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Development and transfer of technologies and implementation of the Technology Mechanism
First periodic assessment referred to in paragraph 69 of decision 1/CP.21

First periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer

Final report by the secretariat

Summary

This report contains the findings of the first periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer. The findings address the areas of assessment suggested under the scope of the periodic assessment contained in the annex to decision 16/CMA.1, including the outputs, outcomes and impact of the Technology Mechanism. The report includes the conclusions from the assessment and recommendations for improving the effectiveness and enhancing support to the Technology Mechanism in supporting the implementation of the Paris Agreement.

Contents

Abbreviations and acronyms

AFCIA	Adaptation Fund Climate Innovation Accelerator
AR	Assessment Report of the Intergovernmental Panel on Climate Change
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
CTC	Climate Technology Centre
CTCN	Climate Technology Centre and Network
DTU	Technical University of Denmark
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LDC	least developed country
MDB	multilateral development bank
NDA	national designated authority
NDC	nationally determined contribution
NDE	national designated entity
non-Annex I Party	Party not included in Annex I to the Convention
SBI	Subsidiary Body for Implementation
SCF	Standing Committee on Finance
SMEs	small and medium-sized enterprises
TAP	technology action plan
TEC	Technology Executive Committee
TNA	technology needs assessment
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization

I. Introduction

A. Mandate

1. COP 16 established the Technology Mechanism to facilitate the implementation of actions for achieving the objective of enhancing action on technology development and transfer.[1] The Mechanism consists of two bodies: the TEC, its policy arm, and the CTCN, its implementation arm. It also serves the Paris Agreement.[2]

2. CMA 1 adopted the technology framework under Article 10, paragraph 4, of the Paris Agreement to provide overarching guidance to the work of the Technology Mechanism in promoting and facilitating enhanced action on technology development and transfer in order to support the implementation of the Paris Agreement.[3] CMA 1 also adopted the scope of and modalities for the periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer.[4]

3. CMA 3 initiated the first periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism, in accordance with its scope and modalities, with a view to it being completed at CMA 4.[5]

4. SBI 56 considered the interim report on the first periodic assessment of the Technology Mechanism[6] and requested the secretariat to consider, as part of the elements of the scope of and modalities for the periodic assessment, the deliberations of Parties at SBI 56[7] when preparing the final report on the first periodic assessment of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer for consideration at SBI 57.

B. Possible action by the Subsidiary Body for Implementation

5. The SBI may wish to consider the information contained in this report and provide recommendations to the CMA for improving the effectiveness and enhancing support to the Technology Mechanism in supporting the implementation of the Paris Agreement and on updating the technology framework, as appropriate.

II. Methodology

A. Scope

6. The methodological approach to the first periodic assessment, which covers global (or, where relevant, regional or country-specific) activities carried out under the Technology Mechanism in 2017–2021, is structured around the scope of the assessment, which consists of the following two elements:[8]

[1] Decision 1/CP.16, para. 117.
[2] Article 10, para. 3, of the Paris Agreement.
[3] Decision 15/CMA.1, para. 1.
[4] Decision 16/CMA.1, para. 1. The scope of and modalities for the assessment are set out in the annex to that decision.
[5] Decision 17/CMA.3, para. 1.
[6] FCCC/SBI/2022/INF.8.
[7] Captured in the note available at https://unfccc.int/documents/510356.
[8] Decision 16/CMA.1, annex, para. 1.

(a) The effectiveness of the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer;

(b) The adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer.

7. For each of these elements, an evaluation grid was developed, setting out the questions, indicators and data sources to be considered (see annex I). A corresponding table, with the evaluation criteria as defined by the Network on Development Evaluation of the Development Assistance Committee of the Organisation for Economic Co-operation and Development, is provided in annex VI,[9] following international best practice for conducting assessments.

B. Workplan

8. The methodology consists of three phases of work:

(a) **Inception**, in which the methodological approach to the assessment was developed in consultation with stakeholders;

(b) **Data collection and analysis**,[10] involving:

(i) An extensive review of publications and internal documents of the TEC and the CTCN to evaluate their strategy, governance, operations, services and outcomes, as well as of other relevant documents (see annex II for the list of documents reviewed);

(ii) Interviews with 15 Technology Mechanism stakeholders, including TEC members and observers, CTCN Advisory Board members and CTCN staff, and representatives of the GCF, the GEF, UNEP, UNIDO and observer organizations (see annex III);

(iii) A survey conducted among TEC members and observers and CTCN Advisory Board members and staff to gather information and views (see annex IV for the survey methodology). The survey had 22 responses, equating to a response rate of 34 per cent;

(iv) Results from the 2020 and 2022 NDE surveys;[11]

(v) Case studies of three countries (Dominican Republic, Thailand and United Republic of Tanzania) to assess the extent to which the outputs of the Technology Mechanism delivered expected outcomes and related impacts (see annex IX for the reports on the case studies);

(vi) Consideration, at SBI 56,[12] of the interim report with preliminary findings of the assessment and the provision of guidance to the secretariat for preparing the final report;

(c) **Conclusion and recommendations**, in which the outcomes of the activities undertaken in the data-collection and analysis phase are considered. CTCN Advisory Board members and TEC members and observers were consulted through a second electronic survey to collect their views on the relevance and feasibility of preliminary conclusions and recommendations. This survey built on the substantiated findings of the assessment in terms of successes and challenges. There were 16 responses to the survey, equating to a response rate of 24 per cent. Revised conclusions and recommendations were shared with the CTCN.

[9] See www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm.

[10] See annex V for the type of stakeholder consulted during this phase.

[11] See CTCN Advisory Board document AB/2021/16/18.1 and TEC document TEC/2020/21/11. The 2022 NDE survey results are based on the raw data.

[12] FCCC/SBI/2022/10, chap. XIII.B.

III. Findings of the first periodic assessment

9. The findings are based on data collected during a desk review of publications and relevant documents and inputs from stakeholders collected through interviews and surveys. They constitute the answers to evaluation questions defined during the inception phase of the assessment (see annex I).

A. Effectiveness of the Technology Mechanism

1. Facilitation of the transformational changes envisioned in the Paris Agreement

10. Activities under the Technology Mechanism are intended to support countries in developing and transferring climate technologies that reduce GHG emissions and improve resilience to climate change. The Technology Mechanism's role in facilitating the transformational changes towards climate resilience and low GHG emission development envisioned in the Paris Agreement is considered to be constrained by the large scale of action required to achieve the purpose and long-term goals of the Paris Agreement and the limited resources allocated to the Mechanism.

11. One of the aims of both the TEC and the CTCN is to help create the enabling conditions (including through capacity-building and development of national policies and measures) that will lead to transformational changes. Transformation is hard to forecast, has multiple facets and causes and occurs gradually over time. Evaluating the Technology Mechanism's contribution to facilitating transformational changes is therefore challenging and needs to be based on a sophisticated monitoring and evaluation system, the development of which itself requires substantial resources.

12. The CTCN monitoring and evaluation system focused on ex ante indicators (e.g. anticipated metric tonnes of carbon dioxide equivalent emissions reduced or avoided as a result of CTCN technical assistance, and anticipated increased economic, health, infrastructure, built environment or ecosystem resilience to climate change impacts reported by CTCN participant countries).[13] Owing to the country-driven nature of the technical assistance provided by the CTCN, deriving a baseline or target for those indicators was not possible. As part of the updated system, the indicators in the technical assistance closure reports have been used to estimate the impact of CTCN activities on GHG emissions for each completed technical assistance project since 2019. However, inconsistencies across data reported by different implementers have been identified by the CTCN secretariat and no disclosure of an aggregated and reliable estimation of the global impact of CTCN activities on GHG emissions was possible at the time of the assessment. The CTCN secretariat is revising the methodology of data collection and control to ensure data reliability. As to the TEC, the nature of its work prevents estimations of its impacts in terms of GHG emission reduction and enhancing resilience to climate change; as such, relevant indicators have not been included in its monitoring and evaluation system.

13. However, there is some evidence that the Technology Mechanism has had impacts in terms of mitigating GHG emissions and improving resilience to climate change. According to the 2020 NDE survey, 56 per cent of respondents considered that CTCN technical assistance supported or influenced activities that could result in reduced or avoided GHG emissions.[14] Consistent with the results of the 2020 NDE survey, the NDEs surveyed in 2022 stated that CTCN technical assistance was likely to bring about sustainable mitigation and adaptation impacts, mainly by contributing to making livelihoods more climate resilient, communities less vulnerable and infrastructure more resistant to climate-induced damages. An assessment of the transformational impact of CTCN support[15] carried out by UNEP Copenhagen Climate Centre[16] in 2020 shows that CTCN activities are expected to contribute

[13] CTCN. 2020. *Climate Technology Centre and Network Monitoring and Evaluation System*. Available at www.ctc-n.org/sites/www.ctc-n.org/files/resources/ctcn_me_system.pdf.

[14] See CTCN Advisory Board document AB/2021/17/18.1, para. 10.

[15] Olsen KH. 2020. *Climate Technology Centre and Network Transformational Impact Assessment*. Copenhagen: UNEP DTU Partnership.

[16] Formerly UNEP DTU Partnership.

to transformational changes by reducing GHG emissions and facilitating adaptation outcomes.

14. In addition to providing technical assistance, the TEC and the CTCN undertook analytical work to address challenges and develop solutions related to technology development and transfer, which contributed to enhancing the knowledge base in this area and could support Parties in making the transformational changes envisioned in the Paris Agreement.[17] Innovation, which plays a key role in transformational change, was the focus of TEC technical papers and reports on international collaboration on research, development and demonstration for climate technologies; innovative approaches to deploying, disseminating and scaling up adaptation technologies; and emerging climate technologies. The TEC organized a thematic dialogue (jointly with the CTCN and the GCF) and virtual events on the promotion of climate technology incubators and accelerators in developing countries.

2. Contribution to the achievement of the long-term vision referred to in Article 10, paragraph 1, of the Paris Agreement

15. The work of the Technology Mechanism has created favourable conditions for the adoption of new and existing technologies by developing countries, but many of the changes arising from these conditions will only materialize over time. The purpose of the first periodic assessment is therefore to assess early signs of progress and the extent to which the Technology Mechanism is already contributing to the adoption of such technologies or is reasonably likely to do so in the future. As concluded in the transformational impact assessment mentioned in paragraph 13 above, CTCN technical assistance facilitates the early adoption or scaling-up of climate technologies by focusing on research, development and demonstration of, or targeting innovation for, a particular area of technology. Whether the technology is ultimately adopted or scaled up depends on the extent to which the recommendations issued as part of the technical assistance are implemented, which is beyond the control of the CTCN. According to the 2022 NDE survey, the impact of technical assistance contributing to mitigation is more likely to be scaled up than that of technical assistance contributing to adaptation. However, technical assistance projects generally lack follow-up activities, leading to limitations in the effective observation of tangible impact, as noted in the terminal evaluation of the UNIDO–GEF project on promoting accelerated transfer and scaled-up deployment of mitigation technologies through the CTCN.[18] This evaluation of a sample of technical assistance projects also revealed ownership by a limited range of local stakeholders, which consequently led to a lack of continuation of activities initiated during the technical assistance projects. These conclusions are consistent with the findings of the three case studies conducted as part of this assessment (see annex IX). The need for technology transfer projects to be tailored to local needs and the ownership of local residents and recipient Governments was also highlighted by Working Group III in its contribution to the AR6 on mitigation of climate change.[19]

16. TEC recommendations and publications have been used by a limited number of stakeholders to enhance technology development and transfer. In the 2022 NDE survey, 29 per cent of NDEs indicated that they based requests for CTCN technical assistance on TEC products. Opinions as to whether TEC products have improved the capacity of national stakeholders to develop, deploy and disseminate technologies were mixed, with 13 per cent of NDEs considering the influence of the TEC in this regard to be non-existent and 48 per cent considering it to be limited. Regarding the use of TEC products by stakeholders other than NDEs, some stakeholders interviewed for this assessment (see para. 8(b)(ii) above), noted that Parties were not utilizing TEC resources when formulating their TNAs and NDCs

[17] See TEC document TEC/2022/24/10.

[18] UNIDO. 2022. *Independent terminal evaluation. Promoting accelerated transfer and scaled-up deployment of mitigation technologies through the Climate Technology Centre and Network (CTCN).* p.8. Available at www.unido.org/sites/default/files/files/2022-01/EvalRep_GFGLO-140307-5832_TE-2020.pdf.

[19] IPCC. 2022. *Climate Change 2022: Mitigation of Climate Change*. *Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. PR Shukla, J Skea, R Slade, et al. (eds.). Cambridge and New York: Cambridge University Press. pp.16-72–16-73. Available at www.ipcc.ch/report/ar6/wg3/.

and that TEC policy guidance only seemed to be taken into account after it had been adopted and recommended by the COP. In a similar pattern to respondents to the 2020 NDE survey, all respondents to the 2022 NDE survey indicated a low (69 per cent in 2022) or a moderate (31 per cent in 2022) level of dissemination of TEC policy recommendations and publications in their countries. None of the NDEs surveyed indicated a high level of dissemination. There are, however, examples of TEC policy recommendations and publications being used directly by stakeholders. One example is the definition of endogenous capacities and technologies recommended by the TEC[20] being applied in the guidance for lead reviewers for the review of national communications and biennial reports.[21] In addition, TEC inputs to draft guidance for the operating entities of the Financial Mechanism have been reflected in decisions of the COP (e.g. decisions 12/CP.25 and 13/CP.25), and a wide range of publications, from scientific articles to guidebooks, have referenced TEC products,[22] including the contribution of Working Group III to the AR6, which refers to the work undertaken by the TEC.[23]

3. Contribution to strengthening cooperative action on technology development and transfer

17. The CTCN has facilitated or enabled collaboration on technology development and transfer within and between developed and developing countries, counting 26 such collaborations in 2021, including 12 South–South collaborations.[24] In 2020, 13 South–South collaborations were facilitated as a result of CTCN technical assistance and 10 cooperative research, development and demonstration programmes were carried out within and between developed and developing countries.[25] Examples of South–South collaboration facilitated by the CTCN include pro bono technical assistance provided by the Republic of Korea to countries in Africa and Asia;[26] technical assistance provided by Network members and CTCN consortium partners from developing countries; knowledge-sharing between Latin American countries during workshops held by the CTCN; the launch of the Latin America and the Caribbean Circular Economy Coalition in 2021; and knowledge-sharing among participants of the Gender Just Climate Solutions programme.

18. TEC and CTCN events and meetings are recognized by stakeholders for their role in facilitating networking and collaboration. Since 2019, the TEC has tracked its events on technology development and transfer, by thematic area, in its monitoring and evaluation system. At the time of the review, the TEC had already exceeded most of the targets in its rolling workplan for 2019–2022[27] regarding number of events. In the area of innovation, the TEC organized and held 10 events on innovative climate technologies and research, development and demonstration between 2019 and 2021 (exceeding its target for 2019–2022 of 1 event). Two events were organized on enabling environments and capacity-building (meeting the target) and 13 events were organized that covered multiple workstreams of the workplan. The TEC exceeded its target for 2019–2022 in the area of collaboration and stakeholder engagement (6 events) by holding 15 events in 2019–2021.

19. Since 2017, the CTCN has held an average of 30 events per year to promote networking, knowledge-sharing and matchmaking. Each year, it has met or exceeded event targets (except in 2020 owing to circumstances related to the coronavirus disease 2019 pandemic). In addition, the number of thematic events, training sessions and national events supported by the CTCN increased significantly between 2017 and 2021, with the reduction in the number of in-person events held since 2020 as a result of the pandemic being

[20] FCCC/SB/2019/4, paras. 52–53.
[21] UNFCCC. 2022. *Review Practice Guidance 2022 for Review of National Communications and Biennial Reports of Developed Country Parties*. Available at https://unfccc.int/documents/461001.
[22] See TEC document TEC/2021/23/14.
[23] Contribution of Working Group III to AR6, pp.16-68–16-71 and 16-73.
[24] See CTCN Advisory Board document AB/2022/19/11.1, p.15.
[25] See CTCN Advisory Board document AB/2021/17/14.1, pp.12 and 31.
[26] Lee W, Bak I, Kim H-J, et al. 2020. What Leads to the Success of Climate Technology Centre and Network Pro Bono Technical Assistance? *Journal of Climate Change Research*. 11(5–1): pp.353–366. Available at www.dbpia.co.kr/Journal/articleDetail?nodeId=NODE10490630.
[27] Available at https://unfccc.int/ttclear/tec.

compensated by an increase in the number of virtual events. Stakeholders generally perceive CTCN events positively, agreeing that they facilitate networking and collaboration.[28]

20. The CTCN programme for SMEs, the aim of which is to help SMEs in various industries move from conventional to climate-friendly technologies and increase their efficiency and competitiveness, is viewed by SMEs involved in the programme as both relevant and promising. Following two clinics for SMEs held in 2020 in Kenya and the United Republic of Tanzania, 27 SMEs were matched with financiers and climate technology solution providers.[29] In 2021, the CTCN held a technology clinic for SMEs in the agrifood industry in Thailand to raise awareness of the climate technologies available and scheduled a matchmaking event for stakeholders for April 2022.

21. The promotion of multi-country technical assistance and the regional approach of the CTCN are designed to foster cooperation among stakeholders in the same region. Multi-country requests have enhanced cooperation among countries and facilitated regional dialogue, leading to the harmonization of regulations,[30] and have provided opportunities for replication, scaling-up and learning, as also exemplified by the findings of the three case studies (see annex IX). The regional approach of the CTCN is a recent addition to the CTCN approach, which means that it is too early to assess its impact on stakeholder cooperation.

4. Enhancement of the implementation of the technology elements of nationally determined contributions and technology needs assessments

22. The CTCN has supported 16 Parties in developing or updating their TNAs as at March 2022.[31] Most of the technical assistance provided to support Parties in developing their TNAs has also helped them to develop TAPs. In addition, the CTCN has supported the implementation of technologies prioritized in TNAs and TAPs. In 2020, it exceeded its target for providing support to Parties to implement their TNAs and TAPs, with 28 countries receiving support.[32] The CTCN Advisory Board members who took part in the survey referred to in paragraph 8(b)(iii) above had an overall positive impression of the support provided by the CTCN in this area. However, the terminal evaluation of phase II of the TNA global project suggested that the involvement of the CTCN in this project was insufficient and more proactive engagement would have been beneficial.[33]

23. Through TNA syntheses on experience and lessons learned from the TNA process and publications on TNA linkages with other processes, including NDCs,[34] the TEC aims to provide a thorough analysis of the TNAs conducted by Parties, results, outcomes and possible improvements. The capacity of the TEC to produce publications and formulate policy recommendations on TNAs and the uptake of existing technologies is assessed by its monitoring and evaluation system (in the thematic area of implementation). The TEC will likely meet its 2019–2022 target for number of sets of policy recommendations (a target of five for 2019–2022, with four delivered in 2019–2021). In addition, the TEC produced four publications on TNAs and existing technologies between 2019 and 2021;[35] given that two publications are planned for 2022, its target of six for 2019–2022 may be achieved.

24. The CTCN ensures that technical assistance projects support the implementation of NDCs by requiring countries to demonstrate the alignment and contribution of the project to their NDC on the technical assistance request form. As a result, most CTCN technical assistance requests are directly related to the implementation of NDCs.[36] To accelerate the implementation of NDCs, the CTCN has also built the capacity of project applicants for preparing GCF concept notes through its Vision to Concept capacity-building module. Most

[28] FCCC/CP/2021/3, para. 31.
[29] See CTCN Advisory Board document AB/2022/19/11.1, p.39.
[30] FCCC/SB/2021/5, para. 77.
[31] See CTCN Advisory Board document AB/2022/19/11.1, p.29.
[32] See CTCN Advisory Board document AB/2021/17/14.1, p.21.
[33] UNEP. 2020. *Terminal Evaluation of the UNEP/GEF Project "Technology Needs Assessment Phase II"*. pp.55 and 84. Available at https://wedocs.unep.org/bitstream/handle/20.500.11822/32207/4948_2020_te_unep_gef_fsp_spcc_technology_needs_assessment_phase_II.pdf?sequence=1&isAllowed=y.
[34] See TEC document TEC/2021/23/7.
[35] Available at https://unfccc.int/ttclear/tec/impact.html.
[36] FCCC/SB/2021/5, para. 79.

respondents to the 2022 NDE survey agreed that technical assistance projects have some (43 per cent of the respondents) or a clear contribution (39 per cent of respondents) to the achievement of the NDC of their country. Since 2017 the TEC has produced publications and organized events on technological innovation and on South–South and triangular cooperation in order to assist Parties when implementing their NDCs.[37] In addition, the joint work of the TEC and the CTCN on technology and NDCs comprised a comprehensive analysis and synthesis of information on technology needs and challenges, as well as linkages between policy and implementation, and between NDCs and national adaptation plans.[38] Most participants in the survey carried out for this assessment (see para. 8(b)(iii) above), however, said that the TEC facilitates the implementation of the technology elements of TNAs and NDCs only to a limited degree.

5. Quantitative impacts resulting from technical assistance, including potential emission reductions, number of technology solutions delivered and investment leveraged

25. Recognition of the work of the CTCN and its potential benefits for developing countries is increasing, as evidenced by the significant increase in the number of technical assistance requests received in 2020 and 2021 (216 and 321 respectively). In terms of delivering technology solutions, the CTCN contributed to the adoption of new technologies mainly through pre-feasibility and feasibility studies, which together account for 20 per cent of all requests for technical assistance.[39] The impacts of the work of the CTCN are generally assessed in the five thematic areas discussed in paragraphs 26–30 below. Achievements of the CTCN in terms of outputs and outcomes for 2020 and 2021, as reported by the CTCN in its annual operating plan reports, are detailed in annex VIII.

26. **Implementation**. The number of technical assistance projects completed annually increased from 24 in 2017 to 58 in 2020. This figure decreased slightly in 2021, to 23, though the dip can be attributed to the effects of the pandemic. The number of lessons learned from implementing technical assistance, as shared on the CTCN knowledge platform, has increased: in 2020, 10 per cent of technical assistance recipients shared lessons learned, compared with 90 per cent in 2021. Furthermore, 81 per cent of NDEs who responded to the 2022 NDE survey indicated that their countries had implemented recommendations from CTCN technical assistance on matters such as funding proposal submission and policy implementation. This indicates the extent to which technical assistance, aimed at developing and strengthening policies, plans, and legal and regulatory frameworks, as well as identifying barriers to the development and transfer of socially and environmentally sound technologies, is acted on. Examples of technical assistance include proposals to update Georgia's TNA through developing technology road maps and to formulate a 10-year national agroforestry strategy for Kenya.

27. **Innovation**. In its second programme of work (covering 2019–2022)[40] and by aligning its annual operating plan with the five key themes of the technology framework,[41] the CTCN has sought to enhance its focus on research, development and demonstration. Through technical assistance, the CTCN facilitated collaboration for research, development and demonstration, and supported countries in developing policies and institutional and regulatory frameworks to encourage climate technology research, development and demonstration, and uptake.[42] Examples include the technical assistance project "Identification of a climate research agenda to include collaboration with academia in Jamaica", which was completed in 2021.[43] A total of 39 countries developed, transferred and

[37] FCCC/SB/2017/3, para. 32, and FCCC/SB/2018/2, para. 23.

[38] TEC and CTCN. 2021. *Technology and Nationally Determined Contributions, Stimulating the Uptake of the Technologies in Support of Nationally Determined Contribution Implementation.* Available at https://unfccc.int/ttclear/tec/techandndc.html.

[39] See CTCN Advisory Board document AB/2022/19/11.1, p.16.

[40] See www.ctc-n.org/sites/www.ctc-n.org/files/ctcn_programme_of_work_2019-2022.pdf.

[41] Innovation, implementation, enabling environment and capacity-building, collaboration and stakeholder engagement, and support; for details, see decision 15/CMA.1, annex, chap. III.

[42] See CTCN Advisory Board documents AB/2021/17/14.1, p.9, and AB/2020/16/12.2, p.5.

[43] See CTCN Advisory Board document AB/2022/19/11.1, p.6.

deployed new and existing climate technologies thanks to CTCN support in 2020[44] and 2021.[45] As a result of CTCN technical assistance, the number of cooperative research, development and demonstration programmes within and between developed and developing countries was 10 in 2020[46] and 26 in 2021 (of which 12 were between developing countries).[47]

28. **Enabling environment**. Recommendations provided under CTCN technical assistance contribute to creating enabling environments, such as by providing information and raising awareness, creating the policy and regulatory environments needed for technology development and transfer and building institutional capacity to adopt, disseminate and scale up climate technologies. Although the CTCN achieved or exceeded most of its targets in this area for 2020 and 2021, stakeholders have rather mixed perceptions of its contributions in this regard according to the survey conducted for this assessment (see para. 8(b)(iii) above). It should, however, be noted that the challenges related to the human capital, institutional capacity and innovation infrastructure required to establish and develop national systems of innovation in developing countries are systemic issues, of which many are beyond the mandate of the TEC and the CTCN.

29. **Capacity-building**. According to the transformational impact assessment referred to in paragraph 13 above, technical assistance commonly addresses raising awareness among government actors. However, the assessment also indicates that few interventions include direct attempts to target changing behaviour and social norms. While an aim of technical assistance tends to be to raise awareness of at least one group of change agents (most commonly government agencies), these change agents are unlikely to bring about sustained transformational change. Half of the respondents to the survey conducted during the second independent review of the CTCN indicated that the CTCN provided stakeholders with access to approaches, tools and means for assessing technologies, supported climate technology plans and increased stakeholder capacity in relation to technology development and transfer.

30. **Financial resources**. Technical assistance may focus on strengthening access to private sector finance by scaling up pre-feasibility studies, thus defining market barriers and thereby enabling investors to overcome the barriers and access those markets. CTCN technical assistance provided to the Dominican Republic is a case in point.[48] The extent to which technical assistance leveraged additional funding is captured by the respective indicator[49] in the CTCN monitoring and evaluation system, according to which additional funding of over USD 250 million was expected to be leveraged in 2020 from a USD 1.5 million investment from technical assistance activities,[50] increasing to more than USD 760 million in 2021.[51] The perception of NDEs regarding the contribution of technical assistance to leverage additional funding or investment has improved over time (58 per cent of respondents had a positive perception in the 2022 NDE survey compared with 48 per cent in the 2020 NDE survey). The interviews and surveys carried out for this assessment (see para. 8(b)(ii–iii) above) found that stakeholders believe that technical assistance is still limited in its capacity to assist in identifying and making available financial resources to support climate technology, particularly in terms of leveraging financing from the private sector.

6. Cost-effectiveness and efficiency of work

31. According to the stakeholders interviewed for this assessment (see para. 8(b)(ii) above), the CTCN is cost-effective considering its broad mandate and the large number of activities it undertakes with limited resources. Advisory Board members who participated in the survey (see para. 8(b)(iii) above) agree that the management structure, processes, procedures, communication, and monitoring and evaluation system of the CTCN have

[44] See CTCN Advisory Board document AB/2021/17/14.1, p.12.
[45] See CTCN Advisory Board document AB/2022/19/11.1, p.15.
[46] See CTCN Advisory Board document AB/2021/17/14.1, p.12.
[47] See CTCN Advisory Board document AB/2022/19/11.1, p.15.
[48] See www.ctc-n.org/content/mapping-contribution-private-sector-mitigation-and-adaptation-targets-dominican-republic.
[49] Amount of funding or investment mobilized or leveraged (in USD) for all activities of the technology framework as a result of the technical assistance.
[50] See CTCN Advisory Board document AB/2021/17/14.1, p.21.
[51] See CTCN Advisory Board document AB/2022/19/11.1, p.33.

contributed to optimizing its operations. The CTCN has adopted a country-driven approach that is in line with the COP decisions that created the Technology Mechanism, and that is considered by the IPCC as relevant to addressing climate change, since technologies require adaptation for the local context and needs.[52] Although the country-driven approach to technical assistance requests enables the CTCN to respond to countries' needs in a targeted manner, it may limit the cost-effectiveness of the CTCN. However, under this approach, technical assistance is tailored to each country's specific needs and thus entails higher transaction costs than a standardized or large-scale approach. The regional approach of the CTCN has enhanced its efficiency by improving communication and coordination with NDEs. In addition, the multi-country projects have enabled ready-to-transfer technologies to be applied at a large scale, covering countries with common challenges and reducing transaction costs.[53] With fewer resources, the CTCN would have had to limit the scope of the projects or cancel some planned activities, thereby affecting the quantity and quality of outputs and outcomes delivered.[54]

32. TEC members and observers interviewed and surveyed agreed that the composition, organizational set-up (with task forces), rules of procedure, planning of activities, and monitoring and evaluation system of the TEC ensured the efficiency of its operations, with effective internal communication among TEC members and observers and the nature of TEC work contributing to its cost-effectiveness.

7. Success in implementation of workplans

33. Overall, the CTCN achieved the targets in its annual operating plans (see annex VIII) and its performance in this regard was recognized by all stakeholders interviewed. However, it appears that the operational objectives of the CTCN were mainly determined by taking into account past results and budget constraints rather than potential for improvement.[55] Performance against targets in various areas of work was as follows:

(a) **Technical assistance**: since 2017, the number of technical assistance response plans being designed has fluctuated between 30 and 50 per year. Between 2017 and 2019, the yearly target output decreased from 50–70 to 30–40 for technical assistance response plans being designed and from 40–60 to 25–35 for technical assistance implemented or concluded. In 2020 and 2021, the target of 30 requests supported per year was achieved. The geographical coverage of technical assistance requests matches the mandate of the CTCN to prioritize the LDCs and other vulnerable countries. The most common type of request, namely for decision-making tools and information, has not changed significantly over the years. Technical assistance provided tends to focus less on adaptation than on mitigation;

(b) **Capacity-building**: capacity-building activities and networking events were perceived positively by stakeholders. Almost every outreach, capacity-building and enabling environment target was met in 2020[56] and 2021.[57] Indicator ratings between 2017 and 2019 relating to peer-learning, capacity-building, networking and stakeholder engagement were more mixed but overall positive.[58] The CTCN partly responded to the recommendation arising from the first independent review of the CTCN[59] to continue training NDEs regularly and facilitating the elaboration of technical assistance requests through regional forums and the CTCN Incubator Programme. These activities are consistent with the findings of the

[52] Contribution of Working Group III to AR6, pp.16-66–16-67.
[53] FCCC/SB/2019/4, para. 121.
[54] FCCC/CP/2021/3, para. 44.
[55] FCCC/CP/2021/3, para. 24.
[56] The only target not met relates to the number of technology descriptions, publications, national plans and other information resources made available on the CTCN knowledge platform.
[57] See CTCN Advisory Board document AB/2022/19/11.1.
[58] While the number of thematic events, training sessions and national events hosted or supported by the CTCN increased significantly between 2017 and 2019, the number of secondees, new countries enrolled in the Incubator Programme, regional forums organized, NDEs trained and webinars held decreased or remained the same during the same period.
[59] See document FCCC/CP/2017/3.

contribution of Working Group III to the AR6 that building capacity of local stakeholders for innovation and managing technological change are essential for technology uptake;[60]

(c) **Knowledge-sharing**: between 2017 and 2019, the knowledge platform of the CTCN underwent structural changes to increase the focus on supportive infrastructure and search engine optimization. As a result, content on the CTCN web pages is now more stable, tailored and accessible. The number of online tools and information materials was reduced between 2018 and 2019 to improve the clarity and relevance of content.[61] The number of knowledge partners contributing to the knowledge platform remained constant and within the target range, while the number of web page visits grew from 122,957 in 2017 to 563,655 in 2021 (equating to an average annual increase of 90 per cent).

34. The TEC performed well in implementing its workplan for 2019–2022 (achievements of the TEC for 2019–2021 are detailed in annex VIII). In terms of policy recommendations for the CMA and the COP, the TEC will most likely meet its target for the period, having delivered 8 sets of policy recommendations by the end of 2021 against the overall target of 12 for 2019–2022. As for publications, the TEC produced 12 between 2019 and 2021, which means it will be challenging to achieve its target of 18 for 2019–2022. The performance of the TEC in terms of organizing meetings and events is covered in paragraph 18 above.

35. Successes in the achievement of the TEC are evidenced by the inclusion of TEC findings and recommendations in COP and CMA decisions. These result from TEC work such as publications and recommendations to the COP and the CMA, covering topics of international collaboration on research, development and demonstration, TNAs, technical expert meetings, innovative approaches to stimulating the uptake of existing technologies, NDCs, endogenous capacities and technologies, enabling environments, and collaboration with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts.[62] The knowledge and availability of technical resources for stakeholders have been enhanced, involving engagement with over 60 organizations across its activities, a wider audience reached through virtual events on adaptation and reports on innovation at events such as the Global Sustainable Technology and Innovation Community and Asia-Pacific Climate Week. Collaboration and dialogues with relevant entities to mobilize climate technology support have also been enhanced (see chap. 9 below on collaboration with stakeholders).

8. Challenges overcome and opportunities for improvement identified

36. This subchapter focuses on how the TEC and the CTCN have been dealing with challenges regarding monitoring and evaluation and the recommendations from previous evaluations. Other challenges and opportunities for improvement are presented throughout this report.

37. The TEC, in coordination with the CTCN, developed a monitoring and evaluation framework and corresponding system to report on its activities and ensure their contribution to the transformational changes envisioned in the Paris Agreement.[63] The TEC implemented its monitoring and evaluation system in 2020 on a trial basis and reviewed it at TEC 21. The trial led to some adjustments being made (e.g. the addition of indicators relating to gender considerations).

38. The monitoring and evaluation system of the TEC is relatively simple in terms of the type and number of indicators involved, which is an advantage considering the resources needed for data processing but could oversimplify the reality.[64] Oversimplification is particularly relevant when assessing the complex outcomes of TEC work. As such, the system may be adequate for assessing the outputs of TEC work, but less so for assessing transformational change.

[60] Contribution of Working Group III to the AR6, pp.16-66–16-68 and 16-73.
[61] CTCN. 2019. *CTCN progress report 2019*. Available at www.unep.org/resources/annual-report/ctcn-progress-report-2019.
[62] See TEC document TEC/2022/24/10, annex I.
[63] As per decisions 15/CP.23, para. 5, and 15/CMA.1, annex, para. 25(e).
[64] See TEC document TEC/2020/21/11, p.9.

39. Regarding the CTCN monitoring and evaluation system, the findings are presented at CTCN Advisory Board meetings and taken into account when preparing CTCN annual operating plans and programmes of work. As noted during the first and second[65] independent reviews of the CTCN, assessing the impacts of CTCN activities in quantitative terms is complex as they are intended to catalyse systemic change, which is not visible in the short term. To address this issue and enhance the consistency of its reporting, as well as better measure and demonstrate the effectiveness and impacts of its services, the CTCN, in coordination with the TEC and drawing on in-kind support from the United States Agency for International Development, reviewed its monitoring and evaluation system before operationalizing a revised system in 2020. As such, most of the indicators currently included in the system are not fully comparable with those used before 2020, and not all impact indicators (baseline and targets) had been calculated at the time of this assessment (see annex VIII).

40. The second independent review of the CTCN revealed that the CTCN had acted on recommendations from previous evaluations, including the first independent review. The management response of UNEP to the second review[66] formalized the actions to be implemented in line with the recommendations from that review. The TEC has not yet been subject to an evaluation.

9. Collaboration with stakeholders

41. The TEC and the CTCN made demonstrable efforts to collaborate with stakeholders in supporting the implementation of the Paris Agreement. The stakeholders interviewed and surveyed for this assessment generally agreed that the two bodies had taken into account and supported a broad range of stakeholders with regard to sustainable development, gender, the special circumstances of the LDCs and small island developing States, and endogenous capacities and technologies.

42. The 2020 and 2021 collaboration and stakeholder engagement results show that the CTCN met or exceeded all targets in this area.[67] These results were confirmed by the NDEs and beneficiaries that responded to a survey conducted during the second independent review of the CTCN. They considered that the CTCN made a solid contribution to informal interactions, collaborations and partnerships with local organizations (public or private) and international organizations and institutions, as well as under various initiatives. To increase the representativeness of the CTCN, COP 26 agreed to amend the constitution of the CTCN Advisory Board to include representatives of indigenous peoples organizations, the women and gender constituency and youth non-governmental organizations.[68] Nevertheless, NDEs and beneficiaries considered that the contribution of the CTCN to collaboration and stakeholder engagement tends to be limited to governments rather than actors such as final beneficiaries, private sector stakeholders and entrepreneurs.

43. The TEC engaged many organizations in implementing its activities – over 60 in 2020[69] and over 50 in 2021[70] – such as governments, observer organizations, NDEs, private sector stakeholders, academic institutions, financial institutions and international organizations. This engagement reflects the diverse expertise that the TEC has benefited from in implementing its work. Representatives of a number of constituencies of non-governmental organizations (including business and industry; environmental; research and independent; and youth) participated in TEC task forces. Furthermore, TEC meetings helped to enhance collaboration. Nevertheless, the survey results show that some gaps remain between the expectations of observer constituencies and their actual participation in TEC work.

44. The TEC made significant progress in mainstreaming gender in its work. In 2019, the TEC agreed to mainstream gender considerations in its workplan and subsequently appointed its gender focal points in 2020. It added gender-related indicators to its monitoring and

[65] See document FCCC/CP/2021/3.
[66] FCCC/CP/2021/3, annex VIII.
[67] See CTCN Advisory Board documents AB/2021/17/14.1, p.31, and AB/2022/19/11.1, p.51.
[68] Decision 10/CP.26, para. 1, and annex, para. 1(g).
[69] FCCC/SB/2020/4, para. 40.
[70] FCCC/SB/2021/5, para. 33.

evaluation system, included a section or recommendations on gender issues in more of its published documents, issued two sets of policy recommendations taking into account gender considerations and undertook three activities that incorporated gender considerations. In 2021, the TEC achieved its goal of achieving gender balance on the panels of its events for the first time. For the CTCN, gender equality is now fully embedded in its mandate through the Gender Policy and Action Plan 2019–2022. It partners annually with the women and gender constituency to hold the Gender Just Climate Solutions Awards and implement the associated mentoring programme.[71]

45. The TEC and the CTCN have engaged the private sector in various thematic areas. However, according to interviewed stakeholders, collaboration under the Technology Mechanism could be more extensive with the private sector, particularly on adaptation projects. A comparison of the rolling workplan of the TEC and the CTCN programme of work revealed that engagement of the private sector in the work undertaken by the TEC and the CTCN could be enhanced.[72] This is consistent with the finding from the second independent review of the CTCN that private sector involvement in CTCN projects is low despite the sector accounting for nearly half of Network members.

46. The TEC has engaged with the research community in its work and activities. IPCC representatives participated in TEC 18 and 23 to present findings from the IPCC Special Report on Global Warming of 1.5 °C[73] and provide a status update on the contribution of Working Group III to the AR6. Representatives of the constituency of research and independent non-governmental organizations participate in several TEC task forces. However, some of the stakeholders interviewed and surveyed were of the view that engagement under the Technology Mechanism with the research community in general and the IPCC in particular could be enhanced in order to strengthen the link between research and implementation of emerging technologies.

47. The CTCN enhanced its collaboration with the GCF, as observed by the increased number of technical assistance requests funded by the GCF Readiness and Preparatory Support Programme. The CTCN Partnership and Liaison Office in the Republic of Korea is expected to further strengthen collaboration at the management level. On the operational side, CTCN Advisory Board members who participated in the survey (see para. 8(b)(iii) above) were generally of the view that collaboration among NDEs, GCF NDAs, GEF operational focal points and other donors (MDBs, bilateral banks, United Nations entities) has not increased. On the basis of monitoring and evaluation indicators in the thematic area of support and its collaboration with the operating entities of the Financial Mechanism, the TEC provided inputs and recommendations to the GCF, the GEF and the SCF in 2019–2021 on five occasions, including annual inputs to the draft guidance for the operating entities of the Financial Mechanism.

10. Response to the overarching guidance provided by the technology framework, existing mandates under the Paris Agreement and guidance from Parties

48. The TEC and the CTCN structure their rolling workplans and programmes of work, respectively, around the five key themes of the technology framework, and the TEC established a task force for each theme of the technology framework to support the implementation of its workplan. Those interviewed (see para. 8(b)(ii) above) mentioned challenges in aligning these workplans with the themes. Some were of the view that the themes should not be considered separately, as doing so makes tracking the impacts of cross-cutting technologies challenging. Nevertheless, stakeholders agreed that the TEC and the CTCN had aligned their rolling workplans and programmes of work, respectively, and their reporting to the CMA with the technology framework and that they had been responsive to

[71] Women Engage for a Common Future. 2020. *Gender Just Climate Solutions*. Available at https://www.ctc-n.org/sites/www.ctc-n.org/files/resources/GJCS_English_Final.pdf.

[72] See TEC document TEC/2022/24/13.

[73] IPCC. 2018. *IPCC Special Report on the Impacts of Global Warming of 1.5 °C above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. V Masson-Delmotte, P Zhai, H-O Pörtner, et al. (eds.). Geneva: World Meteorological Organization. Available at https://www.ipcc.ch/sr15/.

subsequent CMA guidance. The stakeholders interviewed considered the mandate of the CTCN too broad, making it difficult to respond to all areas equally. Examples of action taken by the TEC and the CTCN in response to guidance provided by the CMA and in accordance with the five key themes are well documented in their joint annual reports.[74] Annex VII provides examples of responses of the Technology Mechanism entities to guidance from Parties.

49. The added value of the CTCN has been reported in the second independent review of the CTCN, with the main strength in comparison with other climate technology and finance centres being its institutional legitimacy, under the UNFCCC, with a demand-driven mechanism and strong sectoral expertise that ensure the adequacy of its assistance. It is more agile and responsive than other entities in the United Nations system and it is able to provide early-stage support for small projects without competition from similar centres, as the demand is largely enough for the different centres to coexist.[75] The strength of the TEC lies in its ability to bring together the knowledge of relevant stakeholders and to build expertise to facilitate action on technology development and transfer, which is further legitimized by its position as a UNFCCC body.

11. Collaboration between the Technology Executive Committee and the Climate Technology Centre and Network

50. The TEC and the CTCN have been working together closely to enhance coherence and synergy under the Technology Mechanism. Activities undertaken by them as a collaborative effort include organizing joint sessions of the TEC and the CTCN Advisory Board meetings; establishing a joint task force and a first set of joint activities for work on NDCs and gender; jointly developing their monitoring and evaluation systems; conducting a biennial NDE survey; undertaking joint communication and outreach work under the Technology Mechanism (e.g. side events); and participating in each other's meetings and events. Collaboration between the two bodies has improved as a result of these activities. The efforts of the TEC and the CTCN to enhance their collaboration, including through systematic feedback, is also evidenced by new joint activities proposed during a joint session held in March 2022.[76]

51. Stakeholders surveyed tended to agree that the institutional arrangements and the governance of the TEC (members and task forces) and the CTCN (Advisory Board) facilitated communication and cooperation between the bodies, supported by the UNFCCC and CTCN secretariats. In supporting the work of the TEC and the CTCN, the two secretariats have improved data exchange and knowledge-sharing, as shown by the use of CTCN technical assistance data to identify enablers and barriers in technology development and transfer by the TEC, the use of CTCN databases to identify experts for events organized by the TEC, and the sharing of a TEC survey on endogenous capacities and technologies with CTCN network members, who had been key respondents.[77] Nonetheless, responses to the 2022 NDE survey regarding the contribution of TEC policy recommendations and publications to the preparation of technical assistance requests highlighted this as an area for enhancing the efficiency of the collaboration between the two bodies (see para. 16 above).

B. Adequacy of support provided to the Technology Mechanism

1. Support provided to the Technology Executive Committee and the Climate Technology Centre and Network, including the national designated entities

52. The extent to which stakeholders of the CTCN (CTCN staff, Network members, Advisory Board members, NDEs) and the TEC (TEC members and observers) have benefited from support was perceived positively by the stakeholders interviewed and surveyed for this assessment. The TEC has benefited from the support of the UNFCCC secretariat in

[74] See TEC document TEC/2022/24/13, pp.12–16.
[75] FCCC/CP/2021/3, paras. 19 and 61(a).
[76] See www.ctc-n.org/sites/www.ctc-n.org/files/DAY1_3.2_Update%20on%20the%20work%20of%20the%20CTCN_Moa%20Fostorp.pdf.
[77] See TEC document TEC/2022/24/10, box 3.

implementing its mandate and functions, while the CTC has benefited from being hosted by UNEP. In response to a recommendation resulting from the second independent review of the CTCN, the CTC committed to streamlining its communication with host agencies at the management and operational level, while host agencies agreed to direct as many financial resources as possible to the CTCN multi-donor trust fund so as to reduce administrative and reporting barriers.[78] In 2017–2021, the TEC had annual average funding of approximately USD 806,000 and the CTCN USD 8.89 million – fluctuating between a minimum of USD 3.82 million in 2019 and a maximum of USD 13.37 million in 2020 (see annex X).

53. The CTCN supported the NDEs in their roles by building capacity through events (e.g. annual regional forums facilitating exchange of best practices), webinars and other modes of training (e.g. in 2021, 74 NDEs and nominees participated in a five-week interactive online course on blockchain solutions and emerging digital technologies for global climate action),[79] and publications. As assessed in the second independent review of the CTCN, only half of non-Annex I Party NDEs surveyed stated that they had been supported in fulfilling their roles by the CTCN. Stakeholders agreed that NDEs lack resources in this regard (in order of importance: financial, material and human resources) from both the Technology Mechanism and their national host institutions. In addition, NDEs often felt that they lacked political support and visibility, pointing to an ongoing need to raise their profile within government and the private sector.[80] In response to a recommendation resulting from the second independent review, UNEP indicated that, with additional resources, it would be able to strengthen capacity-building programmes for non-Annex I Party NDEs, enabling them to prepare technical assistance requests in strategic areas following a programmatic approach, as well as further support the development of technology road maps for NDC implementation.

54. The TEC publication on endogenous capacities drew attention to the importance of building NDE capacity.[81] While 29 per cent of respondents to the 2022 NDE survey stated that they had used TEC products to prepare technical assistance requests, stakeholders agreed that TEC publications do not fully address the specific needs of NDEs. The TEC and the CTCN have initiated consideration of enabling environments and capacity-building with a view to maximizing the impact of NDE roles at the national level.[82]

2. Sources, types and level of support provided to the Technology Executive Committee and changes over time

55. The main source of funding of the TEC is the Trust Fund for the Core Budget of the UNFCCC, followed by voluntary financial contributions from Parties. Between 2017 and 2021, TEC core funding averaged USD 585,000 per year (fluctuating by ±15 per cent). Supplementary funding over this time varied between USD 18,000 and 504,000 per year (representing 3–50 per cent of the total annual funding of the TEC in 2017–2021).

56. In 2018 and 2020, the supplementary funding did not fully cover the supplementary expenses, leading to an overall funding deficit of 33 and 14 per cent respectively (there was a surplus in the other years, varying from 14 to 20 per cent). Some stakeholders indicated that they considered there was a lack of human resources within the UNFCCC secretariat available to fully support all the TEC task forces established to support implementation of the TEC rolling workplan. Nevertheless, the large extent to which TEC activities have benefited from support provided by the UNFCCC secretariat was acknowledged by TEC members and observers interviewed and surveyed.

[78] FCCC/CP/2021/3, annex VIII.

[79] See https://www.ctc-n.org/sites/www.ctc-n.org/files/Day%202_12.1_Director%27s%20presentation_Rose%20Mwebaza_0.pdf.

[80] FCCC/CP/2021/3, para. 43.

[81] TEC and UNFCCC. 2021. *Building capacities in climate technologies: Understanding gaps, needs, challenges and enabling measures to promote endogenous capacities and technologies*. Bonn: UNFCCC. Available at https://unfccc.int/ttclear/endogenous/index.html.

[82] See www.ctc-n.org/sites/www.ctc-n.org/files/DAY1_3.1_Update%20on%20the%20work%20of%20the%20TEC%20and%20reflections_Ambrosio%20Yobanolo.pdf.

57. In addition to benefiting from financial support, the TEC benefited from human and technical support provided by Parties and non-Party stakeholders to support the implementation of its workplan, including through the participation of TEC members (nominated by Parties) in its meetings, events and task forces, participation of representatives of non-governmental organizations in the TEC task forces,[83] and participation of CTCN representatives in TEC events.[84]

3. Sources, types and level of support provided to the Climate Technology Centre and Network and changes over time

58. The main sources of funding for the operational budget of the CTCN in 2017–2021 were bilateral funding and the host agencies' multi-donor trust fund (accounting for 74 per cent of the total funding), followed by GCF funding (accounting for 19 per cent), pro bono and in-kind support (accounting for 4 per cent) and contributions from the NDC Partnership and the Adaptation Fund (each accounting for 1.5 per cent). Annex X provides information on resource mobilization of the CTCN.

59. COP 26 noted that the CTCN continues to face challenges that need attention, including limited and insufficient financial resources.[85] Several challenges have beset CTCN funding over the past five years:

(a) The CTCN has faced challenges in diversifying its funding streams (bilateral, multilateral and private sector, and philanthropic sources of support) for multi-year and annual contributions since 2017 and its resource mobilization targets have not been met;[86]

(b) A total of 14 different donor countries have engaged with the CTCN since 2017 (6.75 donors on average per year). Some potential donor countries active in climate finance have opted to support other mechanisms;

(c) The CTCN has benefited from enhanced cooperation on its activities with the operating entities of the Financial Mechanism, as found in the second independent review of the CTCN.[87] The CTCN has collaborated with the operating entities on mutually beneficial projects, for example with the GCF on readiness support: 5 readiness projects had been completed as at 31 July 2021 and 30 approved for a total funding amount of USD 10.2 million.[88] In addition, the CTCN and the GCF co-developed the Vision to Concept capacity-building module to assist developing country Parties in preparing project concept notes for and accessing GCF financing (32 concept notes were completed as CTCN technical assistance deliverables in 2021).[89] The CTCN also continued to collaborate with the GEF; in 2022, the CTCN will start implementing the project Piloting Innovative Financing for Climate Adaptation Technologies in Medium-sized Cities as part of the GEF Challenge Program for Adaptation Innovation.[90] In terms of operational modalities, dialogues were held between the GEF and the CTCN to encourage collaboration between the regional climate technology transfer and finance centres funded by the GEF and the CTCN, as well as to discuss the involvement of the CTCN in GEF national dialogues and expanded constituency workshops, thus promoting CTCN engagement with GEF operational focal points and exploring ways to cooperate in a country-driven manner;[91]

(d) The CTCN did not obtain any financial support from MDBs, the private sector, or philanthropic or innovative sources. This was reiterated by the stakeholders interviewed, who stated that CTCN activities did not benefit equally from major sources of bilateral, multilateral, private sector or philanthropic support;

[83] FCCC/SB/2021/5, para. 20.
[84] FCCC/SB/2021/5, para. 12.
[85] Decision 11/CP.26, para. 13.
[86] FCCC/CP/2021/3, para. 34.
[87] FCCC/CP/2021/3, para. 18.
[88] FCCC/CP/2021/8, para. 47.
[89] See CTCN Advisory Board document AB/2022/19/11.1.
[90] See CTCN Advisory Board document AB/2022/19/11.1.
[91] FCCC/CP/2021/9, para. 206.

(e) In-kind and pro bono support provided to the CTCN has increased thanks to Parties providing staff to the CTCN secretariat or directly implementing technical assistance on behalf of the CTCN. The target of USD 2 million per year set out in the 2018 resource mobilization strategy for in-kind and pro bono support was not reached, though the revised target of USD 0.5–1 million in the 2020 and 2021 annual operating plans was.

60. Besides these challenges, there have also been improvements in CTCN funding. New sources of funding emerged in 2020 with contributions from the NDC Partnership and the Adaptation Fund. As a result of the high-level donor round table convened by the CTC and its host institutions at COP 26, the total funding received by the CTCN in 2021 was 26 per cent higher than in 2020[92] (exceeding the annual target of 10 per cent). Since the CTCN was established, 22 donors (target: 20) of all kinds have provided funds.[93]

61. In a similar manner as for the TEC, various stakeholders involved in the operation of the CTCN, including the CTCN Advisory Board, NDEs, Network members and knowledge partners, provided human and technical support by taking part in meetings, events and knowledge-sharing activities.

4. Use of support provided

62. Opinions, including of stakeholders within the same category, differed on whether financial, human and technical resources provided to the TEC and the CTCN are sufficient to achieve their mandates. However, stakeholders were mostly satisfied with the allocation of resources to different TEC and CTCN activities.

63. Financial autonomy remains a challenge for the CTCN, with 74 per cent of the funding received in 2017–2021 already earmarked and the possibility that donor requests will result in the allocation of unearmarked funds to specific tasks being ever-present. This tends to shift the focus of the CTCN towards specific activities or locations. In addition, CTCN funding tends to be irregular, unpredictable and complicated to manage financially, which resulted in the CTCN underdelivering on its annual operating plan budgets by 17 per cent on average in 2017–2019. The lack of predictability was also noted in the contribution of Working Group III to the AR6, citing the first independent review of the CTCN.[94] However, the CTCN managed to implement 99 per cent of its planned annual budget in 2020[95] and 109 per cent in 2021.[96]

64. Stakeholders interviewed noted the lack of resources allocated to CTCN technical assistance with an adaptation focus despite the increase in adaptation requests, as evidenced by the high number of applications during the first two calls for the AFCIA programme.[97] There is a thematic imbalance in the objectives pursued through technical assistance requests submitted to the CTCN: 29 per cent of requests supported adaptation goals, 23 per cent a combination of adaptation and mitigation goals and almost half mitigation goals only.[98] As for the TEC, no information is available on spending by theme (mitigation, adaptation, cross-cutting), but the majority of the activities set out in its rolling workplan for 2019–2022 support both mitigation goals (18 out of 22 activities) and adaptation goals (15 out of 22 activities), according to their workstream categorization.

65. Stakeholders interviewed also noted a lack of resources allocated to supporting hardware implementation. COP 16 defined the technology cycle as consisting of five stages: research and development, demonstration, deployment, diffusion, and transfer of technology.[99] The services provided by the CTCN contributed to all five stages of the technology cycle, but in particular to the deployment of existing technologies, with a focus

[92] This value does not take into account GCF funding received in 2020–2021.
[93] See CTCN Advisory Board document AB/2022/19/11.1.
[94] Contribution of Working Group III to the AR6, p.16-69.
[95] See www.ctc-n.org/sites/www.ctc-n.org/files/Agenda%20item%2014._CTCN%20AB17_Report%20of%20the%20CTCN%20Director.pdf.
[96] See www.ctc-n.org/sites/www.ctc-n.org/files/Day%202_12.1_Director%27s%20presentation_Rose%20Mwebaza_0.pdf.
[97] See CTCN Advisory Board document AB/2022/19/11.1.
[98] FCCC/SB/2021/5, para. 75.
[99] Decision 1/CP.16, para. 115.

on supporting software-related skills, such as know-how, methods and practices. The CTCN has also worked on increasing private sector participation in the first two stages of the technology cycle by carrying out activities specifically for private sector Network members looking for further opportunities to support local SMEs (e.g. technology clinics, Youth Climate Innovation Labs) and by digitalizing its technical assistance.[100]

5. Extent to which support has met the budgets and plans of the Technology Mechanism

66. The CTCN provides its services by following a demand-driven approach, which ensures that they respond to developing countries' needs. Since the Paris Agreement entered into force, the CTCN has stepped up its efforts in relation to NDCs to support the implementation of the Agreement and respond adequately to developing countries' needs. This is important, as technical assistance requests need to be linked explicitly to national plans and NDCs. The majority of stakeholders surveyed as part of the second independent review of the CTCN, particularly NDEs, considered CTCN activities and interventions to be relevant or very relevant. The CTCN ensures that it can respond well to developing countries' needs through NDEs, as most developing countries have an NDE. According to stakeholders interviewed for this assessment, increased resources would allow the CTCN to respond to countries' needs more effectively (for instance it could allocate specific funds to cover project management costs, some of which are covered by NDEs' own funds) and to conduct more follow-up activities and ex post project evaluations. Overall, most stakeholders interviewed and surveyed considered that resources mobilized were insufficient for implementing TEC and CTCN activities. According to the interviewed and surveyed stakeholders, the CTCN and the TEC would have been able to respond to more country needs if increased resources were available. According to the contribution of Working Group III to the AR6, much more can be done to enhance technology transfer and capacity-building under the UNFCCC, and some areas covered by the CTCN and the TEC, such as knowledge development and legitimacy in technological innovation systems, would need much more support to address the transformational changes envisioned in the Paris Agreement.[101]

IV. Conclusions

67. Based on the assessment findings, the main successes in terms of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer are the following:

(a) Early signs have been observed of favourable conditions being created by the Technology Mechanism for the adoption of new and existing technologies by developing countries, including the implementation of recommendations on policy, strategy and action plan development from CTCN technical assistance projects;

(b) TEC and CTCN events and meetings are recognized by stakeholders as facilitating networking and collaboration on technology development and transfer within and between developed and developing countries, which is further supported through multi-country technical assistance from the CTCN;

(c) The CTCN has effectively supported Parties in developing, updating or implementing their TNAs and TAPs, as shown by the fact that 16 countries received support from the CTCN to undertake or update their TNAs, and that a large number of countries received assistance to implement their TNAs and TAPs;

(d) Recognition of the work of the CTCN and its potential benefits for developing countries is increasing, as shown by the significant increase in the number of technical assistance requests received;

(e) Both the CTCN and the TEC are considered by stakeholders to be cost-effective with regard to their respective mandates, facilitated by organizational structure,

[100] FCCC/CP/2021/3, para. 55.
[101] Contribution of Working Group III to the AR6, p.16-71.

rules of procedure, activity planning and a monitoring and evaluation system that contributes to optimizing their operations;

(f) The CTCN has met the targets of its annual operating plans with regard to the delivery of activities (namely technical assistance, outreach and capacity-building, and knowledge-sharing activities) and benefits from a positive perception among stakeholders with regard to the relevance and quality of the services offered;

(g) The TEC performed well in implementing its workplan, as it met or exceeded the targets regarding preparing policy recommendations for the CMA and the COP and facilitating events;

(h) The findings from both the CTCN monitoring and evaluation system and past evaluations have been considered by the CTCN Advisory Board and taken into account when preparing CTCN annual operating plans and programmes of work;

(i) The TEC and the CTCN have made demonstrable efforts to collaborate with a broad range of stakeholders in supporting the implementation of the Paris Agreement and have been working together closely to enhance coherence and synergy under the Technology Mechanism;

(j) Efforts have been made regarding gender mainstreaming in the work of the TEC and the CTCN;

(k) The CTCN has, to some extent, enhanced its collaboration with the operating entities of the Financial Mechanism;

(l) Both the TEC and the CTCN have been responsive to the guidance provided by the CMA and have structured their rolling workplans and programmes of work respectively around the five key themes of the technology framework;

(m) In-kind and pro bono support provided to the CTCN has increased and new sources of funding (e.g. NDC Partnership and Adaptation Fund) have emerged;

(n) The CTCN has institutional legitimacy under the UNFCCC, strong sectoral expertise, agility and responsiveness, as well as the unique profile of supporting small projects that are not normally supported by other centres or initiatives.

68. Based on the assessment findings, the main challenges in terms of the effectiveness and adequacy of the support provided to the Technology Mechanism in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer are the following:

(a) The Technology Mechanism's role in facilitating the transformational changes towards climate resilience and low GHG emission development envisioned in the Paris Agreement is considered to be constrained by the large scale of action required to achieve the purpose and long-term goals of the Paris Agreement, coupled with the limited resources allocated to the Mechanism;

(b) Assessing the impacts of the Technology Mechanism in quantitative terms is complex, as they are intended to catalyse systemic change, which is not visible in the short term and would require a more sophisticated and resource-intensive monitoring and evaluation system (notably for the TEC);

(c) Limitations in terms of dissemination and use of TEC products by the CTCN, NDEs and Parties have been observed;

(d) The engagement of the private sector and the research community in the work undertaken by TEC and the CTCN could be enhanced;

(e) There is a lack of follow-up activities for the technical assistance projects of the CTCN, owing to the limited resources of the CTCN to scale up technology deployment and the limited engagement and capacity-building of a wider range of local stakeholders during the implementation phase to scale up on their own, which creates uncertainties with regard to the sustainability of long-term outcomes and impacts;

(f) NDEs lack political support and visibility in order to raise their profile within Government and the private sector, and would benefit from additional financial, material and human resources from both the Technology Mechanism and their national host institutions in order to fulfil their roles;

(g) The CTCN has faced challenges in implementing its resource mobilization strategy by diversifying its funding streams (e.g. it did not receive any financial support from MDBs, the private sector, or philanthropic or innovative sources) and being financially autonomous (owing to a lack of regular and predictable funding and earmarking that tends to shift the focus of the CTCN towards specific activities or locations), which has had a negative impact on its ability to respond to requests for technical assistance;

(h) A lack of resources allocated to CTCN technical assistance with an adaptation focus or supporting hardware implementation has been noted by stakeholders, although not all stakeholders agree that the Technology Mechanism should support hardware implementation;

(i) Although opinions of those surveyed and interviewed differed on whether financial, human and technical resources provided to the TEC and the CTCN are sufficient to achieve their mandates, the CTCN would have been able to respond to more country needs if increased resources were available, as well as conduct more follow-up activities and ex post project evaluations.

V. Recommendations

69. Recommendation 1 is to **encourage the TEC and the CTCN to identify priority areas of work when developing their future workplans, using the guidance provided by the technology framework and the findings of the contribution of Working Group III to the AR6**. Owing to a broad scope of work, structural challenges are faced by the TEC and the CTCN regarding their limited financial resources and autonomy. Both bodies are therefore encouraged to further increase the cost-effectiveness and ensure the adequacy of their services by identifying a set of priority areas on which they could focus their resources and efforts. Priority areas could be defined on the basis of the needs expressed by countries to ensure that the CTCN is country-driven; the guidance provided by the CMA to ensure the alignment of the two bodies of the Technology Mechanism with the provisions and scope of the technology framework; and the conclusions of the contribution of Working Group III to the AR6, where the contribution of both bodies to technology development and transfer is specified. For example, the TEC could fulfil the need to assess innovation with a comprehensive approach, and study the processes through which the outputs of innovation are translated into real-word outcomes, and the CTCN could further strengthen the capabilities of local stakeholders to fulfil technological innovation system functions.[102]

70. Recommendation 2 is to **encourage the CTCN to review the guidance, response plan and closure report templates of technical assistance projects to improve the measurement and promotion of transformational change envisioned in the Paris Agreement**. The CTCN is encouraged to raise awareness among technical assistance stakeholders of the notion of transformational change in order to improve the incorporation of transformational change into the design of technical assistance projects and to facilitate the reporting of evidence of transformational change during the implementation of technical assistance.[103] Additional guidance on transformational change could be elaborated in collaboration with the TEC and disseminated to local stakeholders and project implementers. The templates for response plans and closure reports could be revised to include reporting on how technical assistance is promoting and contributing to transformational change, as suggested by the transformational impact assessment conducted by UNEP Copenhagen Climate Centre in 2020.

[102] Contribution of Working Group III to the AR6, pp.16-5 and 16-37.

[103] See Pal U, Bahadur AV, McConnell J, et al. 2019. *Unpacking Transformation: A Framework and Insights from Adaptation Mainstreaming*. pp.21–22, which defines the characteristics of transformational changes as inclusive, systemic, catalytic, scale and sustainable.

71. Recommendation 3 is to **encourage the TEC and the CTCN to explore the opportunity of establishing an integrated monitoring and evaluation framework for the Technology Mechanism in the context of the forthcoming TEC workplan and CTCN programme of work**. The current monitoring and evaluation system of the CTCN does not allow for the assessment of its impact on transformational change envisioned in the Paris Agreement owing to limited data reliability and methodological difficulties. In addition, the monitoring and evaluation system of the TEC does not include impact indicators. Both the TEC and the CTCN are encouraged to review their monitoring and evaluation systems in the light of the experiences and lessons learned from the implementation of those systems. Although both bodies have already aligned their systems with each other, they could now aim to improve the measurement of the impacts of the Technology Mechanism as a whole. COP 26 and CMA 3 invited the TEC and the CTCN to strengthen their collaboration, notably by exploring the preparation of an overarching work programme to support the coordination of activities of both bodies, further develop synergies and strengthen the implementation of the mandates of the Technology Mechanism. In designing such a work programme, both bodies are encouraged to explore the opportunity of developing a common and integrated monitoring and evaluation system aligned with the five key themes of the technology framework, as a common system would support the reporting on collaboration between the two bodies and the assessment of transformational change that would take into account the connections between the activities of both bodies.

72. Recommendation 4 is to **encourage the TEC and the CTCN to strengthen their collaboration regarding the outreach of TEC products and the creation of knowledge products that address the practical needs of developing countries**. The present assessment found that TEC policy recommendations and publications have been used by a limited number of stakeholders to enhance technology development and transfer. Improving the dissemination of TEC products will allow them to be used more effectively and frequently. NDEs, as national entities for the development and transfer of technologies, have a key role to play in that regard, thanks to their valuable knowledge and understanding of local and national stakeholders. It is therefore important that they are fully informed of the work and products of the TEC, so that they can then disseminate TEC publications to the relevant stakeholders within the country and better support the use of the publications in the formulation of technical assistance requests. The CTCN response plan template for technical assistance currently includes a guidance note without referencing the work of the TEC.[104] The guidance note for the design of technical assistance could therefore incorporate a recommendation to review TEC products, together with a list of relevant references to TEC publications. The TEC and the CTCN are also encouraged to further pursue the co-creation of knowledge products that respond to the practical needs of NDEs and developing countries, and to work together to disseminate those products, in the same way as for the joint NDC report.

73. Recommendation 5 is to **encourage the CTCN to sustain technical assistance outcomes by reinforcing engagement and capacity-building of a broad range of local stakeholders and offering further follow-up of activities**. Ownership from a limited range of local stakeholders and limited follow-up from the CTCN have both hampered the continuation and potential scaling-up of technical assistance activities. The CTCN is encouraged to revise the process for designing and implementing technical assistance projects in order to strengthen the engagement of the beneficiaries. The implementation of CTCN activities should reinforce the ownership of the projects by the beneficiaries, build their capacity further, including through training and tools, and hold them accountable for monitoring the implementation of technical assistance recommendations. The CTCN is also encouraged to dedicate resources for following up on the results of technical assistance and better demonstrating the outcomes and long-term impacts. Further, the CTCN is encouraged to consider offering a second stage of support to high-potential technical assistance projects to maximize their long-term climate change-related impacts and socioeconomic co-benefits. Although the CTCN could be hampered in its ability to provide additional support owing to a shortage of resources, it could also review the allocation of its resources, for instance by

[104] Available at www.ctc-n.org/technical-assistance.

considering conducting fewer technical assistance projects, but with more follow-up activities.

74. Recommendation 6 is to **encourage the TEC to foster the participation of the research community and private sector**. The TEC is encouraged to further engage and improve synergies with the research community and the private sector to strengthen the link between research and implementation of emerging technologies, and to take full advantage of their valuable sectoral and geographical expertise. Universities concentrate relevant knowledge that could be further tapped into, linked with the information on emerging ideas for international technology transfer and cooperation contained in the contribution of Working Group III to the AR6, which sees a growing role for universities in developing countries serving as central hubs for capacity-building.[105]

75. Recommendation 7 is to **encourage the TEC and the CTCN to continue efforts to enhance resource mobilization to meet the costs associated with their activities and to report on the lack of resources for implementing their respective mandates**. Financial autonomy is a persistent challenge for the CTCN. In line with the recommendation formulated in the second independent review of the CTCN and in accordance with paragraphs 139 and 141 of decision 2/CP.17, the CTCN, in collaboration with UNEP and in consultation with its Advisory Board, is encouraged to continue its efforts to enhance resource mobilization, including by diversifying its sources of funding. The CTCN and the operating entities of the Financial Mechanism are encouraged to strengthen their collaboration with a view to further facilitating the access to funding for CTCN activities. Furthermore, the CTCN and the TEC are encouraged to inform Parties regarding the lack of resources they face for implementing their activities.

76. Recommendation 8 is to **encourage the CTCN to pursue its efforts in building capacity for adaptation and in supporting an increase in technical assistance requests for adaptation**. There are significantly fewer technical assistance projects that focus on adaptation than on mitigation, even though they are just as important. There has been an increase in the number of technical assistance projects for adaptation since the implementation of the AFCIA programme and this trend is expected to continue. As the demand for technical assistance is country-driven, it is importance to raise awareness among Parties of the importance and availability of technology-related solutions for adapting to the effects of climate change. The CTCN is encouraged to raise awareness about climate-related risks and existing adaptation solutions through events, and build the capacity of NDEs, for example through workshops focusing on climate hazards for specific regions. Such regional activities could also provide a basis for further multi-country technical assistance projects.

[105] Contribution of Working Group III to the AR6, pp.16-73 and 16-89.

Annex I*

Evaluation grids developed for the first periodic assessment of the Technology Mechanism

Table I.1
Evaluation of the effectiveness of the Technology Mechanism in supporting the implementation of the Paris Agreement

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
(a) How has the Technology Mechanism facilitated the transformational changes envisioned in the Paris Agreement?	To what extent: • Have TEC and CTCN activities contributed to reducing GHG emissions? • Have TEC and CTCN activities contributed to improving resilience to climate change?	CTCN monitoring and evaluation indicators: • Anticipated metric tonnes of carbon dioxide equivalent emissions reduced or avoided as a result of CTCN technical assistance • Anticipated increased economic, health, infrastructure, built environment or ecosystem resilience to climate change impacts reported by CTCN participant countries Surveys and interviews with stakeholders: • Perceptions of stakeholders (notably NDEs) regarding the contribution of the TEC and the CTCN to reducing GHG emissions or enhancing climate resilience Case studies and documentation review (including GEF project evaluation): • Specific examples of GHG emission savings and/or increased climate resilience resulting from TEC and CTCN activities
(b) How has the Technology Mechanism contributed to the achievement of the long-term vision referred to in Article 10, paragraph 1, of the Paris Agreement?	To what extent: • Have CTCN technical assistance, capacity-building and knowledge-sharing activities contributed to the adoption and use of new and existing technologies in developing countries? • Have stakeholders used TEC recommendations and publications to enhance technology development and transfer?	CTCN monitoring and evaluation indicators: • Anticipated number of technologies identified, transferred or deployed as a result of CTCN support • NDE feedback on the uptake of CTCN technical assistance and non-technical assistance recommendations and outcomes for enhancing technology development and transfer Surveys and interviews with stakeholders: • Perceptions of stakeholders (notably NDEs) regarding the use of TEC recommendations and publications for enhancing technology development and transfer • Perceptions of stakeholders (notably NDEs) regarding the contribution of CTCN technical assistance and non-technical assistance activities to enhancing technology development and transfer Case studies and documentation review (including GEF project evaluation):

* The annexes have not been formally edited owing to time and resource contraints.

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
		• Specific examples of new and existing technologies adopted and used in developing countries as a result of CTCN activities or TEC work (recommendations and publications)
(c) How has the Technology Mechanism contributed to strengthening cooperative action on technology development and transfer?	To what extent: • Have TEC and CTCN events and meetings (e.g. CTCN regional forums) facilitated networking and collaboration among stakeholders? • Have the regional organization of the CTCN and multi-country technical assistance facilitated or enabled collaboration within and between developed and developing country Parties?	CTCN monitoring and evaluation indicators: • Anticipated number of collaborations facilitated or enabled within and between developed and developing country Parties (disaggregated by South–South; research, development and demonstration; and private sector collaboration) Surveys and interviews with stakeholders: • Stakeholder perceptions of the contribution of TEC and CTCN activities to strengthening cooperation among stakeholders on climate technology development and transfer matters Case studies and documentation review: • Specific examples of cooperation between stakeholders resulting from TEC and CTCN activities (e.g. participation in events, implementation of multi-country technical assistance)
(d) How has the Technology Mechanism enhanced the implementation of the technology elements of NDCs and TNAs?	To what extent: • Has the CTCN supported countries in conducting or updating their TNAs? • Have CTCN technical assistance services supported countries in implementing TAPs and project ideas? • Have CTCN non-technical assistance services helped to build the capacity of countries in relation to TNAs? • Has the TEC facilitated the implementation of the technology elements of TNAs and NDCs through its work, including its recommendations and publications? • Have the TEC and the CTCN promoted linkages between TNAs and NDCs, or the alignment thereof, with a view to increasing coherence between TNAs and NDCs and national strategies for climate-resilient low-emission development?	CTCN monitoring and evaluation indicators: • Number of countries that received support from the CTCN to develop their TNAs and TAPs TEC monitoring and evaluation indicators: • Number of sets of policy recommendations relating to TNAs and the uptake of existing technologies • Number of publications produced by the TEC on TNAs and existing technologies Surveys and interviews with stakeholders: • Perceptions of stakeholders (notably NDEs) regarding the use of TEC recommendations and publications in implementing TNAs and NDCs • Perceptions of stakeholders (notably NDEs) regarding the contribution of CTCN technical assistance and TNA activities to supporting the implementation of TNAs and NDCs Case studies and documentation review: • Specific examples of the direct use of TEC recommendations or publications and CTCN activities in implementing the technology elements of TNAs and NDCs
(e) How has the Technology Mechanism resulted in quantitative impacts through technical assistance,	To what extent has CTCN technical assistance:	CTCN monitoring and evaluation indicators:

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
including potential emission reductions, number of technology solutions delivered and investment leveraged?	• Supported key stakeholders in developing, transferring and deploying new and existing climate technologies (innovation)? • Helped countries to establish a clear pathway, with support options, towards enhancing technology development and transfer (implementation)? • Built stakeholder capacity to develop, transfer and deploy climate technologies and enhanced institutional and legal frameworks in this regard (enabling environment and capacity-building)? • Helped in identifying and making available financial and technical resources to support climate technology development and transfer (support)?	• Anticipated number of direct and indirect beneficiaries as a result of CTCN technical assistance (disaggregated by mitigation, adaptation and both mitigation and adaptation) • Number of countries developing, transferring and deploying new and existing climate technologies as a result of CTCN support • Anticipated number of policies, strategies, plans, laws, agreements or regulations proposed, adopted or implemented as a result of CTCN technical assistance (disaggregated by mitigation, adaptation and type) • Anticipated amount of funding or investment leveraged (in United States dollars) as a result of CTCN technical assistance (disaggregated by public or private source, national or international source, and anticipated or confirmed funding) • Number of stakeholders with enhanced technical capacity to develop, transfer and deploy climate technologies • Number of countries with a strengthened national system of innovation as a result of CTCN support Surveys and interviews with stakeholders: • Perceptions of stakeholders (notably NDEs) regarding the outcomes of CTCN technical assistance Case studies and documentation review (including GEF project evaluation): • Specific examples of outcomes of CTCN technical assistance
(f) How have the Technology Mechanism bodies undertaken their work in a cost-effective and efficient manner?	To what extent: • Have the management structure, processes, procedures, communication, and monitoring and evaluation system of the CTCN optimized its operation? • Have the composition, organization (with task forces), rules of procedure, planning of activities, and monitoring and evaluation system of the TEC made its operations efficient? • Could the same results have been achieved with fewer resources without reducing quality and quantity?	Key documentation: • Rules of procedures, guidelines, modalities and workplans Surveys and interviews with stakeholders: • Stakeholder perceptions of the cost-effectiveness and efficiency of TEC and CTCN operations Case studies and documentation review (including GEF project evaluation): • Specific examples of best practices and inefficiency (in terms of communication, organization, administrative processes, operations, etc.)
(g) How has the Technology Mechanism achieved success in terms of how the bodies of the Technology Mechanism have implemented their workplans?	To what extent: • Has the CTCN contributed to knowledge-sharing in relation to research, development and demonstration of new and innovative climate technologies?	CTCN monitoring and evaluation indicators: Technical assistance: • Number of CTCN technical assistance requests supported (disaggregated by technical assistance and fast technical assistance)

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
	• Has the CTCN assisted countries in developing national institutional, legal and regulatory frameworks to encourage research, development and demonstration, and uptake of climate technologies? • Has the CTCN enhanced planning tools and processes for technology development and transfer? • Has the CTCN helped to raise public awareness of climate technologies? • Has the CTCN helped to create enabling environments for the development and transfer of socially and environmentally sound technologies? • Have TEC policy recommendations and publications on innovation, implementation, enabling environments and capacity-building, and support been used by stakeholders? • Have TEC recommendations and publications helped to enhance technology development and transfer?	• Number of countries receiving CTCN support for national institutional, legal and regulatory frameworks to encourage research, development and demonstration, and uptake of climate technologies • Percentage of CTCN technical assistance supported with a gender analysis Capacity-building: • Number of CTCN training sessions and capacity-building activities • Number of participants in CTCN webinars • Number of people trained by the CTCN (disaggregated by gender) • Number of institutions trained by the CTCN (disaggregated by type) • Percentage of participants reporting satisfaction with CTCN training (disaggregated by gender) • Percentage of participants reporting increased knowledge, capacity and/or understanding as a result of CTCN training (disaggregated by gender) • Number of technology feasibility studies conducted and sectoral road maps developed Knowledge-sharing: • Number of knowledge resources related to research, development and demonstration and new and innovative technologies made available on the CTCN knowledge platform • Number of technology descriptions, publications, national plans and other information resources made available on the CTCN knowledge platform (disaggregated by type) • Number of site visits to the CTCN knowledge platform • Number of people reached through CTCN social media channels • Number of mentions of the CTCN in media TEC monitoring and evaluation indicators: • Number of sets of policy recommendations on support for technology development and transfer; • Number of sets of policy recommendations (comprising multiple policy recommendations) on innovative climate technologies and research, development and demonstration; • Number of sets of policy recommendations on technologies for coastal zone adaptation; • Number of sets of policy recommendations on enabling environments and barriers; and development and enhancement of endogenous capacities and technologies • Number of publications on support for technology development and transfer • Number of publications (including policy briefs, executive summaries, papers and compilations of good practices) on innovative climate technologies and research, development and demonstration

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
		• Number of publications on enabling environments and barriers, and enhancement of endogenous capacities and technologies Surveys and interviews with stakeholders: • Stakeholder perceptions of the cost-effectiveness and efficiency of TEC and CTCN operations Documentation review: • Identification of successes of TEC and CTCN activities implemented and planned (determined by a comparison of joint annual reports with annual and rolling workplans)
(h) How have the Technology Mechanism bodies overcome challenges? (i) How have the Technology Mechanism bodies identified opportunities for improvement?	• Which challenges have the TEC and the CTCN faced? • To what extent have they overcome them and how? To what extent: • Do the TEC and CTCN monitoring systems identify gaps between objectives and effective outputs and outcomes, as well as the causes of those gaps? • Have recommendations from various evaluations, in particular with regard to the CTCN, been taken into account?	CTCN monitoring and evaluation indicators: • Lessons learned from technical assistance implementation available on the CTCN knowledge platform Surveys and interviews with stakeholders: • Stakeholder perceptions of challenges encountered by the TEC and the CTCN, actions adopted to overcome those challenges and the results of the actions • Stakeholder perceptions of opportunities, identified or implemented, for improving TEC and CTCN operations (and the results thereof, as applicable) Documentation review: • Assessment of the extent to which recommendations from previous evaluations and reviews have been implemented • Identification of changes in TEC and CTCN activities implemented and planned (determined by a comparison of joint annual reports with annual and rolling workplans)
(j) How have the Technology Mechanism bodies collaborated with stakeholders in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer?	To what extent: • Have the TEC and the CTCN engaged and collaborated with stakeholders (including local communities and authorities, national planners, the private sector and civil society organizations) in the planning and implementation of Technology Mechanism activities? • Have the TEC and the CTCN enhanced engagement between NDEs and stakeholders, including by providing guidance and information? • Have the TEC and the CTCN collaborated and fostered synergies with relevant	CTCN monitoring and evaluation indicators: • Total number of CTCN events and number of climate technology research, development and demonstration related events • Number of participants in climate technology research, development and demonstration related events (disaggregated by gender) • Number of participants attending CTCN events (disaggregated by gender) • Number of engaged Network members (disaggregated by region, type, approach, enabler and expertise) and knowledge partners • Network member engagement in technical assistance • Overall satisfaction of Network members with CTCN services TEC monitoring and evaluation indicators: • Number of stakeholders engaged in the implementation of the TEC workplan • Number of events organized by the TEC

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
	international organizations, institutions and initiatives (including business, research, academic and youth communities) to leverage their specific expertise, experience, knowledge and information (particularly on new and innovative climate technologies)? • Has the CTCN enhanced platforms and tools for collaboration and learning on climate technology development and transfer? • Have the TEC and the CTCN taken into account and supported a broad range of stakeholders with regard to sustainable development, gender, the special circumstances of the LDCs and small island developing States, and the enhancement of indigenous capacities and endogenous technologies? • Have the GCF, the GEF and the SCF implemented recommendations of the TEC? • Have TEC recommendations and publications identified financial and technical resources to support climate technology development and transfer? • Has the level of collaboration between NDEs, GCF NDAs, GEF operational focal points and other donors (MDBs, bilateral banks, United Nations entities) increased?	• Number of events organized by the TEC on innovative climate technologies and research, development and demonstration • Number of events organized by the TEC on enabling environments and barriers, and enhancement of endogenous capacities and technologies • Number of participants (disaggregated by gender) in events organized • Number of events during which TEC members (disaggregated by gender) provided inputs to TEC-related topics • Number of publications produced by the TEC in collaboration with stakeholders Surveys and interviews with stakeholders: • Stakeholder perceptions of the robustness and added value of collaboration between the TEC and the CTCN and stakeholders Case studies and documentation review (including GEF project evaluation): • Specific examples of collaboration (e.g. partnerships) between stakeholders and the TEC or the CTCN in relation to technology development and transfer
(k) How has the Technology Mechanism responded to the overarching guidance provided by the technology framework referred to in Article 10 of the Paris Agreement, including alignment of its work with the themes of the technology framework? (l) How has the Technology Mechanism responded to existing	To what extent: • Have the TEC and the CTCN aligned their rolling workplans and programmes of work, as well as their reporting, with the technology framework (particularly with its five key themes)? • Have the TEC and the CTCN responded to guidance from the CMA in relation to the Technology Mechanism?	Documentation review: • Assessment of the extent to which the rolling workplans or programmes of work and annual operating plans are aligned with CMA decisions related to the Technology Mechanism • Assessment of the outcomes of TEC and CTCN activities in relation to the work of the GCF, the GEF and the SCF (determined by information contained in annual reports to the COP) Surveys and interviews with stakeholders: • Stakeholder perceptions of the level of response of the TEC and the CTCN to the guidance provided under the technology framework and by Parties

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
mandates under the Paris Agreement and to guidance from Parties?		
(m) How has collaboration between the TEC and the CTCN, and the linkages between these bodies and institutional arrangements under the Paris Agreement, contributed to the effectiveness of the Technology Mechanism?	To what extent: • Has the governance of the TEC (members and task forces) and the CTCN (Advisory Board) facilitated communication and cooperation between the two bodies? • Have the UNFCCC and CTCN secretariats supported cooperation between the TEC and the CTCN? • Have potential synergies between the TEC and the CTCN (whether ongoing or completed) been optimized, and how can synergies be improved in the future? • Have the TEC and the CTCN strengthened the provision of feedback between them with a view to ensuring coherence and synergy and the effective implementation of the mandates of the Technology Mechanism?	Surveys and interviews with stakeholders: • Stakeholder perceptions of cooperation between the TEC and the CTCN, and ways to improve it Case studies and documentation review (including GEF project evaluation): • Specific examples of cooperation between the TEC and the CTCN (and outputs)

[a] *Based on decision 16/CMA.1, annex, paras. 2–3.*

Table I.2
Evaluation of the adequacy of support provided to the Technology Mechanism

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
(a) How have the recipients of support provided, namely the TEC, the CTCN, including the NDEs, benefited?	To what extent: • Have TEC stakeholders (TEC members and observers) and CTCN stakeholders (CTCN staff, Network members, Advisory Board members, NDEs) benefited from support? • Have TEC and CTCN activities built the capacity of NDEs to fulfil their role?	Surveys and interviews with stakeholders: • Stakeholder perceptions of the adequacy of support provided to NDEs, considering the need for country-driven support for technology transfer and development Documentation review: • Specific examples of the benefits of support provided to the TEC and the CTCN (found in reports on meetings of the TEC and the CTCN Advisory Board, annual budgets and operating plans) Case studies: • Review of the activities of NDEs, their need for resources, and support from which they have benefited
(b) What are the sources of support provided?	To what extent: • Have TEC activities benefited from support provided by the UNFCCC secretariat? • Have CTCN activities benefited from multi-tier collaboration with the operating entities of the Financial Mechanism? • Have CTCN activities benefited from bilateral, multilateral, private sector and philanthropic sources of support? • Have Parties and relevant organizations in a position to do so supported the TEC or the CTCN by providing financial and other resources?	CTCN monitoring and evaluation indicators: • Number of events and training sessions co-organized with the operating entities of the Financial Mechanism and MDBs • Extent of mutually beneficial engagement (financial, technical or other) between the operating entities of the Financial Mechanism, MDBs and the CTCN • Number of CTCN technical assistance requests supported by the GCF and the GEF • Value of pro bono and in-kind support secured for CTCN activities • Level of donor engagement • Number of technology proposals developed through CTCN technical assistance anticipated to be supported by the GCF or the GEF TEC monitoring and evaluation indicators: • Number of inputs and recommendations provided to the GCF, the GEF and the SCF
(c) What are the types of support provided?	To what extent: • Have TEC and CTCN activities benefited from in-kind and pro bono support? • Is funding received by the bodies of the Technology Mechanism earmarked?	CTCN monitoring and evaluation indicators: • Value of pro bono and in-kind support secured for CTCN activities • Number of CTCN technical assistance requests supported by the GCF and the GEF • Level of donor engagement Case studies and documentation review: • Analysis of direct and indirect TEC and CTCN resources • Specific examples of in-kind and pro bono support provided by Parties included in Annex I to the Convention to non-Annex I Parties through the CTCN Surveys and interviews with stakeholders: • Stakeholder perceptions of the adequacy of sources of support

Question[a]	*Subquestions*	*Quantitative indicators/descriptors*
(d) How has support provided been used, taking into account mitigation, adaptation and cross-cutting actions at the different stages of the technology cycle?	To what extent: • Are financial resources allocated appropriately and efficiently to TEC and CTCN activities (as planned under the budget scenarios of the TEC and the CTCN)? • Are the financial, human and technical resources of the TEC and the CTCN sufficient to achieve their mandates? • Is there a balance between actions taken at different stages of the technology cycle?	Surveys and interviews with stakeholders: • Stakeholder perceptions of the allocation of resources by the TEC and the CTCN, considering needs Case studies and documentation review: • Analysis of the direct and indirect resources, costs and expenses of the TEC and the CTCN • Specific examples of national support provided across the different stages of the technology cycle for mitigation and/or adaptation
(e) What level of support has been provided and has it changed over time?	To what extent has the level of support provided to the TEC and the CTCN changed over time?	CTCN monitoring and evaluation indicators: • Annual percentage increase of funding mobilized for the activities of the CTCN Documentation review: • Analysis of direct and indirect TEC and CTCN resources
(f) To what extent has support provided met the budgets and plans of the Technology Mechanism?	To what extent: • Has support provided through the Technology Mechanism responded to countries' needs? • Have sufficient resources been mobilized for implementing TEC and CTCN activities? • Would the TEC and the CTCN have responded to more country needs if they had more resources? • Have CTCN services (particularly technical assistance) facilitated the leveraging of additional funding? • Have synergies been optimized in providing funding for climate technology development and transfer?	Surveys and interviews with stakeholders: • Stakeholder perceptions of the adequacy of the level of support provided to the CTCN (including NDEs), considering the need for country-driven support for technology transfer and development • Stakeholder perceptions of the adequacy of the level of support provided to the TEC, considering the need for guidance and information on technology development and transfer Case studies and documentation review (including GEF project evaluation): • Specific examples of demands eligible to the Technology Mechanism that have not been fulfilled owing to a lack of support provided to the TEC and the CTCN • Specific examples of funding leveraged by stakeholders thanks to CTCN services or TEC recommendations and publications • Specific examples of collaboration among NDEs, GCF NDAs, GEF operational focal points and other donors that has facilitated the leveraging of funding for climate technology development and transfer

[a] *Based on decision 16/CMA.1, annex, para. 4.*

Annex II

Decisions and documents processed for the first periodic assessment of the Technology Mechanism

The following decisions and documents were processed for the first periodic assessment of the Technology Mechanism:

(a) Decisions of the CMA and the COP;

(b) Procedures and guidelines of the TEC and the CTCN;

(c) Programmes of work and annual operating plans of the CTCN;

(d) Rolling workplans of the TEC;

(e) Joint annual reports of the TEC and the CTCN;

(f) Progress reports of the TEC and the CTCN;

(g) Reports on meetings of the TEC and the CTCN Advisory Board;

(h) Monitoring and evaluation documents of the TEC and the CTCN;

(i) Documents on CTCN operations and services;

(j) Documents on NDEs;

(k) Reviews of the CTCN;

(l) Publications of the TEC and the CTCN;

(m) TEC policy briefs;

(n) UNFCCC publications;

(o) Documents of the Financial Mechanism;

(p) Other documents.

Annex III

Interviewees consulted for the first periodic assessment of the Technology Mechanism

The following interviewees were consulted for the first periodic assessment of the Technology Mechanism:[1]

(a) CTCN staff members (group interview):

(i) Regional Manager for Africa, West Asia and the Commonwealth of Independent States;

(ii) Knowledge and Communication Manager;

(b) Chair of the CTCN Advisory Board and member of the joint TEC–CTCN task force;

(c) Vice-Chair of the CTCN Advisory Board and member of the joint TEC–CTCN task force;

(d) Chair of the TEC, member of the CTCN Advisory Board and member of the joint TEC–CTCN task force and the TEC task forces on innovation, enabling environment and capacity-building, and support;

(e) Vice-Chair of the TEC, member of the CTCN Advisory Board and member of the joint TEC–CTCN task force and the TEC task forces on implementation, and enabling environment and capacity-building;

(f) Chief of the Energy and Climate Branch of UNEP;

(g) UNIDO staff members (group interview):

(i) Director of the Department of Energy;

(ii) Chief of the Climate Technology and Innovation Division;

(h) GCF representative on the CTCN Advisory Board;

(i) GEF observer on the TEC;

(j) LDC representative on the CTCN Advisory Board;

(k) Business and industry non-governmental organization representative on the TEC support task force;

(l) Research and independent non-governmental organization representative on the TEC collaboration and stakeholder engagement task force;

(m) Environmental non-governmental organization representative on the CTCN Advisory Board and member of the joint TEC–CTCN task force;

(n) Youth non-governmental organization representative on the TEC support task force;

(o) Director of the Global Environmental Partnership Office of the Ministry of Economy, Trade and Industry of Japan (donor).

[1] A limited number of NDEs, final beneficiaries and other key national stakeholders will be interviewed as part of case studies.

Annex IV

Methodology for the surveys conducted to inform the first periodic assessment of the Technology Mechanism

1. As part of the first periodic assessment of the Technology Mechanism, TEC members and observers and CTCN Advisory Board members and staff were asked to complete two electronic surveys.

2. The first survey was carried out during the data collection and analysis phase of the assessment. Alongside mandatory questions for all stakeholders, some questions were selected from the sub questions defined in the evaluation grid and tailored to the profile of the respondents. Participants were asked about the extent to which they agreed with a range of statements on a scale from 1 to 10 (to facilitate comparisons between sub questions). They also had the opportunity to provide additional information in open-ended questions.

3. The second survey was conducted as part of the conclusion and recommendations phase of the assessment to seek feedback on the preliminary conclusions and recommendations. This survey allowed participants to submit additional information and prioritize the preliminary recommendations arising from the assessment, as well as reflect on the conditions needed to implement those recommendations.

4. The surveys were edited in English and rather short (under 10 minutes to complete). Most of the questions were in a multiple-choice format, with a few open-ended questions, to facilitate comparisons.

5. The surveys were completed in a dedicated tool, in which questions are answered on a user-friendly interface, automatic reminders to complete the surveys are sent out, statistics and results are compiled automatically, and all data are downloaded into Microsoft Excel. The findings of the surveys therefore consisted of graphs and statistical analyses as well as anonymized text.

6. Both surveys were sent to the same email addresses provided by the UNFCCC secretariat. The first survey was sent at the end of February 2022 for completion by mid-March. The second survey was sent end of June 2022 for completion within two weeks, with two reminders sent out.

Annex V

Consultation plan

Table V.1
Type of stakeholders consulted during the first periodic assessment of the Technology Mechanism

Type of stakeholders\Sources	*Interviews*	*Electronic Survey*	*Case Studies*	*Interviews and surveys conducted during the 2nd independent review of the CTCN (2021)*	*NDE Surveys 2020 and 2022*
CTCN Host	√			√	
CTCN AB members	√	√		√	
CTC Staff	√	√		√	
CTCN Network members				√	
TEC members	√	√			
Constituency Representatives	√	√		√	
NDEs	√		√	√	√
TA beneficiaries	√		√	√	
Financial Mechanism members	√	√			
Donors	√			√	

Annex VI

Evaluation criteria

Table VI.1
Evaluation criteria addressed by the evaluation questions on the effectiveness of the Technology Mechanism in supporting the implementation of the Paris Agreement

Evaluation Question\Evaluation Criteria	*Relevance*	*Coherence*	*Effectiveness*	*Efficiency*	*Impact*	*Sustainability*
(a) How has the Technology Mechanism facilitated the transformational changes envisioned in the Paris Agreement?					√	√
(b) How has the Technology Mechanism contributed to the achievement of the long-term vision referred to in Article 10, paragraph 1, of the Paris Agreement?					√	√
(c) How has the Technology Mechanism contributed to strengthening cooperative action on technology development and transfer?					√	
(d) How has the Technology Mechanism enhanced the implementation of the technology elements of NDCs and TNAs?					√	
(e) How has the Technology Mechanism resulted in quantitative impacts through technical assistance, including potential emission reductions, number of technology solutions delivered, and investment leveraged?					√	
(f) How have the Technology Mechanism bodies undertaken their work in a cost-effective and efficient manner?				√		
(g) How has the Technology Mechanism achieved success in terms of how the bodies of the Technology Mechanism have implemented their workplans?			√			
(h) How have the Technology Mechanism bodies overcome challenges?			√			
(i) How have the Technology Mechanism bodies identified opportunities for improvement?			√			
(j) How have the Technology Mechanism bodies collaborated with stakeholders in supporting the implementation of the Paris Agreement on matters relating to technology development and transfer?		√	√			
(k) How has the Technology Mechanism responded to the overarching guidance provided by the technology framework referred to in Article 10 of the Paris Agreement, including alignment of its work with the themes of the technology framework?	√					
(l) How has the Technology Mechanism responded to existing mandates under the Paris Agreement and to guidance from Parties?	√					
(m) How has collaboration between the TEC and the CTCN, and the linkages between these bodies and institutional arrangements under the Paris Agreement, contributed to the effectiveness of the Technology Mechanism?	√	√				

Table VI.2
Evaluation criteria addressed by the evaluation questions on the adequacy of support provided to the Technology Mechanism

Evaluation Question\Evaluation Criteria	*Relevance*	*Coherence*	*Effectiveness*	*Efficiency*	*Impact*	*Sustainability*
(a) How have the recipients of support provided, namely the TEC, the CTCN, including the NDEs, benefited?				√		
(b) What are the sources of support provided?				√		
(c) What are the types of support provided?				√		
(d) How has support provided been used, taking into account mitigation, adaptation and cross-cutting actions at the different stages of the technology cycle?				√		
(e) What level of support has been provided and has it changed over time?				√		
(f) To what extent has support provided met the budgets and plans of the Technology Mechanism?				√		

Annex VII

Responses of the Technology Mechanism entities to guidance from Parties

Table VII.1
Examples of responses from the TEC and the CTCN to guidance from Parties

Guidance from Parties	*Examples of responses*
Decision 15/CMA.1, para 2. "Decides that the Technology Executive Committee and the Climate Technology Centre and Network, consistently with their respective functions, mandates and modalities of work, shall implement the technology framework in close collaboration under the guidance of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement"	The TEC and the CTCN have collaborated to identify activities to be undertaken jointly in support of the implementation of the Paris Agreement.[a] Over the years they have enhanced their collaboration by increasing the number of joint meetings and joint activities.[b]
Decision 15/CMA.1, para 3. "Requests the Technology Executive Committee and the Climate Technology Centre and Network: (a) To incorporate the guidance contained in the technology framework into their respective workplans and programmes of work, which should also include methods for the monitoring and evaluation of their activities; (b) To include information in their joint annual report for 2019 on how they incorporated the guidance contained in the technology framework into their respective workplans and programmes of work as referred to in paragraph 3(a) above;"	The TEC and the CTCN jointly developed a monitoring and evaluation system to track the impact of their activities and incorporated the guidance contained in the technology framework into their respective workplans and programme of work which is divided according to the five thematic areas of activities, following the key themes of the technology framework.[c] The description of how the bodies incorporated the guidance contained in the technology framework was not included in a comprehensive manner in the Joint Annual Report of the TEC and the CTCN for 2019[d] according to Decision 8/CMA.2, para 2.
Decision 15/CMA.1, para 5. "Requests the Technology Executive Committee and the Climate Technology Centre and Network to report on the progress of their work and challenges and lessons learned in implementing the technology framework in their joint annual reports;"	The Joint Annual Reports describe the progress of work of both bodies, including on the implementation of the technology framework since its adoption at CMA.1. Since 2017 the Joint Annual Reports contain specific sections on challenges and lessons learned in implementing their respective mandates in the respective parts of both bodies, in response to COP 22 guidance. Since 2019, both bodies have incorporated in these sections challenges and lessons learned in implementing the technology framework.[e]
Decision 8/CMA.2, para 2. "Notes, recalling decision 15/CMA.1, paragraph 3, that the information on how the Technology Executive Committee and the Climate Technology Centre and Network have incorporated the guidance contained in the technology framework into their respective workplan and programme of work was not included in a comprehensive manner in the joint annual report referred to in paragraph 1 above, and requests the Technology Executive	Information on how the TEC and CTCN have incorporated the guidance contained in the technology framework into their respective workplan and programme of work is contained in annex II of the Joint Annual Report of the TEC and the CTCN for 2020.[f]

Guidance from Parties	*Examples of responses*
Committee and the Climate Technology Centre and Network to include this information in their joint annual report for 2020”	
Decision 8/CMA.2, para 3.	
“Also notes the areas identified by the Technology Executive Committee and the Climate Technology Centre and Network for collaboration in 2019–2022, in supporting implementation of the Paris Agreement, and requests them to finalize in 2020 the development of activities to be undertaken jointly in those areas with a view to incorporating the guidance contained in the technology framework into these activities”	In addition to the joint activities implemented in 2020, the bodies finalized in 2020 their activities to be undertaken jointly in 2021–2022, starting with technology and NDCs and gender and technology that were initiated in 2021.[g]
Decision 8/CMA.2, para 4.	
“Encourages the Technology Executive Committee and the Climate Technology Centre and Network to continue to report on the progress of their work as well as on challenges and lessons learned in implementing the technology framework;”	The TEC and the CTCN continue to report on the progress of their work, challenges and lessons learned in implementing the technology framework in their Joint Annual Report for 2020 and 2021.[h]
Decision 8/CMA.2, para 5.	
“Requests the Technology Executive Committee and the Climate Technology Centre and Network to continue to implement their respective mandates with strengthened efforts on all key themes of the technology framework when serving the Paris Agreement.”	The TEC and the CTCN strengthened their implementation of the 5 key themes of the technology framework by increasing their respective activities. However, there are still areas that may need to be strengthened, such as extending collaboration and engagement of relevant stakeholders (i.e. private sector).[i]

[a] *FCCC/SB/2019/4, para. 10.*
[b] *FCCC/SB/2021/5, para. 13.*
[c] *FCCC/SB/2019/4, para. 12, 23 and 92.*
[d] *Decision 8/CMA.2, para. 2.*
[e] *FCCC/SB/2019/4, paras. 50 and 120.*
[f] *FCCC/SB/2020/4, annex II.*
[g] *FCCC/SB/2020/4, para. 15, and FCCC/SB/2021/5, para. 8.*
[h] *FCCC/SB/2020/4, para. 51 and chap. IV.D, and FCCC/SB/2021/5, para. 45 and chap. IV.D.*
[i] *TEC document TEC/2022/24/13, p.16.*

Annex VIII

Technology Executive Committee and Climate Technology Centre and Network outcomes and outputs

Table VIII.1
Outcomes and outputs of the CTCN[1]

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
Innovation	Outcome 1: Key stakeholders develop, deploy, and diffuse new and existing innovative climate technologies	1.A. Number of countries developing, transferring and deploying new and existing climate technologies as a result of CTCN support	25-30 countries served	75 countries served	25 – 30 countries per year	39
		1.B. Number of anticipated cooperative research, development, and demonstration programmes within and between developed and developing country Parties facilitated as a result of CTCN TA	4-5 matchmaking & pro bono opportunities realized	8 pro-bono opportunities 2 matchmaking events	South-South: 2-3 per year RD&D: 4-5 per year Private sector: 4-5 per year	26 total South-South: 12
	Output 1.1: Knowledge sharing on climate technology RD&D and new and innovative technologies	1.1.a. Number of climate technology RD&D-related knowledge sharing workshops and events [does not include trainings]	5-10	12	4 – 5 per year	18
		1.1.b. Number of participants in climate technology RD&D-related workshops and events (gender- and country- disaggregated)	150-200	823	150-200 per year	289 total 182 men; 107 women
		1.1.c. Number of knowledge resources related to RD&D and new and innovative technologies made available on the CTCN knowledge platform	30-40	40	30-40 per year	32
	Output 1.2: Countries assisted in	1.2.a. Number of countries receiving CTCN support for national institutional, legal and	*	23 countries	The CTCN is demand driven	3

[1] AB/2022/19/11.1 and AB/2021/17/14.1.

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
	developing national institutional, legal and regulatory frameworks to encourage climate technology RD&D and uptake	regulatory frameworks to encourage climate technology RD&D and uptake				
		1.2.b. Number of countries with strengthened National Systems of Innovation as a result of CTCN support	*	0	The CTCN is demand driven	9
	Outcome 2: Countries have clear pathways with identified support options to enhance technology development and transfers	2.A. NDE feedback on potential uptake of CTCN TA and non-TA recommendations and products to enhance technology development and transfer	*	74%	N/A as qualitative survey	No NDE survey for this year
		2.B. Number of countries having received support from CTCN to implement TNAs and TAPs	15-20	28	No target	0
		2.C Amount of funding/investment mobilised or leveraged (in USD) as a result of the TAs (disaggregated by public national/international sources, private sector national/international sources)	10:1 (external finance: CTCN investment)	CTCN Investment: 1.589.620 USD Funding leveraged: over 250 million USD	10:1 (external finance: CTCN investment)	From CTCN closure forms: 584,800,522 USD From concept notes developed as a result of CTCN TA for submission for scaled-up funding: 178,421,702 USD
Implementation						
	Output 2.1: Enhanced planning tools and processes for technology development and transfer	2.1.a. Number of CTCN technical assistance supported (disaggregated between TA and FTA)	30 new requests supported	48 new requests supported in 2020 (4 FTAs; 44 TAs))	30 requests supported per year	23 TAs completed in 2021 (21 TAs; 2 FTAs) 37 TAs started implementation in 2021 (including 1 multi-country TA and 1 FTA) 24 TAs that were started in previous years were under implementation in 2021 (including 1 multi-country TA) In total 84 TAs supported in 2021
		2.1.b. Lessons learned from TA implementation available on CTCN knowledge platform	*	4	80% of technical assistance cases completed in reporting year	19 (90.5%)

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
		2.1.c Number of technology feasibility studies conducted and sectoral road maps developed	*	12	The CTCN is demand driven	18
	Output 2.2: Enhanced technical capacity for technology development and transfer	2.2.a. Percentage of participants reporting satisfaction with CTCN training (disaggregated by gender)	>90% satisfaction (3+ on 5-pt scale) reported by workshop/training participants	Data not collected at this time	>90% satisfaction (4+ on 5-pt scale) reported by workshop/training participants	Data provided by implementors in closure reports in 2021 is insufficient to inform this indicator
		2.2.b. Percentage of participants reporting increased knowledge, capacity and/or understanding as a result of CTCN training (disaggregated by gender)	>90% satisfaction (3+ on 5-pt scale) reported by workshop/training participants	Data not collected at this time	>90% satisfaction (4+ on 5-pt scale) reported by workshop/training participants	Data provided by implementors in closure reports in 2021 is insufficient to inform this indicator
Collaboration and Stakeholder Engagement	Outcome 3: A broad range of stakeholders collaborate in promoting gender-responsive climate technology development and transfer	3.A. Number of engaged network members and knowledge partners	20% of Network members	44%	20% of Network members and knowledge partners	25.5%
		3.B. Percentage of new CTCN TA implemented through Network Members	75 to 80% of TA implementers contracted in 2020	75%	No target.	14 TAs implemented by network members 9 TAs implemented by Consortium Partners
		3.C. Overall satisfaction of key stakeholders with CTCN services	Average satisfaction 3.5/5	Network Member Survey: On average, respondents indicating all four activities were ‘useful, beneficial	>90% satisfaction (3+ on 5- point scale) reported by Network members	No network survey for the year 2021 (bi annually)

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
				or moved as planned'.		
	Output 3.1: Enhanced platforms and tools for collaboration and learning on climate technology development and transfer	3.1.a. Number of tools, technical documents and information material supported by the assistance (excluding mission, progress and internal reports) (disaggregated by type)	80-100	200	80-100 per year	253
	Output 3.2: Active partnerships between scientific community, authorities, private sector, CSOs, and financial institutions	3.2.a. Total number of members in the CTC Network (disaggregated by region, type, approach, enabler and expertise)	620	624	620 by 2020 + 10% increase per year	707
		3.2.b. Number of organizations engaged through CTCN support, disaggregated by type of organization (Excluding TA implementers)	125-150	NC	NC	NC
		3.2.c. Number of South-South collaborations enabled during or through CTCN TA support, when stakeholders from other countries were involved in the assistance	2-5	13	NC	NC
Enabling Environment and Capacity Building	Outcome 4: Stakeholders have the necessary capacity and enhanced institutional and legal frameworks to develop, deploy and diffuse climate technologies	4.A. Number of stakeholders with enhanced technical capacities to develop, deploy and diffuse climate technologies	450-500	2,858	450-500	573 people trained through CTCN TA (215 women, 358 men)
		4.B Anticipated number of policies, strategies, plans, laws, agreements or regulations proposed, adopted, or implemented as a result of the TA (disaggregated by mitigation, adaptation, type)	10-12	11	The CTCN is demand-driven	33 in total 13 mitigation 1 adaptation 19 mitigation and adaptation
	Output 4.1: Facilitation of widespread public awareness on climate technology	4.1.a. Number of technology descriptions, publications, national plans, and other information resources made available on the CTCN knowledge platform (disaggregated by type)	200	140	200 per year	883 for 2021

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
		4.1.b. Number of participants in CTCN webinars	600	1,097	600	Due to the Pandemic, most of the CTCN's events were held online. The CTCN has therefore counted the number of participants in CTCN webinars and events together – see 4.1.d
		4.1.c. Total number of CTCN events	15	24	15	53
		4.1.d. Number of participants attending CTCN events (disaggregated by gender)	2000	1,023	2,000	3,164
		4.1.e. Number of site visits to CTCN knowledge portal	130,000	402,609	10% increase per year	563,655 site visits in 2021 - 40.00% compared to 2020
		4.1.f. Number of people reached through CTCN social media channels	250,000	38 M	10% increase per year	13,2% increase in total followers in 2021 on Twitter 6,4% increase on Facebook
		4.1.g. Number of mentions of CTCN in media	30	752	30 per year	1070 mentions in global media (29,7% increase compared to 2020)
	Output 4.2: Enabling environments created for the development and transfer of socially and environmentally sound technologies	4.2.a Number of policies, strategies, plans, laws, agreements or regulations supported by CTCN for tech transfer (disaggregated by type, adaptation, and mitigation)	*	Data not collected at this time	The CTCN is demand driven	33 in total 13 mitigation 1 adaptation 19 mitigation and adaptation
		4.2.b. Number of CTCN training sessions and capacity-strengthening activities	6	34 trainings	6	27
		4.2.c. Number of people trained (disaggregated by gender)	500	2,858	500	573 358 men, 215 women
		4.2.d. Number of institutions trained (disaggregated by type)	*	Data not collected at this time	(The CTCN is demand driven – the nature of TA requests is determined by Parties submitting requests)	241 including 75 Government, 127 private sector and 39 NGOs

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
		4.2.e. Percentage of technical assistance supported with a gender analysis	80%	86%	80%	72%
	Outcome 5: Financial and technical resources identified and available to support climate technology development and transfer	5.A. Annual percentage increase of funding mobilised for the activities of the CTCN	10% increase in funding mobilized for the activities of the CTCN	225% increase from 2019 to 2020 32% increase from 2019 to 2020 attributed to GCF only	10% increase in funding mobilized for the activities of the CTCN per year.	26%
		5.1.a. Number of events co-organised with operating entities of the Financial Mechanism (GEF, GCF), MDBs	6	1	6	3
Support	Output 5.1: Multi-tier collaboration with Financial Mechanism operating entities	5.1.b. Extent of mutually beneficial engagement (financial, technical or other) between the operating entities of the Financial Mechanism (GEF, GCF), MDBs, and the CTCN	*	GCF – 21 Readiness Proposals GEF - Piloting Innovative Financing for Climate Adaptation Technologies in Medium-Sized Cities Adaptation Fund - AFCIA MDBs - IsDB & EBRD active collaboration	Qualitative indicator	TA cases funded or under consideration by GCF, GEF and Adaptation Fund to date; participation in CTCN Advisory Board meetings and other relevant meetings and event
		5.1.c. Number of technical assistance supported by the GEF/GCF (disaggregated by adaptation/mitigation)	10-12	25	10-12	2 GCF readiness projects completed in 2021
	Output 5.2: Diversification and mobilization of the types and sources of technical and	5.2.a. Value of pro bono and in-kind support secured for CTCN activities	$500,000 - 1 million	$719,190	$500,000 - 1 million	565,412 USD in 2021 2.176.967 USD to date
		5.2.b. Level of donor engagement	10 donors engaged	8 donors engaged	20 donors engaged	22 donors engaged

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Target 2020*	*Result 2020*	*Target 2021*	*Result 2021*
	financial support available to countries	5.2.c. Number of technology proposals developed through CTCN technical assistance that are supported by the GEF/GCF	3-5	9	3-5 per year	32 Concept Notes for further financing were developed from CTCN's TAs completed in 2021 and capacity building activities.

Table VIII.2
Outcomes and outputs of the TEC[2]

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Targets by 2022*	*Results 2019*	*Results 2020*	*Results 2021*
Innovation	Outcome 1 – Innovation: Various actors develop, deploy, and diffuse new and existing climate technologies	1.1. Number of sets of policy recommendations (comprising multiple policy recommendations) developed on innovative climate technologies and RD&D	3	0	0	1
		1.2. Number of publications (including policy briefs, executive summaries, papers and compilation of good practices) developed on innovative climate technologies and RD&D	5	0	0	6
		1.3. Number of events organised by TEC on innovative climate technologies and RD&D	1	0	3	7
Implementation	Outcome 2 – Implementation: Countries have clear pathways with identified support options to enhance technology development and transfer	2.1 Number of sets of policy recommendations (comprising multiple policy recommendations) on TNA and uptake of existing technologies	5	1	2	1
		2.2 Number of publications developed by TEC on TNA and existing technologies	6	0	2	1
Collaboration and Stakeholder Engagement	Outcome 3 - Collaboration and stakeholder	3.1 Number of events organized by the TEC to enhance collaboration and stakeholder engagement	6	5	6	4
		3.2 Number of participants to the events organised	300	>300	>135	113

[2] Data provided by the UNFCCC.

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Targets by 2022*	*Results 2019*	*Results 2020*	*Results 2021*
	engagement: A broad range of stakeholders collaborate in promoting climate technology development and transfer	3.3 Number of non-TEC events where TEC members (men, women) provided inputs on TEC-related topics	8	None collected	>4	>8
		3.4 Number of publications developed by the TEC in collaboration with stakeholders	2	0	1	1
		3.5 Number of sets of policy recommendations developed on technologies for coastal zones	1	0	1	0
		3.6 Number of events organized by the TEC covering multiple workstreams of the TEC workplan		5	6	2
		3.7 Amount of UNFCCC social media engagement (retweets, shares, responses) regarding various activities (events, publication launches, etc.)		Per tweet: Retweets:56 Likes:105 Views:0	Per tweet: Retweets:61 Likes:120 Views:5,040	Per tweet: Retweets:34 Likes:74 Views:1,200
				Per LinkedIn post: Likes:0 Views:0	Per LinkedIn post: Likes:86 Views:1,281	Per LinkedIn post: Likes:74 Views:1,057
				Impressions: 0	Impressions: 5,174	Impressions: 4,239
		3.8 Google Analytics (pageviews) for the TEC's content posted in UNFCCC newsroom		816	1 025	1 116
		3.9 Google Analytics (pageviews) for the TEC's content posted on TT:Clear pages		46 310	52 754	70278
Enabling environment and capacity building	Outcome 4 - Enabling environment and capacity-building: A broad range of stakeholders have the resources and means to deploy climate technologies	4.1 Number of sets of policy recommendations (comprising multiple policy recommendations) on enabling environments and barriers, and on development and enhancement of endogenous capacities and technologies	2	1	0	1
		4.2. Number of publications developed by TEC on enabling environments and barriers, and on enhancement of endogenous capacities and technologies	4	0	0	2
		4.3. Number of events organised by TEC on enabling environments and barriers, and on enhancement of endogenous capacities and technologies	2	1	0	0

Themes of the Technology Framework	*Outcome/Output*	*Indicator*	*Targets by 2022*	*Results 2019*	*Results 2020*	*Results 2021*
Support	Outcome 5 – Support: Financial and technical resources identified and available to support climate technology development and transfer	5.1 Number of sets of policy recommendations (comprising multiple policy recommendations) on support for technology development and transfer	1	0	0	0
		5.2 Number of publications developed on support for technology development and transfer	3	1	0	0
		5.3 Number of inputs and recommendations provided to GCF, GEF, and SCF	8	2	1	2
Gender	Outcome 6 – Gender considerations	6.1 Number of TEC activities where gender considerations have been integrated	11	0	0	3
		6.2 Number of policy recommendations containing gender considerations	N/A	0	0	2
		6.3 Distribution of invited speakers to TEC events disaggregated by gender (in %)	Gender balance: female: 50%; male: 50%	Total: 56 Female: 24 (43%) Male: 32 (57%)	Total: 67 Female: 29 (43%) Male: 38 (57%)	Total: 72 Female: 39 (54%) Male: 33 (46%)

Annex IX

Reports on the case studies

I. Dominican Republic

A. Country's context

1. To date the Dominican Republic benefitted from three completed TAs and two are being delivered (among which one is a multi-country TA with Cuba, Ecuador, El Salvador, Paraguay). Completed TAs addressed the following topics: i) energy efficiency, ii) early warning and environmental assessment, and iii) ecosystems management. TAs under implementation are economy wide (cross-sector) and are expected to contribute to both adaptation and mitigation. The country also benefited from several capacity building and knowledge sharing activities. The CTCN has organized six regional forums and NDE training workshops in the Caribbean. Since 2021, Dominican Republic sits on the steering committee of the Latin America and the Caribbean coalition for a regional circular economy, of which the CTCN is a strategic partner.

B. Main findings

77. The findings of this case study are based on the insights provided by two interviewed stakeholders (out of the five initially targeted) and the content of the documents provided by the CTCN, national stakeholders and those available online. They provide concrete examples to the overarching answers provided to the evaluation questions in the core of the report.

1. Capacity-building

78. Interactions with the TEC / Use of TEC recommendations / Complementarity between TEC policy guidance and CTCN services: Stakeholders from Dominican Republic have not worked with the TEC nor used its products.

79. Efficiency of the CTCN in providing its services: Stakeholders consider the delivery of CTCN services in Dominican Republic as efficient. The TA implementers complied with the requirements and needs expressed in the TORs: i) virtual and on-site consultation workshops were organized in an efficient and satisfactory manner, ii) communication with implementers was considered as fluid and relevant by stakeholders, and iii) the presentation of results was timely and considered by stakeholders of high-quality standard.

80. Adoption of new or existing technologies after taking part in CTCN activities: The TAs delivered to date in Dominican Republic are mainly based on data collection and analysis, and capacity building. One of the three TAs had a direct technology component with the development of an IT application supporting early warning systems in Santo Domingo, where the good adequacy of the adopted technology regarding the local context appeared as key to ensure sustainable improvement of the warning services and products.[1] In addition, a TA has contributed to the development of a nationally appropriate mitigation action that has consequently supported the transition to high efficiency lighting technologies (light emitting diodes – LEDs) by establishing mandatory minimum energy performance standards (MEPS) for efficient lighting products in residential, commercial and industrial applications as well as a large-scale LED deployment scheme with participation of utility companies to facilitate a rapid transformation of the market to high efficiency LEDs.

[1] CTCN TA closure report – "An Early Warning Service in every Pocket of Santo Domingo". Available at https://www.ctc-n.org/technical-assistance/projects/community-based-early-warning-system-every-pocket-santo-domingo-dn.

81. Support to the implementation of TNA and / or NDC: Interviewed stakeholders and TA deliverables and reports clearly indicated that TA activities and areas of work are supporting Dominican Republic in achieving its NDC, both on adaptation and mitigation objectives. For instance, the TA that supported the transition of the Dominican Republic to high efficiency lighting technologies has contributed to achieve its NDC to reduce by 25% its greenhouse gas emissions by 2030. In addition, the TA supporting the early warning systems in Santo Domingo was relevant for 3 NDC priority sectors: tourism (effective dissemination of warnings via mobile app to tourists); water (hydrometeorological hazards were included in the scope of work) and Human Settlements (working in among the poorest districts of Santo Domingo). At present, the on-going assistance conducted in the framework of the Climate Action Enhancement Package (CAEP) consists in identifying mitigation goals and adaptation needs of the private sector, NGOs, banking, academia and propose solutions to overcome gaps between these and the NDCs.

82. Provision of support and reinforcement of capacities: Interviewed stakeholders perceived their capacities as reinforced thanks to CTCN activities. They also expressed that CTCN services were relevant to their respective mandate.

83. Collaboration with CTCN and TEC and other stakeholders regarding technology development and transfer: From the projects implemented so far, stakeholders generally consider that TAs have reinforced the engagement of the private sector and academics in the implementation of country commitments (NDC). The use of participatory approaches and the engagement of cooperation with local, national and international organisations in the implementation of TAs, have been identified as key success factors, as evidenced by the closure report of the completed TA "An Early Warning Service in every Pocket of Santo Domingo". To fully mobilize international experience, technical expertise and local knowledge, establishing a clear governance is required. On the longer term, giving a prominent ownership to local partner serves the sustainability of the project in the country.

84. Cooperation with other Parties: The multi-country TA aiming to design of circular economy roadmap under implementation has already inspired Dominican stakeholders with experiences from other countries (Cuba, Ecuador, El Salvador, Paraguay) having successfully implemented circular economy roadmaps.[2] Additionally, regional events are perceived as useful to increase collaboration among countries in the Caribbean region.

2. Access to funding

85. Support of CTCN services (TA notably) in leveraging additional funding: Beneficiaries did not indicate having leveraged funding thanks to CTCN activities. Specifically, regarding the TA provided for early warning systems in Santo Domingo, the closure report states that funding options were identified but more time would have been needed to secure them, which can be challenging if the momentum triggered by the TA decline in the years following its delivery.

86. Use of TEC recommendations or publications for identifying additional financial sources to support development and transfer of climate technologies: No use of TEC recommendations or publications have been reported by interviewees, nor identified in the documentation review.

87. Collaboration with GCF NDAs, GEF OFPs, and donors: Dominican Republic has received support from various donors to fulfill its international climate engagements. It notably accessed funds for consultancy through the CAEP facility of the NDC partnership, but not through the national focal point. The level of collaboration to access these multilateral funds is considered as rather timid by stakeholders.

88. Restrictions in submitting demands and / or receiving TA from the CTCN: None.

[2] Assessment of the current status of the circular economy for developing a roadmap.

3. Impacts and sustainability

89. The following paras cover the main expected and materialized outcomes of CTCN TAs.

90. Development, transfer or deployment of new technology solutions by stakeholders: The closure report of the TA related to the development of an application supporting early warning systems (EWS) in Santo Domingo indicates that the CTCN TA mechanism was well suited for this purpose, as it supplies time and resources for interactively identifying bottlenecks in the system and agreeing upon projects. Results achieved include notably the adaptation of EWS services and products for public information, the integration of local warning systems with the National EWS, the delivery of a platform for sharing and exchanging information among EWS stakeholders. According to interviewed stakeholders, there is an opportunity for replicating this TA and supporting the evaluation of similar systems in the region and establishing a regional initiative.

91. Definition of a clear national pathway with identified support options to enhance technology development and transfer: No national pathways have been developed in the framework of the first three implemented TAs in Dominican Republic. However, both TAs currently being delivered are expected to provide Dominican Republic with clear roadmaps, notably on circularity. The related impacts cannot be assessed at this point in time.

92. Building the capacity of stakeholders and enhanced institutional and legal frameworks to develop, transfer and deploy climate technologies: The TA "Capacity building to develop a biological mountain corridor in los Haitises" has provided the local government with specific knowledge and technologies for managing landscapes, ecosystems and hydrological networks, strengthening local markets, creating opportunities for rural communities and comprehensive policy frameworks, regulations and strong governance platforms.

93. New financial and technical resources identified and made available to support climate technology development and transfer: With increased follow-up activities, it is suggested that TAs could further help in securing funding by giving more time to the cooperative momentum after the project is delivered.

94. Examples of GHG savings or increase climate change resilience resulting from CTCN and TEC activities: Not assessed because of a lack of reliable and exhaustive data.

II. Thailand

A. Country's context

95. To date Thailand benefitted from six completed TAs, while one is in design phase. Three TAs tackled energy efficiency issues, two were related to early warning and environmental assessment and one TA focused on agriculture and forestry. Half of them is expected to contribute to adaptation and the other half to the mitigation objective. The country also benefited from several capacity building and knowledge sharing activities. The CTCN has organized ten regional forums and NDE training workshops.

B. Main findings

96. The findings of this case study are based on the insights provided by two interviewed stakeholders (out of the five initially targeted) and the content of the documents provided by the CTCN, national stakeholders and those available online. They provide concrete examples to the overarching answers provided to the evaluation questions in the core of the report.

1. Capacity-building

97. Interactions with the TEC / Use of TEC recommendations / Complementarity between TEC policy guidance and CTCN services: Interviewed stakeholders indicated having used

TEC products to prioritize technology sectors relatively to the context in Thailand. The complementarity between TEC guidance and CTCN services brings the value-added of working with the legitimacy of the Technology Mechanism and the guidance of the UNFCCC to complete the NDCs.

98. Efficiency of the CTCN in providing its services: Interviewed stakeholders were very satisfied with the efficiency of CTCN delivered services. However, room for improvement were identified in terms of project management related issues, notably: i) when coordinating the project timeline with multiple stakeholders (furthermore attached to different entities and ministries) is required, and ii) due to language barriers. To ensure smooth coordination and complete understanding from every project stakeholder, a good practice identified was the designation of a key local beneficiary / agency (with the agreement of the NDE) at the pre-implementation phase of the project.

99. Adoption of new or existing technologies after taking part in CTCN activities: Taking part in CTCN activities, stakeholders have created the conditions for adopting climate-related technologies and environmentally sound practices, but challenges remain for wide-scale technologies adoption. For instance, the closure report of the TA "Energy efficient street lighting technologies and financing models in Thailand" completed in July 2020 states that despite the clear evidence about the benefits supported by positive results of energy efficient street lightening demonstration projects (representing about 60%-70% of the total electricity consumed by the municipality annually), uptake of energy efficient street lighting technologies at the municipal level have been very slow because of the lack of confidence in investing in these new technologies in a large scale and limited access to finance. It has also been highlighted by interviewees that CTCN TA could focus more on the adoption of technologies that are ready to transfer and collaborate more with alliances from private sectors.

100. Support to the implementation of TNA and / or NDC: Interviewed stakeholders and TA deliverables and reports clearly indicated that TA activities and areas of work are supporting Thailand in achieving its NDC both on adaptation and mitigation objective. For instance, the TA completed in December 2021 "Enabling Readiness for Up Scaling Investments in Building Energy Efficiency for Achieving NDC Goals in Thailand" was directly aimed at contributing to the NDC goal of reducing 26.1 million tonnes GHG emissions in the building sector through compliance with the Building Energy Code (BEC), sustainable building materials and effective construction practices. In addition, CTCN activities on TNA and TAP projects improved the capability of a final beneficiary, the National Science and Technology Development Agency (NSTDA), notably by identifying, assessing, and prioritizing technological needs.

101. Provision of support and reinforcement of capacities: Interviewed stakeholders have expressed that CTCN activities have contributed to strengthen their capacity and that CTCN's services were relevant to their respective mandate. To be more impactful in its capacity building activities, interviewed stakeholders have suggested that CTCN could focus more on building better climate resilient systems in post Covid-19 situation, for example: i) by delivering TAs related to crisis management, ii) by facilitating experts exchange program to share knowledge, and iii) by providing capacity building and joint research program on science-politics policy to tackle crises.

102. Collaboration with CTCN and TEC and other stakeholders regarding technology development and transfer: Stakeholders perceive the level of cooperation at national level as very good. The NDE expressed being well identified as such in its national context and TA beneficiaries consider the delivery of TAs as very participative - the NDE playing an important role in organizing and facilitating the delivery of the TA. CTCN activities have encouraged stakeholders in forward thinking on future of technology and engaged Thai stakeholders to focus on climate resilient technology.

103. Cooperation with other Parties: Regional events and workshops are considered by interviewed stakeholders as very useful in the extent that they allow to collaborate and share best practices with countries having similar context in the same region.

2. Access to funding

104. Support of CTCN services (TA notably) in leveraging additional funding: Even though further financial support would be required to sustain TAs, beneficiaries did not indicate having leveraged funding thanks to CTCN activities. However, it appears that potential Thai applicants for technical and financial support directly interact with focal points of the Financial Mechanism and not with the NDE associated with the Technology Mechanism. Linking TA to GCF project proposals could be a way to bridge more systematically the work of the Technology Mechanism with the funding capacities of the Financial Mechanism and to ensure the sustainability of the TA outputs. For instance, regarding specifically the TA under design "High resolution regional climate model projections for Thailand", sufficient funding could not be leveraged to buy the necessary high-performance computers. Pro-bono contribution from developed countries could be an option to finance this equipment.

105. Use of TEC recommendations or publications for identifying additional financial sources to support development and transfer of climate technologies: Stakeholders indicate having used TEC recommendations and publications to better identify and prioritize sectors and technologies.

106. Collaboration with GCF NDAs, GEF OFPs, and other donors: The level of collaboration with financing entities through the activities of the Technology Mechanism appears as rather limited. The NDE occasionally interacts with the GCF NDA while no interaction with the GEF OFP is observed.

107. Restrictions in submitting demands and / or receiving TA from the CTCN (due to CTCN budget constraints while eligible): None observed by interviewed stakeholders.

3. Impacts and sustainability

108. The following paras cover the main expected and materialized outcomes of CTCN TAs.

109. Development, transfer or deployment of new technology solutions by stakeholders: The CTCN is doing an important job in assisting the early developments of project but could focus more on technology matching with countries needs and collaborative efforts on joint activities in R&D and technology transfer. It also appears that in the post covid-19 era, experts exchange program could be beneficial to improve the coordination and skills in climate resilient technology, to help developing country access to knowledge through learning experiences.

110. Definition of a clear national pathway with identified support options to enhance technology development and transfer: CTCN activities, and particularly technical assistances, have set the conditions for the development and transfer of socially and environmentally sound technologies and practices. For instance, the TA "Energy efficient street lighting technologies and financing models in Thailand" completed in July 2020 has initiated discussion between the final beneficiary (the Provincial Electrical Authority of Thailand) and the national government (including the Ministry of Energy and Ministry of Finance) on implementing a multi-year implementation plan for energy-efficient street lighting in Thai municipalities.

111. Building the capacity of stakeholders, enhancing institutional arrangement and legal frameworks to develop, transfer and deploy climate technologies: Stakeholders have expressed that CTCN TA implementers are not always engaging enough with national and local partners. These stakeholders have been identified as key for facilitating the sharing of the knowledge built during TAs and for sustaining the impacts. Local ownership and long-term collaboration between local stakeholders may increase the likelihood of success of TA activities. NDE expressed a lack of capacity for performing following-up activities, so this aspect should be already integrated in the TA implementation plan.

112. New financial and technical resources identified and made available to support climate technology development and transfer: Overall, stakeholders highlighted that CTCN

activities mainly helped in building capacity of stakeholders, by providing mainly technical resources, while the mobilization of financial resources is not subsequent to taking part in CTCN activities.

113. Examples of GHG savings or increase climate change resilience resulting from CTCN and TEC activities: Not assessed because of a lack of reliable and exhaustive data.

III. United Republic of Tanzania

A. Country's context

114. To date the United Republic of Tanzania benefitted from four completed TAs and two are on-going. Two of the completed TAs were multi-country TAs covering several African countries. In addition, two TAs are currently in design phase. Most of the TAs addressed energy issues including energy efficiency and implementation of renewable energy, and one TA focuses on transport issue (e-mobility). Except for one TA in design phase that should contribute to both adaptation and mitigation objectives, all the other TAs are expected to contribute only to mitigation. The country also benefited from several capacity building and knowledge sharing activities. The CTCN has organized seven regional forums and NDE training workshops for Africa. Several experts from Tanzania participated in workshops on RD&D.

B. Main findings

115. The findings of this case study are based on the insights provided by three interviewed stakeholders (out of the five initially targeted) and the content of the of the documents provided by the CTCN, national stakeholders and those available online. They provide concrete examples to the overarching answers provided to the evaluation questions in the core of the report.

1. Capacity-building

116. Interactions with the TEC, use of TEC recommendations, and Complementarity between TEC policy guidance and CTCN services: Overall, interviewed stakeholders indicated having little to no knowledge of TEC products. The Tanzanian NDE got to know the TEC in 2021 and interacted with it once since (through an online meeting), while beneficiaries of completed Technical Assistances did not communicated with the TEC or used its products.

117. Efficiency of the CTCN in providing its services: The engagement of all relevant local stakeholders appears as a key success factor in the efficient and successful delivery of TAs. The closure report of the completed TA "Scaling-up sustainable wood fuel (charcoal and firewood) systems in the Pwani, Lindi and Mtwara regions of Tanzania" clearly states that having involved a wide array of stakeholders (NDE, proponents, government departments, NGO, private sector and individuals including grassroot communities involved in woodfuel production, trade and use) was crucial to make the TA successful, and enabled to yield "multi-dimensional and useful insights allowing to make the woodfuel systems sustainable and to address societal problems associated to the sector." Conversely, interviewees noted that because of the lack of on boarding and involvement of local communities, a key component of the TA "Sustainable domestic water pumping using solar photovoltaic" could not be performed, while it would have allowed for future replication and dissemination of the lessons learned during the project (documented and practical guidelines for water authorities) instead of having a hardware pilot working but not sufficiently maintained. Overall, it is widely expressed by interviewees that the more local communities and partners are involved along the project, the more likely it is that it will be cautiously followed-up and generate tangible impacts over a longer time span. Some TA have been negatively impacted by the

covid-19 pandemic, but it has been noticed that the CTCN and the implemented have been flexible and arranging to make the remote delivery as smooth as possible.

118. Adoption of new or existing technologies after taking part in CTCN activities: Taking part in CTCN activities, Tanzanian stakeholders have created the conditions for adopting climate-related technologies and environmentally sound practices. While the use of solar photovoltaic technology has been supported thanks to the ad-hoc training developed in the framework of the completed TA "Promoting the sustainable use of solar photovoltaic technology in Tanzania", the on-going one "sustainable domestic water pumping using solar photovoltaic" allows to develop a new GCF project for water-related technology (water desalination) and scale up the government investments in water schemes. In addition, the TA implemented to identify the most suitable direct use applications and technologies in low to medium temperature geothermal systems in six African countries enabled Tanzanian beneficiaries to target potential direct use of geothermal applications as well as the corresponding sectors and technologies that are best suited to benefit from direct use of geothermal projects.

119. Support to the implementation of TNA and / or NDC: Interviewed stakeholders and TA deliverables and reports clearly indicated that TA activities and areas of work are supporting the implementation of NDC. For instance, the TA related to the promotion of the sustainable use of solar photovoltaic technology contributed to the NDC target to "reduce greenhouse gas emissions economy wide between 10-20% by 2030 relative to the Business As Usual scenario".

120. Provision of support and reinforcement of capacities: Even though NDE activities could be further supported, interviewed stakeholders expressed that their capacities have been reinforced thanks to CTCN activities and that its services are relevant to their respective mandate.

121. Collaboration with CTCN and TEC and other stakeholders regarding technology development and transfer: Stakeholders have perceived a good level of cooperation at national level. The NDE considers being well identified as such in its national context and TA beneficiaries consider the delivery of TAs as very participative (the NDE playing an important role in organizing and facilitating the delivery of the TA). The key success factor identified for a high level of satisfaction regarding cooperation is a high level of engagement of TA implementers with local communities and partners. Both the NDE and TA beneficiaries observed an improved collaboration with other national organizations through CTCN activities (such as NDAs, academia, the private sector, etc) as a result of the implementation of TAs. For instance, the solar photovoltaic related TA helped strengthen collaboration between the beneficiary and the private sector,[3] while the TA related to sustainable wood fuel strengthened official relationships with the public administration.[4] Overall, the covid-19 pandemic and staff turnover along project implementation have been the main reasons for a lower level of interactions.

122. Cooperation with other Parties: Multi-country TAs are considered by interview stakeholders as very proficient in the extent that they to collaborate and share best practices with countries having similar context in the same region.

2. Access to funding

123. Support of CTCN services in leveraging additional funding: A TA beneficiary, the Tanzania Renewable Energy Association (TAREA) indicated having accessed finance from international organization thanks to the solar training programme implemented under the TA on "Promoting the sustainable use of solar photovoltaic technology". The TA made it easier to convince international donors to finance the implementation of a solar training center and the provision of materials to Tanzanian stakeholders.

[3] Promoting the sustainable use of solar photovoltaic technology in Tanzania.

[4] Scaling-up sustainable wood fuel (charcoal and firewood) systems in the Pwani, Lindi and Mtwara regions of Tanzania.

124. Use of TEC recommendations or publications for identifying additional financial sources to support development and transfer of climate technologies: No use of TEC recommendations or publications has been revealed by interviewees and identified in the documentation review.

125. Collaboration with GCF NDAs, GEF OFPs, and donors: The level of collaboration with the operating entities of the Financial Mechanism appears to be rather low. The NDE has collaborated with experts assigned by the GCF NDA in the framework of the preparation of a GCF Readiness and Preparatory Support Proposal,[5] but no interaction with the GEF OFPs was observed. In addition, the NDE occasionally communicated with UNDP on a specific project.

126. Restrictions in submitting demands and / or receiving TA from the CTCN: None.

3. Impacts and sustainability

127. The following paras cover the main expected and materialized outcomes of CTCN TAs.

128. Development, transfer or deployment of new technology solutions by stakeholders: The CTCN is recognized as playing a key role in assisting the early development of projects. The on-boarding of local stakeholders has been observed to have a direct effect on their long-term viability. For instance, as explained by interviews stakeholders, the pilot technology installed during the implementation of the TA "Sustainable domestic water pumping using solar photovoltaic" is still working; however, there is an inherent risk that the project will not to be enough maintained (and repaired in case of a future break down) because of the lack of ownership of the technology by the local community (that has not been enough on-boarded).

129. Definition of a clear national pathway with identified support options to enhance technology development and transfer: CTCN activities, and particularly TAs, have set the conditions for the development and transfer of socially and environmentally sound technologies and practices. It can be exemplified by the TA "Scaling-up sustainable wood fuel (charcoal and firewood) systems in the Pwani, Lindi and Mtwara regions": i) until last year, TAREA, the beneficiary, was not able to build upon the outcomes of the TA due to political issues and a lack of coordination regarding biomass energy in Tanzania, ii) the Tanzanian Ministry of Resources and Tourism - the main administration responsible on the supply side - and the Ministry of Energy – the main administration responsible on the demand side - were not coordinated on this topic. TAREA has been advocating for more coordination and the situation got unlocked in 2021. TAREA is now expecting to operationalize the results of the study elaborated with the CTCN and conduct an organizational update in the 3 regions.

130. Building the capacity of stakeholders, enhancing institutional arrangement and legal frameworks to develop, transfer and deploy climate technologies: Thanks to the TA "Promoting the sustainable use of solar photovoltaic technology in Tanzania", a training program was developed by TAREA to improve the syllabus for solar artisans and a solar training center was implemented at Arusha Technical College (ATC) two years after the end of TA.

131. New financial and technical resources identified and made available to support climate technology development and transfer: Stakeholders expressed that the potential leverage effect of TAs is not fully tapped into in Tanzania because of a lack of awareness of the Ministry of finance and Vice-President offices for government funding to scale-up projects and sustain the impacts.

132. Examples of GHG savings or increase climate change resilience resulting from CTCN and TEC activities: Not assessed because of a lack of reliable and exhaustive data.

[5] National framework for leapfrogging to Energy Efficient Appliances and Equipment in Tanzania (Refrigerators and Distribution Transformers) through regulatory and financing mechanism.

Annex X

Breakdown of Climate Technology Centre and Network and Technology Executive Committee finances (2017–2021)

Table X.1
Type of CTCN funding (2017–2021)[1]

	2017	2018	2019	2020	2021	Total
Unearmarked	4 936 965	2 739 432	967 128	109 083	2 869 602	11 622 210
Unearmarked (%)	72%	33%	25%	1%	24%	26%
Earmarked	1 927 188	5 553 223	2 856 837	13 262 979	9 227 556	32 827 784
Earmarked (%)	28%	67%	75%	99%	76%	74%
Total	**6 864 153**	**8 292 655**	**3 823 965**	**13 372 062**	**12 097 159**	**44 449 994**
Total funding – Year-on-year variation (%)	-16%	21%	-54%	250%	-10%	

[1] Analysed from the data provided by the CTC, without pro-bono contributions.

Table X.2
State of the resource mobilization strategy of the CTCN as of 2021

	2017			2018			2019			2020			2021		
	Target	**Actual**	**Gap (%)**	***Target***	**Actual**	**Gap (%)**	***Target***	**Actual**	**Gap (%)**	***Target***	**Actual**	**Gap (%)**	***Target***	**Actual**	**Gap (%)**
Bilateral donors / host agencies	-	6 364 003	-	-	7 377 271	-	*10 000 000*	3 623 447	-64%	*10 000 000*	7 078 869	-29%	*10 000 000*	9 867 700	-1%
In-kind / pro-bono, Financial Mechanism, MDBs	-	500 150	-	*5 000 000*	915 384	-46%	*6 000 000*	620 466	-90%	*7 800 000*	7 012 383	-10%	*7 800 000*	2 607 458	-67%
Bilateral pro-bono/in-kind support	-	NC	-	-	NC	-	*2 000 000*	419 948	-79%	*2 000 000*	719 190	-64%	*2 000 000*	378 000	-81%
GCF	*500K/y*	500 150	-40%	*1 000 000*	915 384	-8%	*4 000 000*	200 518	-95%	*4 000 000*	5 271 513	32%	*4 000 000*	1 901 345	-52%
GEF	*1M/y*	-	-50%	-	-	-100%	-	-	-100%	*1 800 000*	50 000	-100%	*1 800 000*	-	-100%
AF	-	-	-	-	-	-	-	-	-	-	650 000	-	-	-	-
NDC Partnership	-	-	-	-	-	-	-	-		-	321 680	-	-	328 113	-
Others	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Private sector / philantropic / innovative sources	-	-	-	-	-	-	*5 000 000*	-	-100%	*5 000 000*	-	-100%	*5 000 000*	-	-100%
Total		6 864 153			8 292 655			4 243 913			14 091 252			12 475 159	

Table X.3
Cumulative funding of the CTCN by type of sources (2017-2021)

	Cumulative (2017-2021)	
	Actual (abs)	**Actual (%)**
Bilateral donors / host agencies	34 311 291	75%
In-kind/pro bono, Financial Mechanism, MDBs	11 655 841	25%
Bilateral pro-bono/in-kind support	1 517 138	3%
GCF	8 788 910	19%
GEF	50 000	0.1%
AF	650 000	1%
NDC Partnership	649 793	1%
Others	-	0%
Private sector / philanthropic / innovative sources	-	0%
Total	45 967 132	100%

Table X.4
Funding, budget, and expenses of the CTCN (2017-2021)[2]

Year	2017	2018	2019	2020	2021	TOTAL
Budget	13 700 000	9 110 000	9 210 000	10 000 000	10 003 800	**52 023 800**
Expenditure	9 614 150	5 972 138	6 548 917	9 942 985	10 883 432	**42 961 622**
Funding	6 864 153	8 292 655	3 823 965	13 372 062	12 097 159	**44 449 994**
Gap – Budget vs. Exp.	-30%	-34%	-29%	-1%	9%	**-17%**
Gap – Funding vs. Exp.	-29%	39%	-42%	34%	11%	**3.5%**

Table X.5
Income and expenses of the TEC (2017-2021)

	Year	2017	2018	2019	2020	2021	TOTAL
Income	Core income	494 186	615 378	670 350	601 701	547 234	**2 928 850**
	Supplementary income	503 803	17 965	256 265	38 643	283 726	**1 100 402**
Expenses	Core expenses	(494 186)	(615 378)	(670 350)	(601 701)	(547 234)	**(2 928 850)**
	Supplementary expenses	(364 854)	(229 913)	(74 942)	(131 171)	(160 115)	**(960 996)**
Surplus / (Deficit)		138 948	(211 948)	181 323	(92 528)	123 611	**139 406**
		14%	-33%	20%	-14%	15%	**3%**

[2] Without pro-bono contributions.