

<b>Country</b>	<b>Pakistan</b>
<b>Request ID#</b>	<b>2022000024</b>
<b>Title</b>	Development of a Technology Roadmap for the Implementation of Nationally Determined Contributions of Pakistan.
<b>NDE</b>	Dr. Saima Shafique Director, Ministry of Climate Change 4th Floor, Local Government Complex, G-5/2, Islamabad, 44000, Pakistan saimashafique76@hotmail.com
<b>Proponent</b>	Ministry of Climate Change, Pakistan

**Summary of the CTCN technical assistance**

The significance of technology in the implementation of absolutely any policy on climate change is inevitable. The United Nations Framework Convention on Climate Change (UNFCCC) also acknowledges the role of technology in combatting climate change through mitigation and adaptation.

As a signatory to the Paris agreement, Pakistan needs to keep a track of structure and the level of detail of the information provided on technology aspects that can vary significantly. Such details may include qualitative information, while some also include quantitative information, as well as detailed information on the required scope of technologies and their estimated costs. The technology roadmap around NDCs for Pakistan is required to encompass areas such as technology needs; specific technologies to be deployed; technology innovation and research and development; policy, regulatory and legal aspects; and support to be provided to other Parties for technology development and transfer.

This CTCN technical assistance aims to develop a detailed Technology Roadmap for NDC waste and water sectors to enable an effective implementation of underlying priority technologies. This will also play a critical role in providing the right enabling environment for effective incorporation of technology in its NDC implementation and improvement process.

**Agreement:**

*(If possible, please use electronic signatures in Microsoft Word file format)*

**National Designated Entity to the UNFCCC  
Technology Mechanism**

Name: Dr. Saima Shafique

Title: Director

Date: 31-01-2024

Signature: 

**Proponent** (signature of the Proponent is optional)

Name:

Title:

Date:

Signature:

**UNFCCC Climate Technology Centre and Network (CTCN)**

Name: Rajiv Garg

Title: CTCN Director ad interim

Date: 11 April 2024

Signature:



## **1. Background and context**

The significance of technology in the implementation of absolutely any policy on climate change is inevitable. The United Nations Framework Convention on Climate Change (UNFCCC) also acknowledges the role of technology in combatting climate change through mitigation and adaptation. The Technology Needs Assessment (TNA) is yet another intervention designed especially for the developing countries to assess the needs for relevant technologies and technology gaps, to combat climate change as per need of the country. The TNA process has a strong linkage to NDCs, especially when it comes to identifying appropriate technologies, their required enabling framework conditions and preparing implementation plans for their transfer and diffusion.

Developing countries can maximize the potential of their TNAs by further developing them to explicitly analyze what is needed to implement existing NDCs, including by better aligning their focus, scope and updating with the priority sectors included in the NDCs. In addition, extensively analyzing and implementing the Technology Needs Assessment (TNA), can further aid the developing countries in gauging international assistance, through technology transfer.

As a signatory to the Paris agreement, Pakistan needs to keep a track of structure and the level of detail of the information provided on technology aspects that can vary significantly. Such details may include qualitative information, while some also include quantitative information, as well as detailed information on the required scope of technologies and their estimated costs. The technology framework around NDCs for Pakistan is required to encompass areas such as technology needs; specific technologies to be deployed; technology innovation and research and development; policy, regulatory and legal aspects; and support to be provided to other Parties for technology development and transfer. Similarly, it may also include financing, enabling environments, and stakeholder engagement and coordination. The Roadmap under this TA will focus in particular areas related to waste and water, with renewable energy and gender and social inclusion as cross cutting. . The analysis of linkages between policy and implementation in the context of technology and NDCs found that strong linkages are needed for the effective uptake of climate technologies. In addition, fostering linkages between the technology-related aspects of the NDC and the NAP processes can benefit both processes greatly, avoiding duplication of work and accelerating implementation. Hence, for the development of an effective technology framework on NDCs for Pakistan, the country should focus on the technology solutions driven by governments, the private sector and communities, and showcase different approaches to overcoming the technical, financial, institutional and social challenges that arise in taking up technologies. These approaches may include innovative policies and business models, gender-responsive approaches and effective stakeholder engagement techniques and methodologies.

The uptake of technologies under NDCs should include the importance of recognizing the crucial role stakeholders play in technology planning and implementation to ensure that technology solutions are technically, economically, institutionally and socially viable. Creating local champions to showcase the successful uptake of technology solutions can play an important role in securing the economic, institutional and social support needed for scaling up the technology in a country.

## **2. Problem statement**

The development of a Technology Roadmap based on the updated NDC from 2021 is a complex process requiring expert knowledge across waste and water sectors and continuous stakeholder engagement of the public and private sector. Pakistan is especially facing challenges in terms of institutional and financial capacities in order to conduct this process which could jeopardize the effectiveness and unanimous commitment to the Technology Framework and Roadmap.

Pakistan also has a high degree of provincial autonomy for some subject areas and hence implementation is often a provincial subject while planning and target setting is done at a national level. This project will help bridge that gap and ensure effective communication and cooperation in the implementation of NDCs.



<b>Output 2: Technology Roadmap Coordination Mechanism</b>																				
<b>Activity 2.1: Mobilizing of a Coordination Mechanism</b>																				
<p>An efficient coordination mechanism will be activated based on committees involved in the NDC revision process. These reactivated committees will guide the activities of NDC Technology Roadmap development. A high-level Technology Roadmap Committee (TRC) will be set up, which will be chaired by the Ministry of Climate Change. The TRC will receive input from both, a Waste Technology Committee as well as an Water Technology Committee.</p> <p>Cross-cutting concerns related to integrated into the work of the technical committees through in various consultation meetings, review and verification processes as appropriate and required to ensure that the final Technology Roadmap effectively incorporates cross cutting issues.</p> <p>The various committees and working groups will be constituted in alignment with the overall NDC Implementation Plan of Pakistan. An equal representation of women should be guaranteed in the constitution of the committees and working groups.</p> <p>A 2-day kick-off workshop with the presence of all committees and working group members will be held. The purpose of this meeting will be to present the implementation timeline, discuss consultation modalities and collect first-hand information on the waste and water sectors.</p> <p>Stakeholder mapping and analysis will be carried out in Provinces, namely Baluchistan, Khyber Pakhtunkhwa, Punjab and Sindh.</p>																				
<b>Activity 2.2: Regular Technology Roadmap Committee (TRC) meetings</b>																				
<p>At least two (2) meetings with the TRC will be held throughout the implementation of the technical assistance in order to provide updates on project progress and endorse deliverables. This includes the review and endorsement of the Sectoral and technology prioritization reports (Output 3), and the NDC Technology Roadmap (Output 4).</p> <p>Both TRC meetings will be held in person, and costs for travel, DSA, and meeting logistics will be covered. International consultants will join in person.</p>																				



<p>A list of 5 pertinent technologies (4 existing technologies and 1 emerging technology) per sector will be prepared for and validated with the Waste Technology Committee.</p>																		
<p><b>Activity 3.1b: Analysis of water sector and identification of technologies</b></p> <p>An analysis of the water sector - water (incl. WASH) will be conducted in order to identify the status quo, current challenges, barriers and technology needs. For this purpose, desk research of existing documents (NDCs, climate change strategies, sectoral strategies, etc.) complemented with consultation meetings with stakeholders at a national and provincial level (incl. stakeholder workshop under 2.2.) will be conducted. In addition, the survey results of the NDC Implementation Plan will be reviewed. Furthermore, prominent technologies at an international level will be considered in the priority sectors.</p> <p>A list of 5 pertinent technologies (4 existing technologies and 1 emerging technology) per sector will be prepared for and validated with the Water Technology Committee.</p> <p>Technologies will also be prioritized on the basis of benefits for gender, youth and vulnerable communities.</p>																		
<p><b>Activity 3.2a: Assessment of identified waste management technologies</b></p> <p>The 5 identified mitigation technologies in the sector - waste management (incl. circular economy) will be assessed in terms of their market environment and stage of development/deployment, as well as policy, regulatory and legal aspects. This will result in a market assessment per technology, including an analysis of strengths, weaknesses, opportunities, and threats (SWOT).</p> <p>A technical and economic feasibility analysis will be developed to understand the cost economics. Furthermore, a climate impact analysis will be conducted to evaluate the mitigation potential (i.e., reduction of GHG emissions). Lastly, social benefits in terms of mainstreaming of gender, youth and vulnerable communities will be evaluated.</p> <p>In summary, for each sector and each technology identified following would be produced:</p> <ul style="list-style-type: none"> <li>• Market Assessment of the respective technology</li> <li>• SWOT Analysis</li> <li>• Climate Impacts</li> </ul>																		

<ul style="list-style-type: none"> <li>• Cost Economics, including cost curve (illustrating the estimated size and cost of feasible approaches to abatement by 2030 for the sector)</li> </ul>											
<p><b>Activity 3.2b: Assessment of identified water technologies</b></p> <p>The 5 identified adaptation technologies in the sector - water (incl. WASH) will be assessed in terms of their market environment and stage of development/deployment, as well as policy, regulatory and legal aspects. This will result in a market assessment per technology, including an analysis of strengths, weaknesses, opportunities, and threats (SWOT).</p> <p>A technical and economic feasibility analysis will be developed to understand the cost economics. Furthermore, a climate impact analysis will be conducted to evaluate the adaptation potential (i.e., population with increased resilience, economic costs avoided). Lastly, social benefits in terms of mainstreaming of gender, youth and vulnerable communities will be evaluated.</p> <p>In summary, for each sector and each technology identified following would be produced:</p> <ul style="list-style-type: none"> <li>• Market Assessment of the respective technology</li> <li>• SWOT Analysis</li> <li>• Climate Impacts</li> <li>• Cost Economics, including cost curve (illustrating the estimated size and cost of feasible approaches to abatement by 2030 for the sector)</li> </ul>											
<p>Deliverables 3:</p> <table border="1" data-bbox="219 1038 1503 1283"> <thead> <tr> <th>Deliverables</th> <th>Delivery date</th> </tr> </thead> <tbody> <tr> <td>3.1a Analysis of mitigation sectors and technology prioritization report</td> <td>28 February 2023</td> </tr> <tr> <td>3.1b Analysis of adaptation sectors and technology prioritization report</td> <td>28 February 2023</td> </tr> <tr> <td>3.2a Mitigation technology report for 2 sectors (including sector cost curves and detailed assessment for each technology)</td> <td>31 March 2023</td> </tr> <tr> <td>3.2b Adaptation technology report for 2 sectors (including sector cost curves and detailed assessment for each technology)</td> <td>31 March 2023</td> </tr> </tbody> </table>	Deliverables	Delivery date	3.1a Analysis of mitigation sectors and technology prioritization report	28 February 2023	3.1b Analysis of adaptation sectors and technology prioritization report	28 February 2023	3.2a Mitigation technology report for 2 sectors (including sector cost curves and detailed assessment for each technology)	31 March 2023	3.2b Adaptation technology report for 2 sectors (including sector cost curves and detailed assessment for each technology)	31 March 2023	
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The ideas should target GCF or other relevant climate finance institutions aiming towards readiness for full-scale projects to be submitted to suitable financiers.

Given resource and time limitations, the concept notes will not be fully fledged concepts notes that are ready for submission to GCF or similar institution. However, the work on the concept notes should target becoming full proposals as per standard requirements. This might include a project summary, detailed project information, indicative financing/cost information and supporting documents that may include a theory of change, economic and financial models, pre-feasibility studies, evaluation reports from previous projects, and/or results of environmental and social risk screening. Content of the concept notes will be discussed during kick-off to ensure shared expectations on the depth of concept notes.

**Deliverables 5:**

5.1 Two Funding Concept ideas

31 July 2024

**4. Resources required and itemized budget:**

Please provide an *indicative overview* of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 1% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.

Activities and Outputs	Input: Human Resources  (Title, role, estimated number of days)	Input: Travel (Purpose, national vs. international, number of days)	Inputs: Meetings/events (Meeting title, number of participants, number of days)	Input: Equipment/Material (Item, purpose, buy/rent, quantity)	Proposed budget
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<p><b>Output 1:</b>Development of implementation planning and communication documents</p>	<p><i>IE1: 5 days</i> <i>NE1: 5 days</i></p>				<p>12,563</p>
<p>Activity 1.1: Formulation of i) Detailed work plan, ii) Monitoring and evaluation plan, iii) CTCN Impact Description, iv) Closure and Data Collection report.</p>					
<p><b>Output 2:</b> <b>Technology Roadmap Coordination Mechanism</b></p>	<p><i>IE1: 17 days</i> <i>IE2: 9 days</i> <i>IE3: 9 days</i> <i>IE4: 9 days</i> <i>IE5: 9 days</i> <i>NE1: 11 days</i> <i>NE2: 9 days</i></p>				<p>106,396</p>

	<i>NE3: 9 days</i>				
Activity 2.1: Establishing a Coordination Mechanism		<i>International travel for IE1, IE2, IE3 (USD 15000)</i>	<i>Inception workshop of 2 days in person (USD 12000).</i>		<i>27000</i>
Activity 2.2: Regular TRC meetings		<i>International travel for IE1, IE2, IE3 (USD 15000)</i>	<i>1 TRC meeting in person (USD 12000)</i>		<i>27000</i>
Activity 2.3: Regular Waste Technical Committee and Water Technical Committee meetings			<i>2 online workshops (USD 12000)</i>		<i>12000</i>
<b>Output 3: Identification of climate technologies for intervention in the high impact sectors renewable energy, waste management, water,</b>	<i>IE1: 12 days</i>				<i>57,047</i>

<p><b>and agriculture</b></p>	<p><i>IE2: 20 days</i> <i>IE3: 20 days</i> <i>IE4: 20 days</i> <i>IE5: 20 days</i> <i>NE1: 40 days</i> <i>NE2: 12 days</i> <i>NE3: 12 days</i></p>				
<p>Activity 3.1a: Analysis of mitigation sectors and identification of technologies</p>					
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<p>Activity 3.2b: Assessment of identified</p>					

adaptation technologies					
<b>Output 4: Development of a Technology Roadmap for NDC Implementation</b>	<i>IE1: 20 days</i> <i>IE2: 10 days</i> <i>IE3: 10 days</i> <i>IE4: 10 days</i> <i>IE5: 10 days</i> <i>NE1: 20 days</i> <i>NE2: 20 days</i> <i>NE3: 5 days</i>				49,628
Activity 4.1: Development of an NDC Technology Roadmap for identified sectors					
<b>Output 5: Preparation of Financing Support</b>	<i>IE1: 3 days</i> <i>IE2: 5 days</i> <i>IE3: 5 days</i> <i>IE4: 5 days</i> <i>IE5: 5 days</i> <i>NE1: 10 days</i> <i>NE2: 3 days</i> <i>NE3: 3 days</i>				23,340
Activity 5.1: Development of 2 concrete concept ideas, including 2 GCF concept note					

**GGGI Budget proposal for implementation of the Response Plan**

248,974

## 5. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

<b>Experts required</b>	<b>Brief description of required profile</b>
<i>Please use the same titles for all experts as applied in section 4.</i>	<i>Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).</i>
<b>National Consultants</b>	
National Waste Policy and Climate Technology Specialist (NE1)	<ul style="list-style-type: none"> <li>• Bachelor’s degree or higher in engineering, public policy or related fields</li> <li>• At least 7 years of experience with climate policy development across sectors</li> <li>• Excellent understanding of climate smart policy and technologies in the waste sector, the Paris Agreement, Nationally Determined Contributions (NDC) and/or National Adaptation Plans (NAPs) highly desirable</li> <li>• Excellent knowledge of the waste policy environment in Pakistan</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholder</li> <li>• Presence in Islamabad, Pakistan is desired.</li> <li>• Fluency in Urdu and English are mandatory</li> </ul>
National Water Policy and Climate Technology Specialist (NE2)	<ul style="list-style-type: none"> <li>• Bachelor’s degree or higher in engineering, public policy or related fields Technical Assistance Response Plan – Terms of Reference</li> <li>• At least 7 years of experience with climate technology identification and implementation across sectors</li> <li>• Excellent knowledge of the water policy environment in Pakistan</li> <li>• Excellent understanding of climate smart policy and technologies in the water sector, the Paris Agreement, Nationally Determined Contributions (NDC) and/or National Adaptation Plans (NAPs) highly desirable</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Presence in Islamabad, Pakistan is desired.</li> <li>• Fluency in Urdu and English are mandatory.</li> </ul>

National Gender and Youth Specialist (NE3)	<ul style="list-style-type: none"> <li>• Relevant master’s degree in social sciences, gender studies or other relevant disciplines with a focus on the field of gender issues in a developing country context.</li> <li>• At least 5 years of working experience with gender mainstreaming issues in a developing country context.</li> <li>• Demonstrated knowledge and experience of gender mainstreaming in climate change adaptation and mitigation.</li> <li>• Experience in waste, WASH/water sectors an asset.</li> <li>• Presence in Islamabad, Pakistan is desired.</li> <li>• Fluency in Urdu and English are mandatory.</li> </ul>
International Team Lead (IE1)	<ul style="list-style-type: none"> <li>• Master’s degree or higher in technology, engineering, policy or related fields, with specialization in the area of climate change</li> <li>• At least 10 years of experience in a lead role in implementing national and international development projects related to climate technologies and policy</li> <li>• Experience in carrying out or having been directly involved in at least one assignment of similar nature and complexity close to the present assignment</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Experience with developing technology roadmaps • Experience in Asia-Pacific highly desirable</li> </ul>
<b>International Experts</b>	
International Waste Management Expert (IE2)	<ul style="list-style-type: none"> <li>• Master’s degree or higher in waste management, engineering, or related fields</li> <li>• At least 5 years of experience in identifying and implementing low-carbon technologies and solutions in the area of waste management</li> <li>• Experience in carrying out or having been directly involved in at least one assignment of similar nature and complexity close to the present assignment</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Experience in conducting technical and economic feasibility studies for technologies</li> <li>• Experience in Asia-Pacific highly desirable</li> </ul>
WASH/water expert (IE4)	<ul style="list-style-type: none"> <li>• Master’s degree or higher in water management, engineering, or related fields</li> <li>• At least 5 years of experience in identifying and implementing adaptation technologies and solutions in the area of water and WASH</li> <li>• Experience in carrying out or having been directly involved in at least one assignment of similar nature and complexity close to the present assignment</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Experience in conducting technical and economic feasibility studies for technologies</li> <li>• Experience in Asia-Pacific highly desirable</li> </ul>

<p>International Finance and Investment Specialist – available (IE4)</p>	<ul style="list-style-type: none"> <li>• Master’s degree or higher in waste management, engineering, or related fields</li> <li>• At least 5 years of experience in identifying and implementing low-carbon technologies and solutions in the area of waste management</li> <li>• Experience in carrying out or having been directly involved in at least one assignment of similar nature and complexity close to the present assignment</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Experience in conducting technical and economic feasibility studies for technologies</li> <li>• Experience in Asia-Pacific highly desirable</li> </ul>
<p>International Renewable Energy Expert (IE5)</p>	<ul style="list-style-type: none"> <li>• Master’s degree or higher in waste management, engineering, or related fields</li> <li>• At least 5 years of experience in identifying and implementing low-carbon technologies and solutions in the area of waste management</li> <li>• Experience in carrying out or having been directly involved in at least one assignment of similar nature and complexity close to the present assignment</li> <li>• Experience with coordinating and liaising with multiple national and international stakeholders</li> <li>• Experience in conducting technical and economic feasibility studies for technologies</li> <li>• Experience in Asia-Pacific highly desirable</li> </ul>

## 6. Intended contribution to impact over time

The NDC Technology Roadmap that results from this technical assistance will have an impact on a short- and longer-term.

Short-term:

- Enhanced institutional capacity of Ministry of Climate Change and other stakeholders in the deployment and scale-up of technologies to reach NDC mitigation and adaptation objectives
- Alignment of stakeholders around a common technology agenda
- Clear and actionable plan for technology deployment and scale-up

Long-term:

- Enhanced climate change mitigation through mitigation technology deployment and scale-up, leading to GHG emission reduction
- Enhance climate change adaptation through adaptation technology deployment and scale-up, leading to enhanced resilience of population and/or reduction of economic loss due to infrastructure damage
- Market creation and/or growth of existing and new technologies, leading to creation of employment and sustainable economic growth

## 7. Relevance to NDCs and other national priorities

Nationally Determined Contribution (2021) In 2021, Pakistan has submitted its' updated Nationally Determined Contribution which will be used as a key document for this technical assistance. Pakistan mentions the high financial needs requiring more international climate finance and investments from the private sector in order to achieve NDC targets. Pakistan also mentions the need of detailed and effective implementation frameworks for NDC implementation.

<https://policy.asiapacificenergy.org/sites/default/files/Pakistan%27s%20Updated%20Nationally%20Determined%20Contribution%202021.pdf>

Technology Needs Assessments, Technology Action Plans (2016/17) In 2016/17, Pakistan has conducted Technology Needs Assessments and developed Technology Action Plans for mitigation and adaptation sectors, on the basis of the first NDCs submitted to the UNFCCC in 2016 as well as other documents and through a consultative process.

<https://tech-action.unepdtu.org/country/pakistan>

## 8. Linkages to relevant parallel on-going activities:

As a signatory to the Paris agreement, Pakistan has submitted its' first Nationally Determined Contribution to the UNFCCC in 2016. Based on the 2016 NDC, Pakistan has conducted Technology Needs Assessments, the analysis of barriers and enabling environment, as well as the Technical Assistance Response Plan – Terms of Reference development of Technology Action Plans for Mitigation and Adaptation published in 2016/17. Mitigation sectors included Energy and Waste, Agriculture and LULUCF, as well as Transportation and adaptation sectors included Agriculture and Water.

In 2021, Pakistan has developed updated NDCs with the following priorities in mitigation and adaptation:

**Mitigation sectors and objectives:**

- Energy: ensure efficient, affordable and renewable energy supply • Agriculture: Promote climate smart inputs and management practices in agriculture and livestock management
- Industries: Promote energy efficient practices in industries
- Forestry: Promote conservation and sustainable management of area under cover
- Waste management: Promote 3Rs and improve waste management practices

**Adaptation sectors and objectives:**

- Agriculture: Promote climate smart inputs and management practices in agriculture • Water: Improve irrigation and water management
- Biodiversity: To build resilience through nature-based solutions and protection of ecosystems and biodiversity
- Early warning: Mitigate impacts of extreme events through preparedness and capacity building.
- Human health: Incorporate health and environment in climate and disaster risk reduction related policies and vice versa.
- WASH: Improve climate resilience of communities through improved development outcomes in WASH sector A technology assessment under the updated NDCs has not been conducted yet.

**9. Anticipated follow up activities after this technical assistance is completed:**

The technical assistance will result in an effective and actionable NDC Technology Roadmap which will lay the basis for the following follow-up activities:

- Full integration of the NDC Technology Roadmap in the overall NDC Implementation Plan
- Operationalization of the NDC Technology Roadmap by responsible stakeholders
- Monitoring of the NDC Technology Roadmap implementation progress through the Ministry of Climate Change, using the M&E Plan
- Promotion of the NDC Technology Roadmap at a provincial, national and international level, using the Communication Plan
- Pursuit of financing opportunities, PPPs and/or business models identified/developed within the Financial Mobilization Plan
- Submission of funding concept note

**10. Gender and co-benefits:**

Imbedded in design of the activities:

Throughout the implementation of this CTCN technical assistance, gender and youth aspects will be integrated across all activities. Gender-responsive, inclusive, participatory and equitable processes and approaches will be fostered to the uptake of climate technologies that take into account the needs, priorities, knowledge and capacities of all technology stakeholders; awareness of technology benefits will be generated in particular for women and youth.

This will be ensured, inter alia, through an equal representation of women in the various committees and working groups that will be created as part of this technical assistance. Furthermore, social impact factors for gender and youth will be evaluated throughout technology prioritization and Technology Roadmap development.

	The final deliverable as well as concept notes will integrate a dedicated gender analysis. In particular the roadmap will incorporate gender based inputs and ideas of mainstreaming vulnerable communities and population through adoption of technology.
Gender and co-benefits intended as result of the activities:	The NDC Technology Roadmap is aimed to have a clear positive impact for gender and youth in terms of direct benefits of the mitigation and adaptation technologies, as well as their implication in their deployment and scale-up. This includes increased resilience, economic savings and health benefits on one side, and improved professional opportunities on the other side.

**11. Main in-country stakeholders in implementation of the technical assistance activities:**

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholder	Role in implementation of the technical assistance
National Designated Entity (Ministry of Climate Change)	Technical assistance coordination, stakeholder engagement, data and research input, chair of the TRC, member of the Waste Technical Committee and Water Technical Committee
Ministry of Energy	Stakeholder engagement, data and research input, chair of the Waste Technical Committee
Ministry of National Food Security & Research	Stakeholder engagement, data and research input, chair of the Waste Technical Committee
Other ministries • Ministry of Industries and Production • Ministry of Planning, Development and Reform • Ministry of Science and Technology • Ministry of Housing and Works • Ministry of Finance,	Data and research input, member of the TRC, Waste Technical Committee and/or Water Technical Committee
Provincial governments	Data and research input, contribution to technology prioritization, member of the TRC, Waste Technical Committee and/or Water Technical Committee

**12. SDG Contributions:**

Instructions: Please complete the grey section below for **a maximum of three SDGs** that will be advanced through this TA. A complete list of SDGs and their targets is available here:

<https://sustainabledevelopment.un.org/partnership/register/>.

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	<i>The Technology Roadmap developed under this technical assistance will identify key mitigation technologies in the area of renewable energy and waste management to strengthen access to renewable energy and reduce GHG emissions.</i>
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	

	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	<i>All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b).</i>
	<i>13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</i>	<i>The Technology Roadmap developed under this technical assistance will identify key adaptation technologies which will strengthen resilience and adaptive capacities of the population</i>
	13.2 - Integrate climate change measures into national policies, strategies and planning	<i>he technical assistance will develop a Technology Roadmap that directly contributes to the achievement of the updated NDCs of Pakistan. The prioritized technologies within the Technology Roadmap will be integrated in the agendas of relevant stakeholders</i>
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

### 13. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

<i>Please tick off the relevant boxes below</i>	<i>Primary</i>	<i>Secondary</i>
<input type="checkbox"/> 1. Decision-making tools and/or information provision	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2. Sectoral roadmaps and strategies	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3. Recommendations for law, policy and regulations	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4. Financing facilitation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 5. Private sector engagement and market creation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 6. Research and development of technologies	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<input type="checkbox"/> 7. Feasibility of technology options	<input type="checkbox"/>	X
<input type="checkbox"/> 8. Piloting and deployment of technologies in local conditions	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 9. Technology identification and prioritisation	<input type="checkbox"/>	X

*Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.*

#### **14. Monitoring and Evaluation process**

*Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.*