				Wild Fauna and Flora (CITES) Ramsar Convention Convention on the Conservation of Migratory Species (CMS) United Nations Convention to Combat Desertification (UNCCD) Punjab Environmental Policy, 2015 Recharge Pakistan Program National Adaptation Plan 4.5 Living Indus 2022 Chapter 2, Action 9 Punjab Environmental Policy, 2015 Lahore Development Authority (Water and Sanitation Agency) Sewerage and Drainage Amended Regulation 2017 Recharge Pakistan Program Pakistan Floods 2022: Resilient Recovery, Rehabilitation, and
Climate-Induced Disasters	4.7	**13.1**-Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters **13. b-** Promote mechanisms for raising capacity for effective climate change-related planning and management **13.2**-Integrate climate change measures into national policies	Development of a Hydrometeorological monitoring system and establishment of a Climate database	

Resilient Punjab Sectors					
					Reconstruction Framework
Human Health	4.3		2.2- End all forms of malnutrition 3.3-End the epidemics 3.7-Ensure universal access to sexual and reproductive healthcare services 5.6-Ensure universal access to sexual and reproductive health and reproductive rights 6.1- Achieve universal access to drinking water for all 6.2-Access to sanitation & hygiene	Incorporate health and environment in climate and disaster risk reduction-related policies and vice versa.	National Adaptation Plan 4.4 Punjab Health Sector Strategy 2019-2028 Punjab Environmental Policy, 2015
Climate Justice	4.8.2		1.4-Ensure All have equal rights to economic resources 1.5-Build the resilience of the poor & reduce vulnerability to climate-related extreme events 5. a-Undertake reforms to give women equal rights to economic resources, ownership & control over land by national laws 5. c-Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and empowerment 5.5-Ensure women's full and effective participation and equal opportunities for leadership at all levels 16.7-Ensure representative decision-making	Gender Mainstreaming actions and potential targets	National Adaptation Plan 4.6 Pakistan's Climate Change Gender Action Plan 2023 Punjab Women Development Policy 2018 Punjab Environmental Policy, 2015

PA 2: Climate Change Mitigation

All sectors	-		-	Overall, a 50% reduction of its projected emissions by 2030	
Energy Generation & Efficiency	5.1, 5.2		7.2- Increase substantially the share of renewable energy in the global energy mix 7.a- Enhance international cooperation to facilitate access to clean energy research	By 2030, 60 % of all energy produced in the country will be generated from renewable energy resources, including	National Adaptation Plan 4.2.3., 4.6.3 Living Indus 2022 Chapter

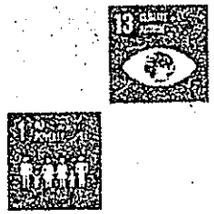
Climate Resilient Punjab Sectors	NCCP	SDGs	SDG Targets	Pakistan's NDCs	Others
			and technology & and promote investment in energy infrastructure and clean energy technology	hydro. Focus on a) Efficiency improvements to boiler and furnace energy, b) Improving energy efficiency in building, and c) Solar energy technology. From 2020 onwards, a moratorium is in place on new imported coal-based power plants and no generation of power through imported coal, plans for two new coal-fired power plants have been shelved in favor of hydro-electric power, and there is increased focus on coal gasification and liquefaction for indigenous coal.	2, Action 5 Alternate & Renewable Energy Policy 2019 National Energy Efficiency and Conservation Policy 2023 Punjab Growth Strategy 2023
Industry	6.5		9.4-Upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies with all countries taking action following their respective capabilities 12.2- Achieve the sustainable management and efficient use of natural resources	No generation of power through imported coal	National Adaptation Plan 4.2.3 Punjab Industrial Policy 2018 Punjab Clean Air Policy 2023 Punjab Environmental Policy, 2015
Transport	5.3		11.6-Adverse per capita environmental impact of cities' air quality and municipal and other waste management	By 2030, 30 % of all new vehicles sold in Pakistan in various categories will be Electric Vehicles (EVs). Focus on a) Bus rapid transport, and b) Vehicle	National Adaptation Plan 4.2.3 National Electric Vehicle Policy 2019 Punjab Clean Air Policy

				tuning.	2023 National Adaptation Plan 4.2.3 Living Indus 2022 Chapter 2, Action 6
Waste & Wastewater	5.4		11.6-Adverse per capita environmental impact of cities' air quality and municipal and other waste management 12.5- Substantially reduce waste generation	Banning on single plastic use. Promote reuse and source reduction of waste	Pakistan's Global Methane Emission Pledge 2021 The Punjab Local Government Act 2022 Basel Convention

PA 3: Cross-Cutting (Adaptation & Mitigation)

Forestry & Green Spaces	4.4, 5.7		15.2-Promote the implementation of sustainable management of all types of forests 13.1- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters	From 2016 onwards, continued investments in Nature-based Solutions (NBS) through the largest-ever afforestation programs	National Adaptation Plan 4.2 Living Indus 2022 Chapter 2, Action 7 United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol Punjab Environmental Policy, 2015

Climate Resilient Punjab Sectors	NCCP	SDGs	SDG Targets	Outcomes	Others
Climate-Integrated Planning	5.4		11.6- Adverse per capita environmental impact of cities including air quality and municipal and other waste management 11.3- Integrated and sustainable human settlement planning and management in all countries 11.b- Inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters 11.7- Universal access to safe, inclusive, and accessible, green and public spaces 11.2- Safe, affordable, accessible, and sustainable transport systems for women, children, persons with disabilities, and older persons 13.1-Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters	Reduction of flood risk and enhanced water recharge at six sites in the Indus Basin in the wake of the project 'Recharge Pakistan'	National Adaptation Plan 4.3.3 Living Indus 2022 Chapter 2, Action 12 Ramsar Convention United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol Vienna Convention and Montreal Protocol Stockholm Convention on Persistent Organic Pollutants (POPs) Punjab Environmental Policy, 2015 Punjab Clean Air Policy 2023 Punjab Forest Policy of 2019

Agriculture and Livestock	4.2, 5.6		**2.3-** Double the agricultural productivity and incomes of small-scale food producers **2.4-**Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production that strengthen capacity for adaptation to climate change **13.1-**Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters	Complete ban on open burning of rice stubble, solid waste, and other hazardous materials, and Disposal of crop residue in an environmentally friendly manner. (Mitigation) Focus on a) Reforestation and reducing CO_2 emissions from forest degradation, and b) Farm forestry as a carbon sink. (Adaptation) Focus on a) High-efficiency irrigation systems for irrigated and rain-fed areas, b) Drought-tolerant crop varieties, and c) Climate monitoring and forecasting - early warning system.	National Adaptation Plan 4.1, 4.3.3 Living Indus 2022 Chapter 2, Action 18 and 20 Punjab Agriculture Policy 2018 Punjab Growth Strategy 2023
Climate Financing	6				National Adaptation Plan 5.3 United Nations Framework Convention on Climate Change (UNFCCC) and Kyoto Protocol

Abbreviations

ABAD	Agency for Barani Areas Development
CDA	Cholistan Development Authority
C&W	Communication and Works Department
CBOs	Community-Based Organizations
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSR	Corporate Social Responsibility
DAs	Development Authorities
ECS	Emission Control Systems
EPA	Environmental Protection Agency
EPCCD	Environment Protection and Climate Change Department
ETS	Emission Trading System
EV	Electric Vehicle
FD	Finance Department
FW&FD	Forest, Wildlife & Fisheries Department
GCMs	Global Climate Models
GDP	Gross domestic product
GHG	Greenhouse Gases
HQs	Headquarters
HUD&PHED	Housing and Urban Development and Public Health Engineering Department
ICI&SDD	Industries, Commerce, Investment & Skills Development Department
LGCDD	Local Government and Community Development Department
LDD	Livestock and Dairy Development Department
MEAs	Multilateral Environmental Agreements
MoCC&EC	Ministry of Climate Change and Environmental Coordination
MPDD	Management and Professional Development Department
NAP	National Adaptation Plan (2023)
NBS	Nature-based Solutions
NCCP	National Climate Change Policy (2021)
NDCs	Nationally Determined Contributions (2021)
NGOs	Non-Governmental Organization
NOx	Nitrogen Oxides
P&DB	Planning & Development Board
P&SHC	Primary & Secondary Health Care Department
PAs	Policy Areas
PCCPIC	Provincial Climate Change Policy Implementation Committee
PDMA	Provincial Disaster Management Authority
PEECA	Punjab Energy Efficiency & Conservation Agency
PHA	Parks and Horticulture Authority
PHED	Public Health Engineering Department
PM_{10}	Particulate Matter 10
$PM_{2.5}$	Particulate Matter 2.5
PMD	Pakistan Meteorological Department
PPP	Public-Private Partnership
PPRA	Punjab Procurement Regularity Authority
PTPL	Punjab Thermal Power (Private) Limited
PRMP	Punjab Resource Management Program
RECP	Resource Efficient and Cleaner Production
SCPNAP	Sustainable Consumption and Production National Action Plan
SDGs	Sustainable Development Goals
SECP	Securities and Exchange Commission of Pakistan
SMEs	Small and Medium-sized Enterprises
SOPs	Standard Operating Procedures
SPA	Small Project Assistance
SSP	Shared Socio-economic Pathways
SUPARCO	Space & Upper Atmosphere Research Commission
UNFAO	United Nations Food and Agricultural Organization
VICS	Vehicle Inspection and Certification System
VOCs	Volatile Organic Compounds
WAPDA	Water and Power Development Authority
WASA	Water and Sanitation Agency
WASH	Water, Sanitation, and Hygiene
WDD	Women Development Department
WMCs	Waste Management Companies

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