***Agriculture, Livestock and Fisheries Department***

Pakistan NDC implementation framework template Document

# Background

Pakistan is a lower middle-income country with GDP at USD 284 billion. Pakistan’s contribution to global greenhouse gas emissions is meager however the impacts of climate change faced in the country are abundant. Pakistan has been ranked 8th most vulnerable country to the impacts of climate change[[1]](#footnote-1) and adaptation is biggest domestic climate change challenge faced by Pakistan today. ND-Gain Index[[2]](#footnote-2) has placed Pakistan as the 27th least ready’ country in the world to address the impacts of climate change. The increased temperatures, varied precipitation and monsoon patterns, and increased emissions have resulted in increased frequency of extreme weather events (floods, tropical cyclones, droughts, landslides, Glacial Lake Outburst Floods (GLOFs)); consequently impacting livelihood and food security. In addition, Pakistan’s air quality has been significantly worsening accounting for PKR 62-65 Billion losses annually. Government of Pakistan (GoP) has lately taken multiple actions to respond to air pollution and climate change in an integrated manner and plans to continue the efforts through focused interventions.

## Paris Agreement and Pakistan’s Contribution

Pakistan ratified the Paris Agreement in 2016 and as an obligation under Article 4 of the Paris Agreement’s Nationally Determined Contribution (NDC) update process, the Ministry of Climate Change, Government of Pakistan (MoCC) submitted Pakistan’s updated NDCs in 2021. Aimed at achieving reduced poverty and ensuring stable economy, the updated NDCs commit to abate overall 50% of Pakistan’s projected GHG emissions by 2030. The enhanced commitment will be contributed by the shift to 60% renewable energy for electricity generation, and 30% to electric vehicles by 2030 and complete ban on the use of imported coal. The success of restoring the forest cover and conservation efforts was corroborated when the latest GHG inventory of 2018 reported an 8.7% decline in projected GHG emissions for the year 2018 (sequestration of 8.4 Mt CO2e). Encouraged by these analytics, Pakistan commits to enhance its reliance on Nature-based Solutions (NbS) underpinned by the fact that Ten Billion Tree Tsunami program (TBTTP) will alone sequester 148.76 MtCO2e if fully implemented.

To achieve these set commitments, it is estimated that transition to renewable energy will cost Pakistan US$ 101 billion by 2030 plus additional US$ 65 billion by 2040 given costs involved in completing in-progress renewable energy projects, building additional hydropower (US$50 Billion by 2030 and US$80 Billion by 2040) and transmission lines (US$ 20 billion), and phasing out coal (US$ 18 billon to buy out Pakistan’s coal power plants and US$ 13 billion to replace the energy production capacity of coal power plants with solar). Pakistan’s adaptation cost ranges of between US$ 7–14 billion per annum to 2050. Financing these initiatives is considered a challenge in NDCs and Pakistan in the NDCs commits to employing the instruments on enhanced ambition provided in Article 6 of the Paris Agreement, public-private partnerships and international climate finance opportunities including Green Climate Fund (GCF), Global Environment Fund (GEF) etc.

# NDC Implementation

## Strategic objectives

It illustrates a pathway for implementing outlined activities and articulates aspects of the enabling environment that may need strengthening to reach the targets set out in the updated NDC. To achieve this goal, following **objectives** are pursued:

* Strengthening enabling environment (e.g., policies, regulations, institutional arrangements) to overcome articulated challenges and barriers to implementing activities committed
* Identify possible sources of funding and Monitoring Reporting and Verification (MRV) for the implementation of the NDC in all economic sectors, with a view to develop a financial investment plan
* Increasing awareness among stakeholders[[3]](#footnote-3) about what is required to achieve the NDC targets by seeking technical expertise, increasing buy-in for action in new areas and building knowledge capital in key institutions

### Provincial Chapters

The 18th amendment to Pakistan’s constitution in 2010 has led to delegating more power to provinces. MoCC being the national entity, is responsible for formulating the national policies and provinces are responsible to adopt these policies into their planning and operations in different economic sectors. Since climate change is a cross sectoral subject and in some cases provincial and local capacities are limited on climate change concepts, MoCC understands the need for provinces to adopt NDCs in to a form of a roadmap with monitoring and evaluation mechanism. This activity is a subsequent action to “Priority actions, Implementation schedule and Costs” which will essentially provide a good evidence on what actions to prioritize in what sectors based on the costs and logistics and when to implement. The **provincial roadmap formulation** will follow following proposed steps:

* *Taking stock of the NDC sectors at sub-national level which will essentially cover the understanding of what targets are being committed in NDCs and how provincial level policy instruments and actions will be implemented. This will also require identification of gaps for regular stock-taking to report back to UNFCCC.*
* *Assessing the human and information capacities required for NDC implementation for prioritized actions in priority sectors which will help devise a plan to build capacity in both short and long terms.*
* *Assessing the policy instruments and institutional readiness for implementing the NDC which will cover analysis of different mitigation and adaptation policy instruments and deciding most suitable approach to attain desired NDC outcomes. This will also require an overhaul of existing practices in terms of policies as well as roles and responsibilities among different economic sectors based on addressing bottle-necks to NDC implementation.*
* *Assessing the regulatory framework to review regulatory frameworks to ensure that these can help drive NDC implementation and bring about the agreed policy objectives*
* *Mapping the financial support which will then inform national climate finance framework*
* *Monitoring progress and reporting back to MoCC on decided set of indicators consistent and captured within the national inventory, BTR reporting, and feed into the Paris Agreement’s global stocktake*

The proposed steps will require extensive stakeholder consultations to ensure larger political buy-in and ownership among various actors involved in successful implementation of the roadmap. Through literature and data collected during NDC update process, following impacts are recognized in provinces:

**Gilgit Baltistan and Azad Jammu and Kashmir**: Just like KPK, GB and AJK are responsible for the supply of electricity for the entire country from its hydro-power stations. The regions are responsible for the operation and maintenance of these infrastructures and require additional resources to convert these to climate resilient infrastructure. In addition, region is also prone to GLOFs, flash floods, avalanches, heatwaves etc.

Provinces will undergo the stages highlighted under **provincial roadmap formulation** to prioritize areas of intervention for short, medium and long-term. Based on these prioritization, MoCC will be coordinating with provinces and will regularly monitor and evaluate their progress. The quarterly progress reports submitted by provinces will also be a way for provinces to communicate their needs like finances, technical assistance etc. to MoCC to make necessary arrangements. These financial needs will then inform financial framework covered in next section.

Based on the national and sub-national situation analysis, following actions with responsibilities and targets were committed in updated NDCs:

**Table-1: Overarching Mitigation Objectives & Supporting Initiatives**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Objective | Supporting Actions | Lead Organization | Potential Indicators | Goals | Priority by Provinces(H,M,L) |
| Promote climate smart inputs and management practices in agriculture and livestock management  | Improve irrigation practices and water management  | Provincial agriculture department | Reduction in drop per crop |  |  |
| Climate resilient agriculture/agroforestry practices  | Ministry of National Health Services, Regulation & Coordination (MoNHSR&C)/ Provincial Departments | Number of farmers trained on farming techniques |  |  |
| Introduce climate resilient seed varieties  | MoNHSR&C & Provincial Departments of Agriculture (DoAs)/ Provincial Departments | Number of crop varieties developed and piloted. |  |  |
| Promotion, storage and management of green manure | MoNHSR&C & DoAs/ Provincial Departments | Area of land using green manure |  |  |

**Table 2: Supporting Adaptation Actions & Indicators**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Objective | Supporting Actions | Lead Organization | Indicators | Priority by Provinces (H,M,L) |
| Agriculture |  |
| Promote climate smart inputs and management practices in agriculture  | Development of crop varieties and livestock breeds resistant to heat and water stresses | National Agricultural Research Centre (NARC), DoAs/ Provincial department | Number of crop varieties developed, piloted and approved |  |
| Develop sustainable soil fertility improvement practices | DoAs/ Provincial department | Area of land with sustainable soil fertility improvement practices |  |
| Adopt mechanical and biological control methods to keep pest populations under control and to protect soil fertility and nutrient value agricultural produce | Ministry of National Food Security & Research (MoNFSR), NDMA, PDMA & DoAs\ Provincial department | Area of land with systemic protection from pests |  |

## **Template to be completed by Department**

**Table 1: Mitigation Actions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Objective | Potential Indicators | Priority actions by Provinces(H,M,L) | Immediate Action/ Long term Action  | Activity Cost | Timeframe | Stakeholders/Implementing Organization |
| Promote climate smart inputs and management practices in agriculture and livestock management  | Reduction in drop per crop |  |  |  |  |  |
| Number of farmers trained on farming techniques |  |  |  |  |  |
| Number of crop varieties developed and piloted. |  |  |  |  |  |
| Area of land using green manure |  |  |  |  |  |

**Table 2: Adaptation Actions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Objective | Indicators | Priority by Provinces (H,M,L) | Immediate Action/ Long term Action | Activity Cost | Timeframe | Stakeholders |
| Promote climate smart inputs and management practices in agriculture  | Number of crop varieties developed, piloted and approved |  |  |  |  |  |
| Area of land with sustainable soil fertility improvement practices |  |  |  |  |  |
| Area of land with systemic protection from pests |  |  |  |  |  |
| Identifying rights-based and gender-responsive measuresEnsure that plans, strategies, programs and budgets of government bodies, funding agencies and NGOs promote gender equality and access to resourcesAssessing the differential impacts of actions in the agriculture sector | Trainings and workshops conducted for women farmersNumber of women employed/self-employed Number of women engaged in protected area managementNon timer products prompted in TBTTP and other forestry initiatives |  |  |  |  |  |
| Number of women accessing information |  |  |  |  |  |
| Number of incentive schemes designed for women  |  |  |  |  |  |
| Number of awareness sessions conducted Number of women present at various forums |  |  |  |  |  |
|  | Number of national level forums for better gender integrationNumber of sectoral policies integrating gender |  |  |  |  |  |
|  | Number of indicators for data collection identified |  |  |  |  |  |

# Ministry of Climate Change- Climate Change Implementation Framework

Goal: Streamline the implementation of National Climate Change Policy and Nationally Determined Contribution (Pak-NDC) to ensure that climate change is mainstreamed in the economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate compatible development.

**Objectives:**

The main objectives include:

1. To pursue sustained economic growth by appropriately addressing the challenges of climate change;

2. To integrate climate change policy with other inter-related national policies;

3. To focus on pro-poor gender sensitive adaptation while also promoting mitigation to the extent possible in a cost-effective manner;

4. To build climate-resilient infrastructure;

5. To track impact of climate change on water, food and energy security of the country, and to implement remedial plans to support water, energy and food policies;

6. To minimize the risks arising from the potential increase in frequency and intensity of extreme weather events such as floods, droughts and tropical storms;

7. To develop climate-resilient agriculture and food systems for all agro-ecological zones in the country;

8. To promote country’s transition to cleaner, lower emission and less carbon intensive development;

9. To accelerate the policy coherence and integration to achieve the United Nations’ Sustainable Development Goals (SDGs) in the light of its Sustainable Development Report 2020 (SDR2020) and our Nationally Determined Contributions;

10. To strengthen inter-ministerial and inter-provincial decision making and coordination mechanisms on climate change;

11. To facilitate effective use of the opportunities, particularly financial, available both nationally and internationally;

12. To foster the development of appropriate economic incentives to encourage public and private sector investment in adaptation and mitigation measures;

13. To enhance the awareness, skill and institutional capacity of relevant stakeholders;

14. To promote tree plantation, conservation of natural resources, nature-based solutions and long- term sustainability

15. Improve NDC planning, policy, strategy, and legislation

16. Strengthen an enabling environment for NDC implementation

17. Accelerate the policy coherence and integration to achieve the United Nations’ Sustainable Development Goals (SDGs) in the light of its Sustainable Development Report 2020 (SDR2020)

18. Enhance NDC measurement, reporting and verification, and transparency of climate action.

# Implementation targets and priority objectives

The implementation framework presents the targets and objectives of NCCP and NDC divided under three broad categories of adaptation, mitigation and cross-cutting issues. The framework is informed by the NCCP and NDCs where the localized actions to achieve these objectives and reporting mechanisms will be decided by provinces.

**Sectors:**

1. **Adaptation**
* **Water Resources**
* **Agriculture and Livestock**
* **Human Health**
* **Forestry**
* **Biodiversity**
* **Other Vulnerable Ecosystems**
* **Disaster Preparedness**
1. **Socio Economic Measures**
* **Gender**
* **Youth**
1. **Mitigation**
* **Energy Generation**
* **Energy Efficiency and Energy Conservation**
* **Transport**
* **Urban Planning and waste management**
* **Industries**
* **Agriculture and livestock**
* **Caron Sequestration and forestry**

## **Template to be completed by Department**

|  |
| --- |
| **Legend** |
| Pak-NDC 2021 Stop |
| NCCP 2021Stop |
| Immediate In 2 years |
| **Medium-term** In 5 years |
| Long-term In 10 years |

| **Sectors** | **Objectives****(NCCP and NDCs 2021)** | **Stakeholders** | **Activities*****(Options for the provinces to select from or they can add more relevant activities )*** | **Indicators** | **Timeline** | **Tentative Cost** |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Immediate** | **Medium-term** | **Long-term** | **Implementation** | **Performance tracking**  | **Reporting** |  |  |  |  |
| **Adaptation** |  |  |  | **IMMEDIATE, MEDIUM-TERM AND LONG-TERM** |  |  |  |
| **Agriculture and Livestock** | Enhance the research capacity and promote targeted research on assessment of climate change impacts; identify ideal cropping patterns for each region and for the adoption of sustainable land management practices Stop | Ensure an enabling financial environment for farmers to invest in and adopt the relevant technologies to overcome climate related stresses Stop |  |  |  | **Immediate:*** Develop reliable high-resolution local level climate change scenarios.
* Develop adaptation measures well suited for each agro-ecological zone and for all agricultural production systems based on above scenarios.
* Establish close coordination mechanisms among concerned agricultural organizations and meteorological departments at district level for benefiting from reliable weather and climate predictions.
* Set-up climate change adaptation and mitigation cells in the departments of agriculture, livestock and EPA of the AJK.
* Establish close collaboration between academic and research organizations/ institutions in Balochistan particularly dealing in agricultural areas.
* Remote Sensing Methods/Models Used for Mapping Cropping Patterns (Remote Sensing-Based Classification Methods for Mapping Cropping Patterns).

**Medium-term:*** Develop and introduce research based drought resistance crop varieties.
* Optimal Cropping Pattern Modifications through innovative research.
* A project consisting of research and technology-oriented land-based approach, using projected climatic data.

**Long-term:*** Enhance the existing financial services for the farming community to cater to the technological innovation needed due to impending climate change related droughts.
* Make innovative technologies in agricultural irrigation readily available in the country and also financially viable.
* Establish institutions that provide information to the farmers regarding finances available for technologies, equipment and new crops that will be needed in their regions due to climate change conditions.
* Establish a special financial grant mechanism for the farmer's community in Balochistan.
* PTV may consider launching an “Agricultural TV channel” to transfer information and agriculture technology to farmers.
 |  |  |  |
| Promote climate smart inputs and management practices in agriculture Stop |  |  |  |  | **Immediate:*** Cultivation of perennials, increasing tree and shrub cover on smallholder farms, practicing conservation agriculture, ensuring better management of manure and the installation of renewable sources of energy such as biogas and solar devices.
* Genetically modified crops that are more carbon responsive to enhance productivity under increased GHGs conditions.
* Develop new and hybrid climate change resistant crops that could survive both changes in temperature and precipitation, and still be high yielding, resistant to heat stress, drought tolerant, less vulnerable to heavy spells of rains, and less prone to insect-pests.

**Medium-term**:* Undertake capacity development of concerned provincial institutions for introduction of carbon responses plants and crops.
* Strengthen and undertake research in KPK through Agriculture University Peshawar, agriculture & environmental research institutions of KPK.

**Long-term:*** Climate Smart Agriculture ([Irrigated Agriculture Productivity Improvement Program Pilot and Project](https://projects.worldbank.org/en/projects-operations/project-detail/P125999)).
 |  |  |  |
|  | Promote through financial incentives, solar water desalination for irrigation particularly in saline groundwater regions Stop |  |  |  |  | **Immediate**:* Establishing Climate Change units in agriculture research organizations to devise adaptive strategies for projected impacts of climate change on agriculture.
* Streamline information flows through agriculture extension services for climatic conditions and related cropping to farmers.
* Undertake awareness campaign among all stakeholders to give due importance to climate change’s impact on agriculture.
* Involve farmers in policy formulation and strategic dialogues.
* Conduct review and harmonize existing legislations, policies and plans in the agriculture sector to include climate change adaptation and mitigation measures.
* Local agricultural research committees involve producers directly in adaptive research.
* Establish community organizations at village/ town levels to ensure imparting them scientific knowledge.
* Arrange awareness material, campaigns and exposure workshops in all provinces particularly in Balochistan for Information dissemination to farmers about climate change threats.
* Undertake awareness raising and capacity building of farmer’s communities to understand the natural phenomenon of climate change.

**Medium-term**:Shared-risk Agricultural Financing Incentive Mechanism Support Project (“farmer friendly” financial incentives).* Climate-Finance to farmers for the incorporation of Solar Water Desalination Plants in Balochistan.
* Conversion of existing and new tube wells and farming equipment to energy efficient and renewable power.
 |  |  |  |
| Develop a proper risk management system including crop insurance to safeguard against crop failures due to extreme events Stop | Promote water-efficient and energy-efficient crop productivity per unit of land Stop |  |  |  |  | **Immediate**:* Setup agricultural production surveillance systems in various arid, semi arid and other vulnerable areas to categorize them according to their vulnerability to extreme climate change events.
* Involve corporate sector, comprising public and private insurance firms to build an agricultural production insurance system for the agriculture sector of Pakistan, particularly focused on climate change related crop failures.
* Involve the farming community to manage the local risk identification process and the safeguard methods.

**Medium-term**:* Develop and introduce research based drought resistance crop varieties.
* Training of farmer communities to promote water conservation techniques in drought prone areas.
* Promote contour farming in mountain areas.
* Set-up pilot project for demonstration and introduction of high yielding crop varieties in Balochistan.
* Set-up a programme for reclamation of denuded agriculture land.
* Set-up pilot project for demonstration of water conservation techniques to the farmers of Balochistan.
* Promote sustainable management of Irrigation water and rehabilitation of field water-courses through community participation.
* Rehabilitation of salinity drainage infrastructure to reduce water logging and salinity etc.
* Discourage traditional flood irrigation practices.
* Develop and provide quality seeds and planting material to farmers in GilgitBaltistan.
* Index insurance mechanisms make possible the layering of risk, and facilitate the transfer of risks through market instruments.
* Controlled Environment Agriculture - CEA (systems-level opportunities to increase the sustainability of agriculture by providing resource-efficient farming systems with respect to water and nutrient use).
* Farm Energy Efficiency practices for Field Production (Invest in low-energy water management, Replace diesel pumps with solar pumps for irrigation).
 |  |  |  |
| Agriculture drought management Stop | Establish livestock disease monitoring and surveillance systems at district level Stop |  |  |  |  | **Immediate**:* Identify the drought vulnerable agricultural areas.
* Develop and introduce drought resistant crops.
* Develop localized plans for water storage and rain water harvesting for drought management.
* Involve the farming community to manage the recurring drought due to climatic variations.
* Involve line departments to transfer innovative technologies for agricultural drought management to the vulnerable areas on pilot basis.
* Provide incentives for reuse of domestic and sewage water for kitchen gardening.
* Initiate a programme of land leveling and preparation of land sites for agriculture purposes in Balochistan.
* Drought stress management (watershed management, in situ water conservation, and integrated farming systems that include resilient crops, contingent crop plans, characterization of agroecosystem, stress mitigation options, and genetic modification of crops for drought tolerance).

**Medium-term**:* Improve veterinary facilities at grass root level to prepare for any livestock epidemics.
* Establish agriculture, livestock and poultry research institute in AJ&K.
* Develop capacity to use “Embryo Transfer Technology” to enhance livestock reproduction.
* Epidemiology and National Surveillance System at national and regional level.
* Project on Animal Disease Monitoring and Surveillance (Training Program on Research Methodology, Epidemiology And Biostatistics).
* Develop and introduce disease resistant fish species and promote public-private partnership for development of new fish farms in Gilgit-Baltistan.
 |  |  |  |
| **Mitigation**  |  |  |  |  |  |  |  |
| **Agriculture And Livestock** | Promote wide-scale adaptation of better management practices for agriculture and livestock Stop Stop |  |  |  |  | **Immediate**:* A project consisting of techniques related to mitigation of carbon intensive agriculture and livestock rearing is required to be formulated.
* Enhance infrastructure to absorb biotechnology and genetic engineering for both crops and livestock to improve varieties and breeds, making them drought resistant.
* Promote production of bio-gas from the livestock waste for meeting domestic and commercial gas requirements

**Medium-term**:* Genetically modified crops that are more carbon responsive to enhance productivity under increased GHGs conditions.
* Develop capacities of the Bureau of Statistics, PARC, PMD and other database institutions to compile information on crop, soil and climate related parameters for different aspects of agricultural production systems in all agro-ecological zones.
 |  |  |  |
| Explore methods to reduce nitrous oxide and methane emission Stop |  |  |  |  | **Immediate**:* Establish Biotechnology Labs in livestock and crop sectors.
* Develop and promote best management practices for methane and nitrogen management in the agriculture and livestock sector.
* Promote optimum use of chemical fertilizer and pesticides for achieving mitigation goals.
* Arrange pest management training programmes for farmers.
* Develop best practices of tillage and soil management that improve soil carbon storage.
* Promote use of green manure in agriculture.
* Mitigation of methane and nitrous oxide emissions from animal operations (grazing management, manure management, biofiltration, aeration during manure storage, changing dietary strategies).
* Set-up system to control the illegal import of pesticides and for applying quarantine measures at dry/ sea ports particularly in Balochistan.
* Improve energy use efficiency in the agriculture sector to reduce carbon emissions.

**Medium-term**:* Undertake extensive review of existing research about mitigation options in the agricultural sector to assess the value of investment in these programs.
* Undertake detailed study to assess the possible threat of cultivation of biofuel crops on a country's food security.
* Initiate cultivation of biofuel crops on limited pilot scale to assess its viability.
* Develop and introduce appropriate feedstock mixes and additives to reduce methane production from enteric fermentation/ digestion in cattle.
 |  |  |  |
| Manage water in rice paddies to control releases of methane Stop | Develop and adopt new breeds of cattle which are more productive in terms of milk and meat, and have lower methane production from enteric fermentation Stop |  |  |  |  | **Immediate**:* Measurement techniques of methane emission from paddy fields (Closed chamber method, Eddy covariance method using an open-path gas analyzer).
* Develop and introduce improved water management in rice paddy to control release of methane from agriculture soils.
* Introduce low water dependent rice varieties.
* Be a part of Global Alliance for Climate Smart Agriculture.

**Medium-term**:* Develop livestock research capabilities of research institutions and universities based on projected changes in climatic conditions.
* Develop improved livestock breeds suitable for mountainous areas of Giligit-Baltistan, KPK and provide incentives to local communities for its adaptation.
* Initiate research on local livestock species-breed improvements especially of sheep, and introduction of new foreign breeds either should be discouraged or linked to stringent tests and trials.
* Develop efficient biogas and manure digester for methane reduction and energy production.
* Develop and introduce appropriate feedstock mixes and additives to reduce methane production from enteric fermentation/ digestion in cattle.
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1. GermanWatch Climate Risk Index 2021 Available at: https://germanwatch.org/en/19777 [↑](#footnote-ref-1)
2. ND-Gain Index Available at: https://gain-new.crc.nd.edu/country/pakistan [↑](#footnote-ref-2)
3. Public, private, donors/investors, academia, development banks, etc. [↑](#footnote-ref-3)