



**Technology Executive Committee**

02 April 2024

**Twenty-eighth meeting**

**16–19 April 2024 (19 April TEC-CTCN Advisory Board Joint session)**

## **Draft concept note for a technical paper on artificial intelligence for climate action**

### **Cover note**

#### **I. Background**

1. As per Activity A.4.1 of its rolling workplan (2023-2027), the TEC is exploring the role of artificial intelligence (AI) and applied machine learning as enablers of climate solutions.
2. At TEC 27, the TEC requested is activity group on digital technologies that supports the implementation of this activity to develop a draft concept note for a technical paper on AI for climate action, including risks and challenges of the use of AI, for consideration at TEC 28.

#### **II. Scope of the note**

3. The annex to this note contains the draft concept note for the technical paper on AI for climate action.

#### **III. Expected action by the Technology Executive Committee**

4. The TEC will be invited to consider the draft concept note contained in the annex and provide guidance to the activity group on further work on this matter.

## Annex

### **Draft concept note for a technical paper on artificial intelligence for climate action**

#### **I. Background**

1. The UNFCCC Technology Executive Committee (TEC) agreed at its 27<sup>th</sup> meeting (TEC 27) in September 2023 to develop a draft concept note for the preparation of a technical paper on artificial intelligence (AI) to explore the role of AI as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries, with a focus on the least developed countries (LDCs) and small island developing States (SIDS), while also addressing the challenges and risks posed by AI, such as energy consumption, data security and the digital divide.

2. Subject to approval of the draft concept note by the TEC at TEC 28, the technical paper would be drafted and submitted for consideration and finalization at TEC 29 in September 2024. In line with the modalities of work of the TEC, the technical paper will be developed by the TEC activity group on digital technologies with support from the TEC secretariat and a consultant with subject matter expertise.

3. The activity group met in February 2024 and agreed to consider the following for the development of the technical paper:

(a) Policy-makers as target audience;

(b) Elements of a draft paper on AI for climate action shared by an activity group member in October 2023 and comments made by other members on the draft;

(c) COP 28 decisions on the Technology Mechanism Initiative on AI for Climate Action and related matters, in particular regarding a focus on LDCs and SIDS, risks and challenges of using AI, such as energy consumption, data security and the digital divide, raising awareness of AI for climate action, building capacity for the use of AI, linkages with the implementation of the Technology Mechanism Joint Work Programme and outcomes of technology needs assessment (TNAs) of developing countries, including any references to AI in TNA documents;

(d) Work of the Climate Technology Centre and Network (CTCN) on AI;

(e) Showcase of concrete use cases and benefits of AI for climate action in developing countries;

(f) Set-up a peer-review process to solicit expert views and examples of AI-powered climate action in developing countries, in particular from LDCs and SIDS.

## II. Draft annotated outline

### Abbreviations and acronyms

### Foreword

*By the TEC Chair and Vice-Chair.*

### Executive Summary

*Summary of key findings.*

#### 1. Background

- *Mandate: Information on the Technology Mechanism and its Initiative on AI for Climate Action and relevant decisions from COP 28 (decisions 9/CP.28, 1/CMA.5, 14/CMA.5) resulting in the focus of this paper on AI for climate action in developing countries, in particular LDCs and SIDS, and risks and challenges of the use of AI in this context.*
- *Objectives: The main objectives of this technical paper are to: explore the role of artificial intelligence as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries, with a focus on LDCs and SIDS, while also addressing the challenges and risks posed by AI, such as energy consumption, data security and the digital divide; offer recommendations to policy-makers on how to use AI as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries and overcome identified risks and challenges; and showcase examples of how AI is already being used in LDCs and SIDS for addressing climate change.*
- *Methodology:*
  - *Literature review: A comprehensive literature review will be conducted to provide an overview of the current state of play regarding the use of AI for climate action with a focus on LDCs and SIDS. The literature review will involve an in-depth examination of scholarly articles, research papers, and reports demonstrating benefits, risks and challenges of AI for climate action in developing country contexts. A preliminary list of information sources to be considered is included in the Reference chapter below;*
  - *Semi-structured interviews: Interviews will be conducted with stakeholders involved in research or project implementation on AI for climate action in developing countries to identify case studies for inclusion in the respective thematic chapters of the paper;*
  - *Peer-review: A peer review group will be established to provide specific suggestions for improvements of the draft paper and to propose case studies for inclusion.*

#### 2. Introduction

- *Definitions: Definition of AI, machine learning and climate action;*
- *High-level introduction to AI for climate action: Latest facts and figures on AI, the urgency for climate action and AI for climate action;*
- *Introduction to climate change adaptation and mitigation in the context of LDCs and SIDS and overview of potential areas, risks and challenges of the use of AI for climate action, including energy consumption, data availability/access/security and the digital divide;*
- *Overview on how AI features in countries' latest national determined contributions and TNAs and on how the CTCN has supported AI for climate action to date.*

#### 3. AI for climate action in developing countries

*Case studies from SIDS and/or LDCs to be included in each section.*

### **3.1. Monitoring and data collection**

#### 3.1.1. Satellite imagery analysis:

- Examination of sea level rise and coastal transformations;
- Detection of deforestation and forest degradation, pollution sources, biodiversity and nuanced land use alterations through advanced algorithms.

#### 3.1.2. Power of IoT devices and sensor networks:

- Strategic deployment of sensors for real-time climate data acquisition;
- Integration of AI-driven data analysis to fortify early warning systems.

### **3.2. Climate modelling and prediction**

#### 3.2.1. Machine learning's transformative role in climate modelling:

- Utilization of algorithms to predict extreme weather events and disaster scenarios;
- Assessment of the ramifications of climate change on local ecosystems through sophisticated AI models.

#### 3.2.2. AI contributions to climate scenario simulations:

- Evaluation of potential adaptation strategies with the aid of artificial intelligence;
- Provision to decision-makers with actionable insights through simulations and analysis of sensor data.

### **3.3. Resource management**

#### 3.3.1. AI interventions in energy management:

- Optimizing existing systems;
- Enabling and increasing efficiency in energy generation, distribution, and consumption (buildings, traffic, etc).

#### 3.3.2. AI interventions in fisheries management and marine life preservation:

- Tracking fish stocks, marine protected area preservation and combat illegal fishing activities;
- Implementation of sustainable fishing practices.

#### 3.3.3. AI intervention in farming management:

- Improving agriculture with data-driven insights;
- Adaptive strategies for navigating changing climate conditions.

### **3.4. Disaster risk reduction**

#### 3.4.1. AI support for disaster preparedness:

- Predictive analytics shaping evacuation planning;
- Coordination of response efforts during disasters.

#### 3.4.2. AI support for post-disaster recovery and reconstruction:

- Assessment of damage and prioritizing recovery efforts;
- Efficient post-disaster rebuilding processes.

### **3.5. Education and community engagement**

#### 3.5.1. AI-powered tools for climate change education;

#### 3.5.2. AI-powered tools for raising of awareness and promoting sustainable practices;

#### 3.5.3. AI-powered tools for the engagement of local communities in climate action;

#### 3.5.4. Incorporation of indigenous knowledge in local AI models.

#### **4. AI for the implementation of the Technology Mechanism Joint Work Programme and TNA outcomes**

##### **4.1. AI for the implementation of the Technology Mechanism Joint Work Programme (2023-2027)**

- *Review of thematic areas covered by the joint work programme and identify where AI-powered solutions can support the implementation of the joint work programme based on findings of Chapter 3, including possible sub-chapters on:*
  - 4.1.1. National Systems of Innovation;
  - 4.1.2. Water-Energy-Food systems;
  - 4.1.3. Energy systems;
  - 4.1.4. Buildings and resilient infrastructure;
  - 4.1.5. Business and industry;
  - 4.1.6. Emerging and transformational adaptation technologies.

##### **4.2. AI for the implementation of TNA outcomes**

- *Review of thematic areas covered by countries' latest TNAs and identify where AI-powered solutions can support the implementation of TNA outcomes, including technology action plans, based on findings of Chapter 3.*

#### **5. Risks and challenges of using AI for climate action in developing countries**

*Include gender considerations regarding risks and challenges*

##### **5.1. Energy consumption**

*Analysis of risks and challenges regarding GHG emissions and competing development priorities as regards energy use.*

##### **5.2. Data security**

*Analysis of risks and challenges regarding data securing including privacy concerns associated with data collection and analysis, biases and lack of data.*

##### **5.3. Digital divide and equitable access to AI for climate action**

*Analysis of risks and challenges regarding a growing digital divide as well as regarding access as end user of solutions (access to electricity, ICT infrastructure and computing power) and access in terms of being able to develop own AI-based solutions.*

#### **6. Policy options for the use of AI as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries, with a focus on LDCs and SIDS, while also addressing the challenges and risks posed by AI**

- *Identify policy options.*

#### **7. Conclusions and recommendations**

- *Conclusions on the use of AI as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries, with a focus on LDCs and SIDS, while also addressing the challenges and risks posed by AI;*
- *Recommendations on the use of AI as a technological tool for advancing and scaling up transformative climate solutions for mitigation and adaptation action in developing countries, with a focus on LDCs and SIDS, while also addressing the challenges and risks posed by AI.*

#### **8. Acknowledgements**

*Acknowledge contributions from members of the TEC Activity Group and the peer-review group.*

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### III. Draft timeline

|                |   |
|----------------|---|
| 26 Mar 2024    | Activity group agrees on draft concept note to be presented at TEC 28   |
| 16/17 Apr 2024 | Member of the activity group presents the draft concept note at TEC 28  |
| 30 Apr 2024    | Activity group finalizes the concept note following guidance from TEC 28  |
| 14 Jun 2024    | Consultant presents a first draft of the technical paper to the activity group                                      |
| 21 Jun 2024    | Activity group reviews first draft and provides comments  |
| 1 Jul 2024     | Revised first draft is shared with the peer-review group for comments and inputs by 17 July 2024                    |
| 26 Jul 2024    | Activity group reviews and decides on comments and inputs received from the peer-review group                       |
| 13 Aug 2024    | Consultant presents second draft to the activity group  |
| 20 Aug 2024    | Activity group reviews second draft and provides comments   |
| TBC Sep 2024   | Consultant presents final draft at TEC 29, the TEC considered final draft and provides guidance on its finalization |
| 27 Sep 2024    | Consultant finalizes the paper and presents final version to activity group for approval                            |
| TBC Oct 2024   | TEC secretariat facilitates professional editing, layout and design of the paper                                    |
| TBC Nov 2024   | Launch of the technical paper at COP 29 (TBC)   |

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