***Forest 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 conservation and sustainable management of area under cover | Mass afforestation through the involvement of government agencies, provinces, local governments and non-state actors  | MoCC and provincial forest department | Area afforested or number of new plants planted | 1 million ha afforested |  |
| Conservation and management of existing forests by controlling deforestation, protecting forest reserves, and controlling other anthropogenic disturbances  | Same as above/ Provincial Departments | Increase in forest cover |  |  |
| Conservation and restoration of mangroves, peatland ecosystems, and coastal & marine ecosystems to reduce emissions and revive natural carbon sink | Provincial forest department | Increase in restored area as carbon sink |  |  |
| Maintaining forest inventories and increasing capacity for monitoring and modeling carbon changes | MoCC, GCISC and provincial forest department | Annual forest inventory reports  |  |  |
| Encouraging private investments in farm forestry  | MoCC and provincial forest department | Number of private investments |  |  |
| Develop a comprehensive management system for protected areas including coastal wetlands | MoCC/ Provincial Departments | Number of management plans generated  |  |  |
| Establishment of a transboundary ecological corridor  | MoCC/ Provincial Departments | Number of ecological corridors established |  |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Objective | Supporting Actions | Lead Organization | Indicators | Priority by Provinces (H,M,L) |
| To build resilience through nature-based solutions and protection of ecosystems and biodiversity. | Wildlife corridors for preservation and protection of wildlife species. Also, Develop community-focused management plans for protected areas | MoCC/ Provincial department | Number of wildlife corridors established |  |
| Adoption of good practices of natural grassland management in livestock production | Provincial livestock departments | Area of land protected with sustainable grassland management practices |  |
| Management of notified areas in collaboration with local communities under the Protected Areas Initiative | MoCC/ Provincial department | Area of land restores/conserved under Protected Areas Initiative |  |
| Prioritize the consideration of “blue” nature-based solutions (NbS). | MoCC/ Provincial department | Number of ‘blue’ nature-based solutions piloted. |  |
| Increase coastal areas under protection, notably through the creation of new marine protected areas and the demarcation of extensive no-take zones | MoCC/ Provincial department | Length of coastal areas protected |  |

## **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 conservation and sustainable management of area under cover | Area afforested or number of new plants planted |  |  |  |  |  |
| Increase in forest cover |  |  |  |  |  |
| Increase in restored area as carbon sink |  |  |  |  |  |
| Annual forest inventory reports  |  |  |  |  |  |
| Number of private investments |  |  |  |  |  |
| Number of management plans generated  |  |  |  |  |  |
| Number of ecological corridors established |  |  |  |  |  |

**Table 2: Adaptation Actions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Objective | Indicators | Priority by Provinces (H,M,L) | Immediate Action/ Long term Action | Activity Cost | Timeframe | Stakeholders |
| To build resilience through nature-based solutions and protection of ecosystems and biodiversity. | Number of wildlife corridors established |  |  |  |  |  |
| Area of land protected with sustainable grassland management practices |  |  |  |  |  |
| Area of land restores/conserved under Protected Areas Initiative |  |  |  |  |  |
| Number of ‘blue’ nature-based solutions piloted. |  |  |  |  |  |
| Length of coastal areas protected |  |  |  |  |  |
| 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** |  |  |  |
| **Forestry** | Awareness campaigns on benefits of forest ecosystems Stop | empirical research on adaptationof forests, biodiversity and forest management systems to climate change Stop |  |  |  |  | **Immediate:*** Develop joint programs in partnership with civil society to show up the role of forests particularly among the forest dependent communities and students in tackling climate change.
* Launch nationwide campaign for sensitization of the general public via print and electronic media to highlight the importance of forest ecosystem and biological diversity.
* Establish ‘Communication’ wings in the relevant ministries at national, provincial and local levels.
* Enhance dissemination of appropriate information on forestry and climate change in Pakistan through the proposed ‘Information Communication’ wings.
* Develop curricula on forest ecosystem, biodiversity (GREEN BOOK) and their relevance to climate change and introduce them at all levels of schooling (Eco-clubs).
* Regularly monitor the public awareness of forestry’s role in helping combat climate change through public opinion’s surveys.
* Develop and promote ‘Forest and Climate’ expert groups at national and provincial levels to deliver newer ideas and information to public, forest communities and professional foresters based on latest research in forestry and climate change
* Arrange workshops and seminars for forest professionals and managers to widen up their professional horizons on green issues related to climate change.
* Organize capacity building and educational opportunities for forest professionals on interconnectedness of forestry and climate change.
* Promote forestry’s role in tackling climate change through engagement with appropriate government, sectoral and cross-sectoral forums.
* Sensitize politicians and provide advice to Parliamentarians (ministers, senators, members of national and provincial assemblies) and other key government personnel on forestry-related aspects of the National Climate Change Policy.

**Pakistan’s Habitat Strategic Plan (2018-2022)- Urban Agenda*** Generation of sustainably minded, environmentally conscious people through communities like religious leaders, existing CBOs, etc. Workers engagement at grass-root level.
* Establishment of the Young Reporters for the Environment (YRE) group
* Emergence of multinational corporations and insurance funds investing in forestry research.
* A project designed and enforced against the timber mafia, besides illegal trade of indigenous flora, plants of medicinal values, and vulnerable species in Pakistan.
* Universities, NGOs, and non-profit research institutions explore the horizons of empirical research in the forestry sector.

**Medium term:*** Initiate immediate collaboration with national and international research institutions (such as CIFOR1, IIASA2 and other renown international research bodies); and organize research projects on species vulnerable to climate change in all natural forests located in various ecological zones of Pakistan.
* Undertake ‘forest ecosystem’ based research and map out ecosystems of high and low resilience to climate change.
* Commence research on species and climate change interactions in the most vulnerable forest types.
* Organize research projects on response of various forest types to increased temperature and drought spells.
* Undertake research on forest pathology and entomology in the vulnerable forest types/ areas to control insect and disease outbreaks.
* Initiate studies on forest management systems to explore new tools and adaptation options for managing forest areas in wake of climate change.
 |  |  |  |
| Initiate pilot projects on adaptation efforts Stop | Improve forest governance to safeguard the interests of vulnerable forest dependent communities Stop |  |  |  |  | **Immediate**:* Designate national and provincial focal institutions for steering, coordination and implementation of the REDD plus mechanisms and CDM processes.
* Develop strategy for establishing regulatory, governance and law enforcement framework for REDD mechanisms in consultation with all stakeholders including communities depending on forests for their livelihoods.
* Establish linkages with national and international entities, (especially the UNREDD program, World Bank’s Forest Carbon Partnership Fund- FCPF, Forest Investment Program- FIP; Australia’s International Forest Carbon Initiative; and Norway’s International Climate and Forest Initiative) for technical and financial assistance to initiate programs and pilot projects on CDM and REDD plus in various phases.
* Make institutional and legislative arrangements to clearly define the rights on carbon stored in the forests.
* Organize training workshops and seminars for forest professionals and forest dependent communities on “Free, Prior and Informed Consent” (FPIC) taking on board all the relevant stakeholders to avoid future conflicts and disagreements.
* Develop and enhance national capacity for assessing existing forest carbon stocks, monitoring and accounting capacity in accordance with the globally accepted Monitoring, Reporting and Verification (MRV) system for REDD plus projects.
* Build capacities of provincial forest department personnel in ‘Reduced Impact Logging’ (RIL) to minimize damages to forest trees and soil thus so as to save the future carbon stocks.
* Organize training events to enhance national capacity on taking a lead role in the negotiation processes under UNFCCC to include incentives for REDD plus in the post-2012 legally binding climate change agreement in the national interest.
* Provide training to professional foresters and staff of provincial forest departments on developing documentation for CDM and REDD plus projects.
* Develop and disseminate manuals and guidelines for target audience including forest dependent communities and civil society on REDD plus and CDM projects.
* Integrate climate change as a compulsory part of the forestry education system with particular emphasis on understanding the concepts of REDD plus and CDM mechanisms.
* Climate-ADAPT (Climate knowledge platforms for decision-making about adaptation action).
* Green Urban Infrastructure Strategy (regeneration of degraded areas through eco-design techniques, the enhancement of urban biodiversity).
* Granting secure tenure to existing productive farmland within the forest.
* Shared benefits in forest harvesting.

**Medium-term:*** Develop and put into practice appropriate forest legislation, regulation and incentives to promote sustainable management of forests.
* Seek policy advice from experts and international bodies (such as FAO) through institutional and technical capacity building.
* Facilitate dissemination of best practices and exchange of experiences particularly with the forest communities and civil society organizations through networking, workshops, seminars, exposure visits.
* Capacity building of the relevant institutions for preparedness to address emergency situations in forests caused by natural disasters or adverse effects of human activities, e.g. forest fires, pathogens and storms.
* Initiate specific projects and programs to promote sustainable use of non timber forest produce (NTFP) with greater participation of the local communities with particular focus on livelihood improvement.
* Integrate land use planning and community participation in managing forest lands.
* Recognize the role of indigenous knowledge and give it due consideration while managing forest and other natural resources with participation of the local communities.
* Institutional strengthening and re-organization of provincial forest departments to form manageable forest management units (Climate Resilient Urban Human Settlement Units).
* Organize refresher courses for lower staff of the forest departments to pace with the recent developments.
* Take appropriate measures to stop encroachment of the forest areas in the country.
* Minimize revenue generation focus from the existing forests and put more focus on ecological values.
* Define jurisdiction for shamlat and guzara forests and manage them involving the local communities to restore the depleted forest fragments.
* Put emphasis on ‘self sustenance’ use of forest resources for the local communities.
* Ensure in time ‘sanctioned water’ availability to the irrigated plantation.
* Provide economic incentives for forest guards, foresters and RFOs.
 |  |  |  |
| Pursue afforestation and reforestation programs Stop | Ensure implementation of UNFCCC’s decisions on REDD+ to obtain result based payments against carbon sequestration potential Stop |  |  |  |  | **Immediate**:* Identify land use, land-use change and forestry activities in particular those that are linked to the drivers of deforestation and forest degradation.
* Pursue massive afforestation and reforestation programs for enhancing the country’s forest cover and establishing forest areas as effective carbon sinks.
* Launch ‘Reduced Impact Logging’ (RIL) techniques in commercial forests to minimize damages during forest operations to save the future carbon stocks and avoid soil disturbance and erosion risks.
* Develop forest cover assessment at district level through GIS/ RS in decision making and forest carbon accounting system to assess changes in carbon stocks in forest areas.
* Develop effective mechanisms to avoid illicit cutting of forests and strictly enforce such measures in all forest types of Pakistan.
* Design and disseminate project to prevent environmental stresses such as scarcity of natural resources, climatic extremes, inequitable access to natural resources, and environmental migrations, energy and water crises, besides unjust distribution of natural resources.
* Intensively encourage farm forestry and agroforestry practices through plantation of multipurpose and fast growing tree species to meet the demands of local population for fuel, timer and fodder for cattle.
* Initiate projects and programs to provide alternative fuel and livelihood options for forest dependent communities to compensate for avoiding deforestation (e.g. improved livelihoods through conservation and sustainable use of NTFPs, providing fuel efficient stoves and provision micro hydro energy etc).
* Afforestation of coastal protection forest in combination with short-term livelihoods development.

**Medium-term:*** Develop and maintain an appropriate climate change and forestry monitoring framework for the forestry sector.
* Verify the proposed MRV system after certain intervals of time if the emission reductions, as part of the REDD process, are progressing.
* Publish annual progress reports and make them publicly available.
 |  |  |  |
| Explore the use of new planning and decision-making support tools to deal with uncertainty and risk in long-term forest planning Stop | Promote the sustainable management of forests according to national and international norms and with water and soil management strategies StopStop |  |  |  | Immediate:Include forest pathology, entomology, water management, watershed management, flood risk management, soil conservation and other interrelated disciplines as integrated part of forestry research programs depending on the research objective(s).* Develop an appropriate ‘Risk Management Framework’ and include the research findings into it and good practice guidance.

Application of real options theory to forestry investment analysis (model uncertainty and managerial flexibility).* Induction of robust portfolio method (inclusion of different sources of uncertainty to generate a set of feasible portfolios).
* Applying information-gap theory (how much uncertainty can be tolerated before our decision would change).
* Uncertainty Features Optimisation in planning models - UFO (Solutions computed with a model involving an explicit uncertainty set are sensitive to errors in the uncertainty characterization).
* Agroforestry with full fledged engagement of farmers.
* Terrace farming in hilly areas of Pakistan.

**Medium-term and long-term:*** Develop and implement criteria and indicators to clearly define SFM; prepare manuals and guidelines to monitor progress towards it.
* Set up pilot projects, with participation of the forest dependent communities, to demonstrate and compile best practices of SFM in all forest types of Pakistan.
* Bring all forest areas, either state owned or community owned, under a certain management regime based on the principles of SFM.
 |  |  |  |
| Pilot Natural Capital Accounts NCA for protected ecosystems Stop |  |  |  |  | **Immediate:*** Integrated Valuation of Ecosystem Services and Tradeoffs project through NCA.

**Medium-term:*** A five-year Global Strategy for advancing the testing and research agenda of the System of Environmental-Economic Accounting.
* Wealth Accounting and Valuation of Ecosystem Services (WAVES) program.

**Long-term:*** Be a part in the project “Natural Capital Accounting and Valuation of Ecosystem Services”-NCAVES (aim to advance both the knowledge agenda and the development of policy-applications of ecosystem accounting).
 |  |  |  |
| Reducing Forest Fires, Disease Outbreaks and Other Damage Stop |  |  |  | **Immediate:*** Upgrading buildings and defensible space around the forests

**Medium-term:*** National Forest Health Monitoring Program (designed to determine the status, changes, and trends in indicators of forest condition on an annual basis).

**Long-term:*** The Forest Resiliency Burning Pilot Project (Pilot partners engaged in a statewide and targeted local outreach campaign during prescribed burn windows).
* Structured Approaches for Forest Fire Emergencies in Resilient Societies - SAFERS (forest fire Decision Support System).
 |  |  |  |
| **Biodiversity** | empirical research on flora and fauna in the context of their responses to climatic changes Stop |  |  |  |  |  | **Immediate:*** Enhance capabilities of research institutions and academia to explore and promote sustainable use of natural resources and the associated biological diversity in the country.
* Initiate meaningful applied research on biodiversity conservation in the wake of climate change at national and provincial levels.
* Document and integrate indigenous knowledge into the latest scientific findings/ information for use in conservation planning and activities.
* Commence joint partnerships with international research institutions and make the best use of their collaboration in terms of technical assistance and the use of latest technologies in conservation efforts.
* Extend conservation practices in joint collaboration with the local communities making use of their knowledge from a local perspective.
* Integrate biodiversity conservation practices into all relevant disciples such as forestry, wildlife, marine and agriculture.
* Promote in-situ as well as ex-situ conservation of valuable species for research and other purposes in biodiversity rich regions.
* Empirical Perspectives on Species Borders: From Traditional Biogeography to Global Change (Data collection through satellite imaging)
 |  |  |  |
| Set National Biodiversity Indicators Stop |  |  |  |  |  | **Immediate:*** Appropriate number of indicators, Aggregating Indicators, Assessing progress towards targets, Frameworks for categorizing indicators, Linking biodiversity loss to drivers and pressures, Setting appropriate baselines, Time lags and indicators).
 |  |  |  |
| Ensure the integrity of all ecosystems and the protection of biodiversity in the country to deal with climate change Stop Stop |  |  |  |  | **Immediate:*** Reduce, reuse, and recycle program with clear connections to protection of biodviersities.

**Medium-term:*** A well-designed monitoring program with engagement of land-management agencies.
 |  |  |  |
| Encourage involvement of local communities in conservation and sustainable use of biodiversity Stop |  |  |  |  |  | **Immediate:*** Promote public and political sensitization activities to put biodiversity conservation as one of the top priority agendas.
* Promote knowledge and information sharing among relevant stakeholders preferably among the local communities and sensitize them towards the importance of conserving valuable species of flora and fauna through various programs.
* Local communities develop opportunities through financial incentives.
* Community-based Natural Resource Management (CBNRM) - community engagement in conservation activities.
 |  |  |  |
| Notify protected areas, wildlife corridors and develop ecological management plans Stop Stop |  |  |  |  |  | **Immediate**:* Strengthen institutions and organizations that are involved in various activities (e.g. data collection, information dissemination, and conservation) pertaining to conservation of flora and fauna in Pakistan.
* Identify and classify national priorities to conserve various threatened ecosystems and the associated biodiversity in each province in accordance with the Biodiversity Action Plan for Pakistan.
* Integrating ecological specialists and construction teams in developing ecological management strategy.
* Set up provincial focal points and steering committees in all provinces to draw up Biodiversity Conservation Plans at provincial/ local levels and ensure its practical implementation.
* Involvement of the Project Ecologist and Project Landscape Architect to minimize loss of any valued vegetation and habitat within the Project Footprint.
 |  |  |  |
| Enhance community engagement for conserving biodiversity Stop Stop |  |  |  |  | **Immediate:*** Integrated Conservation and Development Programme (ICDP) Regulating resource use through a self-disciplined way by social norms and regulations.
* Enhance capacities of research institutions, government departments, civil society and local communities to monitor activities pertaining to conservation of biodiversity.
 |  |  |  |
| Biological control of pests (locust) Stop |  |  |  |  | **Immediate:*** Integrate biodiversity conservation practices into all relevant disciples such as forestry, wildlife, marine and agriculture.
* Integrated Pest Management (IPM) action plan.
 |  |  |  |
| **Other Vulnerable Ecosystems** | Carry out detailed studies to identify the most fragile and resilient ecosystems in all ecological zones Stop | Find a technological breakthrough for irrigation systems, to raise vegetative cover in extremely difficult and harsh arid zone areas Stop |  |  |  |  | Immediate:A GIS Approach to Evaluating Ecological Sensitivity in Fragile Ecosystems.Using theoretical ecology, empirical ecology, and applied ecology through university and government based researches.**Medium-term**:* Sprinkler and drip irrigation systems, irrigation with solar distillers , irrigation through porous walls, irrigation with wicks can be some viable options.
* Ongoing canal lining should be completed on priority to reduce irrigation losses.
* Implementing a project focused on human well-being, social protection, political stability, economic development, national security, and regional cooperation in South Asia. The project may be aimed at consolidating the climate change adaptation framework through adaptation of vulnerable ecosystems.
 |  |  |  |
| Prevent accumulation of solid and liquid waste, trash and unwanted biomass. Stop | Fully exploit the potential of ‘Blue Economy’ while preserving the health of marine and coastal ecosystem Stop Stop |  |  |  | **Immediate:*** Develop special engineering projects to build check dams and other barriers to control solid waste, trash, biomass, and soil erosion from reaching plain areas.
* Organize localized programs for removal and disposal of solid waste from the mountain areas.
* Marine cleaning and maintenance strategy/ action plan.
* Ensure separate collection of non-biodegradable solid waste for disposal and recycling.
* Encourage public private partnership for waste-to-fuel enterprise ventures.
* Encourage recycling of all recyclable waste to reduce the demand on natural resources and save landfill space.

**Medium-term:*** Conduct economic valuation of marine ecosystems and coastal biodiversity resources.
* Involve local communities to develop experimentation agricultural plots near the seashore and in coastal areas to see the adaptability of salinity crops to local environment.
* Identify the minimum amount of water inflows required downstream kotri to maintain marine ecosystems.
* Provide required freshwater inflows downstream kotri to maintain coastal marine ecosystems and fish habitats in good health.
* Develop linkage between upstream and downstream ecosystems and their sustainable uses.
 |  |  |  |
| Restrict commercial activities Stop | Diversify livelihood opportunities to stop migrations Stop |  |  |  |  | **Immediate:*** Identify coastal habitats that are most vulnerable to sand and soil erosion.
* Involve agricultural research institutions to identify the vegetation, shrub and trees most suited for the coastal areas.
* Designate plantation areas for vegetation recovery and regeneration in the coastal areas.
* Restoring coastal vegetated areas; mangroves to protect shorelines from storm surges.
* Managing invasive alien species linked to land degradation.

**Medium-term:*** Eco-friendly livelihood options like sericulture, lac culture, fruit culture and mechanized leaf plate making to develop a precise, region-specific livelihood diversification strategy for socioeconomic development of indigenous community.
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| Promote the growth of natural barriers Stop |  |  |  | **Immediate:*** Designate plantation areas for vegetation recovery and regeneration in the coastal areas.
* Initiate campaigns to plant mangroves, coastal palm and other trees suitable for coastal areas to control sand and soil erosion.
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| Livestock and pasture management, and ecosystem maintenance Stop |  |  |  |  | **Immediate:*** Conduct research to identify ‘fragile’ and ‘resilient’ rangelands and pastures in each province.
* Design rotational program for periodic movement of livestock from fragile to resilient rangelands and pastures to restore the fodder quality grass and shrubs according to the local conditions.

**Medium-term:*** Design and implement programs to ensure optimal livestock densities according to the rangelands’ carrying capacities.
* Organize awareness raising and training programs for local shepherds and farmers so as to maintain the ‘rangeland ecosystem’.
* Establish experimental plots of native, hybrid and adapted vegetation species for increased fodder availability and improved rangeland and pasture management.
* Using the approaches of continuous, rotational, and deferred grazing systems.
 |  |  |  |
| Identify vulnerable coastal areas that should be protected from any infrastructure construction or commercial activities and notify the level of activities allowed in these areas Stop Stop |  |  |  |  | **Immediate:*** Identify the Karachi coastal areas and Pasni areas in Balochistan as vulnerable coastal areas.
* Designate plantation areas for vegetation recovery and regeneration in the coastal areas.

**Medium-term:*** Coastal Zone Management Action Plan (mangroves growth, seawalls, sea dikes, offshore breakwaters).
* Salt harvesting by solar evaporation of seawater, installation of desalination plants
 |  |  |  |
|  | Recognize and enhance the role played by wetlands in natural disaster protection and climate change mitigation Stop |  |  |  | **Immediate:*** Establish research bodies to monitor the immediate and lasting climate change impacts on the wetlands in Pakistan.
* Extend the research possibilities to recognize and enhance the roles played by wetlands in natural disaster protection.

**Medium-term:*** Establish a “Center of Excellence” to conduct comprehensive climate change related research on the conservation of wetlands in connection with associated biodiversity, forestry and related disciplines.
* Green infrastructure such as mangroves protect against flooding and serve as buffers against saltwater intrusion and erosion.
* Wetlands regulate, capture and store greenhouse gasses thus ensure control of siltation of wetlands by reducing deforestation and felling of timber in the catchments.

**Long-term:*** Develop wetlands maintenance programs to control siltation and other debris with efficient participation of the local communities.
* Development of Wetland Protection Programs and Laws under Blue Economy and Blue Carbon Paradigms
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| **Mitigation**  |  |  |  |  |  |  |  |
| **Carbon Sequestration and Forestry** | Enhance natural carbon sinks by afforestation, reforestation and protecting natural systems Stop Stop |  |  |  | **Immediate:*** Urban Forest (Miyawaki Forest), Green belts and Roadside Plantations, Reforestation through aerial reseeding.
* Launch ‘Reduced Impact Logging’ (RIL) techniques in commercial forests to minimize damages during forest operations to save the future carbon stocks and avoid soil disturbance and erosion risks.

**Medium-term:*** Spearhead a nationwide project on Global Information Systems (GIS), Remote Sensing (RS), and field surveys, to determine the three-dimensional (3D) information and [spatial characteristics](https://www.sciencedirect.com/topics/engineering/spatial-characteristic) of the buildings and forests in various cities of Pakistan.

**Long-term:*** Establish an urban-scale building carbon sequestration calculation method, and build a carbon sequestration estimation model.
 |  |  |  |
| Quantify carbon stocks in existing forests with specific focus on recovered and protected forests Stop Stop | Establish linkages with regulated and voluntary carbon markets Stop |  |  |  |  | Immediate:Develop forest cover assessment at district level through GIS/ RS in decision making and forest carbon accounting system to assess changes in carbon stocks in forest areas.Multi-source Inventory Methods for Quantifying Carbon Stocks and Stock Changes by engaging the private sector in surveying and measurement.**Medium-term:*** Compliance carbon markets and creating carbon offset units on the voluntary markets.
* Cap and Trade projects at national and regional levels.
 |  |  |  |
| Enforce laws and regulations required for addressing illegal trade in timber and deforestation Stop Stop |  |  |  |  |  | **Immediate:*** Establish criminal and administrative sanctions as per Forest Law.
* National Environment System, including the environmental administrative bureaucracy.

**Medium-term:*** Real-Time System for Detection of Deforestation (DETER)
* Forest Law, Enforcement, Governance and Trade Action Plan (FLEGT) to improve governance in the forestry sector.
 |  |  |  |
| Provide incentives and alternative fuel and livelihood options to forest dependent communities Stop |  |  |  |  | **Immediate:*** Initiate projects and programs to provide alternative fuel and livelihood options for forest dependent communities to compensate for avoiding deforestation (e.g. improved livelihoods through conservation and sustainable use of NTFPs, providing fuel efficient stoves and provision micro hydro energy etc).
* Direct incentives (Free seedlings) and indirect incentives (tenure security, collectivization of land and forest tenure encourage farmers to manage forest resources sustainably).

**Medium-term:*** Grains for Green Project (basic living standards of farmers were guaranteed by government subsidies because some of their cultivated land was converted into protected forest).
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| Develop the legal and institutional framework for improved forest management and investment Stop |  |  |  |  |  | **Immediate:*** Present an analysis of the evolution of the policy system and institutional framework.
* Government, technocrats and private stakeholders should meet to develop a collaborative approach.
* Soft- policy instruments such as certifications.
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| Restore and establish the blue carbon sequestration capacity StopStop |  |  |  |  |  | **Immediate:*** Blue Carbon Ecosystem Restoration (Conceptualization and Development of a carbon restoration project, Seagrass Meadow Restoration, Coastal Wetland Restoration).

**Medium-term:*** Conceptualizing a Blue Carbon Project (Project boundaries, Stratification of sampling area, Carbon pools to be measured, Determine the type, number, size and location of plots, Sampling Frequency for Permanent Plots).
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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)