

Fourteenth meeting of the Technology Executive Committee

**United Nations Campus, Bonn, Germany
28–31 March 2017**

Report

1. Opening of the meeting

1. The Chair of the Technology Executive Committee (TEC) for 2016, Ms. Duduzile Nhlengethwa-Masina, opened the 14th meeting of the TEC at 2 p.m. on Tuesday, 28 March 2017.
2. The table below lists the TEC members who attended TEC 14. Observers present at the meeting are listed in annex I.

TEC members attending TEC 14	
Mr. Ayele Hegena Anabo	Mr. Naoki Mori
Mr. Robert Berloznik	Ms. Duduzile Nhlengethwa-Masina (Vice-Chair)
Mr. Pedro Borges	Ms. Claudia Alejandra Octaviano Villasana
Ms. Gabriela Fischerova	Mr. Michael Rantil (Chair)
Ms. Stella Gama	Mr. Hugh Sealy
Mr. Mareer Mohamed Husny	Ms. Viktoriia Shtets
Mr. Kashefi Kazem	Mr. Changmo Sung
Mr. Ian Lloyd	Mr. Stig Svenningsen
Ms. Elfriede-Anna More	Ms. Adelle Thomas

2. Organizational matters

a) Election of the Chair and Vice-Chair of the Technology Executive Committee for 2017

3. The TEC elected Mr. Michael Rantil (Sweden) as the Chair and Ms. Nhlengethwa-Masina (Swaziland) as the Vice-Chair of the TEC for 2017.

b) Adoption of the agenda

4. The TEC adopted the agenda for TEC 14 as contained in document TEC/2017/14/1.

c) Organization of work

5. The TEC Chair presented the proposed organization of work for TEC 14 as contained in document TEC/2017/14/3. The organization of work included, on the first day, an update on the work carried out by all TEC task forces since the last TEC meeting.
6. The TEC took note of the proposed organization of work.

d) Membership matters

7. The TEC welcomed the members elected and re-elected at the twenty-second session of the Conference of the Parties (COP), and all members introduced themselves.



8. The TEC took note of the membership status.¹

3. Update on relevant meetings, events and initiatives

a) Marrakech climate change conference 2016

9. The TEC took note of the information presented by the secretariat on the outcomes of the Marrakech climate change conference, held from 7 to 18 November 2016, on matters relating to technology development and transfer, in particular those that are of relevance to the work of the TEC, and of the oral reports by the Chair and Vice-Chair of the TEC on their participation in relevant meetings and events.

b) Outlook of the Bonn climate change conference in 2017

10. The TEC took note of the overview provided by the secretariat of the preparations for the Bonn climate change conference in 2017 with regard to events that are of relevance to the work of the TEC, and welcomed the remarks of Mr. Deo Saran, Ambassador of the Republic of Fiji to the European Union, on behalf of the High-Level Champions on recent developments regarding global climate action.

c) Technology Facilitation Mechanism

11. The TEC took note of the update provided by the representative of United Nations Environment (UNEP) on the progress of the Technology Facilitation Mechanism of relevance to the work of the Technology Mechanism.

d) Others

12. The Chair and Vice-Chair of the TEC reported on their participation in the 14th meeting of the Board of the Green Climate Fund (GCF), held from 12 to 14 October 2016 in Songdo, Incheon, Republic of Korea, where they were invited to make a presentation on the recommendations of the TEC on linkages between the Technology Mechanism and the Financial Mechanism, in response to a request from the COP.
13. TEC members reported on their participation in the following:
 - (a) The side event of the Korea Pavilion at COP 22, “Low Carbon Development in Addressing Climate Change”, held on 15 November 2016 in Marrakech. One message of the event was that technology impact is very important in simulating pathways for low-carbon societies by 2050;
 - (b) The regional forum of the Climate Technology Centre and Network (CTCN) for Latin America and the Caribbean (Spanish-speaking countries), held from 30 November to 2 December 2016 in Tegucigalpa, Honduras, in parallel with an event of the GCF. The forum included a one-day event coordinated with the GCF where the national designated entities (NDEs) for the CTCN and the national designated authorities for the GCF discussed opportunities to increase cooperation in creating technology projects in the region.
14. The TEC took note of the information provided.

4. Matters relating to the Climate Technology Centre and Network

15. The Chair of the Advisory Board of the CTCN, Mr. Spencer Linus Thomas, provided an update on the preparations for the 9th meeting of the Advisory Board, to be held in Bonn from 3 to 5 April 2017. The Director of the CTCN, Mr. Jukka Uosukainen, provided an update on the operations and progress of work of the CTCN.
16. The TEC took note of the information provided.

¹ <http://unfccc.int/ttclear/tec/members.html>.

5. Implementation of the Technology Executive Committee's rolling workplan for 2016–2018

a) Technology needs assessments

17. The secretariat presented brief background information on the country-driven activities and process for conducting and prioritizing technology needs by developing countries, including the relevant role and ongoing work of the TEC thus far.

i. Possible alignment of the technology needs assessment process and the process to formulate and implement national adaptation plans

18. The TEC considered and agreed with the updated outline of the paper presented by the secretariat on aligning technology needs assessments (TNAs) with the process to formulate and implement national adaptation plans (NAPs).

19. The TEC requested the secretariat to organize a conference call with the members of the TEC task force on TNAs, the Adaptation Committee (AC) task force on NAPs and the nominated members of the Least Developed Countries Expert Group (LEG) before the forty-sixth sessions of the subsidiary bodies (May 2017), and to facilitate a meeting among the members of the respective bodies at those sessions.

20. The TEC agreed to nominate Ms. Adelle Thomas to represent the TEC on the AC task force on NAPs, replacing Mr. Al Binger.

21. The TEC invited its task force on TNA, AC, LEG and CTCN to aim to achieve concrete results from this work before the launch of the Global TNA Phase III project by the end of 2017, in order to provide timely input for the 22 countries taking part in the project.

ii. Methodology on monitoring the technology needs assessment results

22. The TEC considered and agreed with the draft methodology on monitoring and evaluation of the implementation of TNA results, presented by the secretariat with the support of consultants.

23. The TEC highlighted the combined responsibility of the NDEs and the TNA coordinators, considering that NDEs are counterparts for this process in their countries.

24. The TEC agreed to:

- (a) Test the proposed option 1 of the monitoring process in a selected number of countries;
- (b) Further elaborate on the objective of such monitoring;
- (c) Include UNEP-DTU Partnership² and UNEP representatives in its task force on TNAs;
- (d) Report back on findings at TEC 15.

25. The TEC agreed that a methodology for tracking implementation of TNA results may be developed and included in the existing TNA guidance, taking into account the amount of resources required for countries to support such an effort.

b) Climate technology financing

i. Follow-up activities on climate technology financing

26. The TEC took note of the information provided by the representative of the GCF secretariat on the outcomes of the 14th meeting of the Board of the GCF and on the outlook for its 17th meeting (July 2017) on technology-related matters. The TEC also took note of the information provided by the secretariat supporting the Standing Committee on Finance (SCF) on the outcomes of the 15th meeting of the SCF of relevance to the work of the TEC, including the sixth review of the Financial Mechanism and draft guidance to the operating entities of the Financial Mechanism.

² The partnership, formerly known as the UNEP Risoe Centre, operates under a tripartite agreement between Denmark's Ministry of Foreign Affairs, the Technical University of Denmark (DTU) and UNEP.

27. The TEC considered and agreed with the follow-up activities on climate technology financing presented by its task force on climate technology financing.³ The TEC requested the task force to undertake the follow-up activities in close collaboration with the GCF, the Global Environment Facility (GEF) and the SCF.
 28. The TEC also requested its task force on climate technology financing to prepare inputs for the participation of the TEC in the annual meeting of the GCF with the UNFCCC thematic bodies, to be organized in conjunction with COP 23.
- ii. Update of the Poznan strategic programme evaluation report
29. The TEC considered the draft terms of reference for updating the Poznan strategic programme on technology transfer evaluation report, presented by its task force on climate technology financing.
 30. The TEC took note of the information provided by the representative of the GEF secretariat that the GEF will include further mid-term evaluation reports as part of its annual report to COP 23.
 31. The TEC agreed to update the terms of reference as per comments provided during this meeting and to provide an update on its progress in updating the evaluation of the Poznan strategic programme at the forty-seventh session of the Subsidiary Body for Implementation (SBI) (November 2017) and to finalize its updated evaluation report in 2018.
- c) Technologies for mitigation, including in-session thematic dialogue on industrial energy efficiency and material substitution in carbon-intensive sectors
- i. Thematic dialogue on industrial energy efficiency and material substitution in carbon-intensive sectors
32. The TEC held, as part of TEC 14, a thematic dialogue on industrial energy efficiency and material substitution in carbon-intensive sectors.⁴ The purpose of the dialogue was to inform and enhance awareness among policy and decision makers to scale up implementation of energy efficiency policies in carbon-intensive sectors, and to identify and support the development and transfer of innovative technologies, partnerships and programmes with the potential to maximize the impacts of industrial energy efficiency measures.
 33. The TEC considered key findings from the thematic dialogue, in particular recommendations for further work for the TEC derived from the discussions that took place during the dialogue. On the basis of those findings, the TEC agreed to produce a TEC Brief on these topics and requested its task force on mitigation to elaborate the content, on the basis of the needs and challenges identified, taking into account previous work of the TEC in this area. In addition, key findings derived from this work will be extracted for inclusion in potential executive summaries to convey selected messages to tailored target groups as well as in potential key messages to COP 23.
 34. The TEC also considered further means for outreach to and collaboration with relevant institutions and stakeholders and requested its task force on mitigation to explore ways to convey key issues and messages.
- ii. Inputs for the technical expert meetings on mitigation
35. The TEC, responding to an invitation from the secretariat, considered its engagement in and inputs to the technical expert meeting (TEM) on mitigation in May 2017.
 36. The TEC agreed to host a thematic session on "innovative policy and technology solutions for sustainable urban development", as invited by the secretariat as the organizer of the TEM on mitigation, and considered the draft agenda for the thematic session initially prepared by the secretariat. It requested its task force on mitigation to provide further guidance to the secretariat for the preparation of the event. The TEC nominated Ms. Stella Gama to facilitate the session and the TEC Chair to present relevant work of the TEC.

³

http://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/tn_meetings/c1800fbd63ab4e9695dc65d448dbc3f5/8220387456f3444c9d0d0a31109cdfd0.pdf.

⁴ http://unfccc.int/ttclear/events/2017_event1.

37. The TEC discussed its future engagement in the technical examination process and requested its task force on mitigation to provide inputs to the assessment of the process to improve its effectiveness, pursuant to decision 1/CP.21, paragraph 113.

d) Technologies for adaptation

i. Further work on South–South cooperation on technologies for adaptation

38. The TEC considered the draft TEC Brief on South–South cooperation and triangular cooperation on technologies for adaptation in the water and agriculture sectors, presented by its task force on adaptation. It requested the task force to finalize it, taking into account the comments provided by TEC members at this meeting.

39. The TEC took note that the work on the compilation of good practices in South–South practical exchanges aims to guide countries in identifying successful exchanges to assist in the implementation of their adaptation actions. It took note that this document will be finalized at TEC 15.

40. With regard to the analysis of potential South–South and triangular cooperation in assisting countries in implementing their nationally determined contributions and NAPs, the TEC took note that the task will be conducted jointly between its task force on adaptation and its task force on mitigation, starting in 2018.

ii. Inputs for the technical expert meetings on adaptation

41. The TEC took note of the report by its task force on adaptation with regard to inputs that have been provided to the AC working group in preparing for the TEM on adaptation in May 2017.

e) Innovation and research, development and demonstration

i. Special event

42. The TEC considered the update on the organization of the special event, presented by its task force on innovation and research, development and demonstration (RD&D).

43. The TEC requested its task force on innovation and RD&D to update the agenda taking into account the comments provided by TEC members at this meeting and to continue to prepare for the special event.

ii. Technology research, development and demonstration

44. The TEC considered the draft technical paper on enhancing climate technology RD&D financing, presented by its task force on innovation and RD&D.

45. The TEC requested its task force on innovation and RD&D to:

(a) Remove the key message and recommendation sections from the technical paper;

(b) Add a summary section to the start of the technical paper and share the paper with the TEC;

(c) Finalize the paper and make it publicly available by May 2017 as a working paper;

(d) Prepare a draft TEC Brief and draft key messages and/or recommendations to COP 23, on the basis of the working paper and the TEC special event on this matter to be held at the forty-sixth sessions of the subsidiary bodies, for consideration at TEC 15.

iii. Mapping enabling environments and barriers

46. The TEC requested its task force on innovation and RD&D to initiate work on this task in accordance with its rolling workplan for 2016–2018 and to report on its progress to TEC 15.

f) Emerging and cross-cutting issues

47. The TEC considered the recommendations for entry points for collaboration with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts, prepared and presented by its task force on emerging and cross-cutting issues.

48. The TEC agreed to finalize the recommendations taking into account the comments provided by TEC members at this meeting (see annex II). The recommendations will be communicated to the Executive Committee, which is in the process of developing activities for its five-year rolling workplan.

Development and enhancement of endogenous capacities and technologies

49. The TEC considered the presentation of a preliminary study prepared by the secretariat on the development and enhancement of endogenous capacities and technologies. The TEC requested all task forces to take into account the issue of development and enhancement of endogenous capacities and technologies in their respective thematic work.
50. The TEC also requested its task force on emerging and cross-cutting issues to assist the TEC in defining the concept and scope of endogenous capacities and technologies, with a view to providing general guidance for the further work of the TEC in this area.

Update of the Technology Executive Committee's rolling workplan for 2016–2018

51. The TEC requested the secretariat to update the TEC rolling workplan for 2016–2018 to incorporate further activities in various thematic areas discussed and agreed at this meeting.

6. Updated procedures for preparing the joint chapter of the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network

52. The TEC considered the oral report by the Chair and Vice-Chair of the TEC regarding their consultation with the Chair and Vice-Chair of the Advisory Board of the CTCN on this matter. It agreed to update the procedures for preparing the joint chapter of the joint annual report of the TEC and the CTCN (see annex III).

7. Possible approaches for preparing the report of the Technology Executive Committee and the Climate Technology Centre and Network to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

53. The TEC considered the possible approaches, presented by the secretariat, to preparing the report of the TEC and the CTCN to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA). It agreed that the TEC and the CTCN should prepare only one joint annual report that captures their activities to support the implementation of the Paris Agreement and the Convention as specified in relevant decisions and provisions of the COP and the Paris Agreement. This joint annual report will be submitted to the COP and the CMA through the subsidiary bodies.
54. The TEC agreed to revisit this arrangement in future if the CMA provides further guidance on further mandated activities to be supported by the TEC and the CTCN for the implementation of the Paris Agreement.

8. Communication and outreach activities

55. The TEC took note of the information provided by the secretariat on recent communication and outreach activities, including the secretariat's work to update the technology information clearing house TT:CLEAR.⁵

9. Date and venue of the next meeting

56. The TEC took note that TEC 15 is tentatively scheduled to be held in the week starting 11 September 2017.

⁵ <http://unfccc.int/ttclear/>.

10. Other matters

57. The TEC, in responding to the invitation from the secretariat to nominate a representative of the TEC to engage in the work of the Paris Committee on Capacity-building for the mandated term of one year, agreed to nominate Mr. Birama Diarra and Mr. Naoki Mori.
58. The TEC took note that Mr. Diarra and Mr. Mori will both participate in the 1st meeting of the Paris Committee on Capacity-building, which will be held as an in-session meeting in conjunction with SBI 46, and that both members will alternate in representing the TEC at the table.
59. The TEC agreed that both members will jointly conduct any intersessional follow-up work.
60. The TEC requested the secretariat to accommodate this arrangement.

11. Closure of the meeting

61. The Chair and Vice-Chair of the TEC summarized the key outcomes of the meeting and officially closed it at 1.30 p.m. on Friday, 31 March 2017.

Annexes to the report

- Annex I List of observers attending the 14th meeting of the Technology Executive Committee
- Annex II Recommendations for entry points for collaboration with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts
- Annex III Updated procedures for preparing the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network to the Conference of the Parties

Annex I

List of observers attending the 14th meeting of the Technology Executive Committee

Party observers

Mr. El Amin Kouadri Boudjelthia (Algeria)
Mr. Kaci Kamel Belaid (Algeria)
Mr. Martin Pepin Aina (Benin)
Mr. Demangnon Appolinaire Gnanvi (Benin)
Ms. Sonia Regina Bittencourt (Brazil)
Mr. Régis Rathman (Brazil)
Ms. Nika Greger (Germany)
Mr. Dietram Oppelt (Germany)
Mr. Tiziano Pignatelli (Italy)
Mr. Takahiro Murayama (Japan)
Mr. Kenichi Wada (Japan)
Mr. Kazuhiko Hombu (Japan)
Ms. Chae Woon Oh (Republic of Korea)
Ms. Ji-Hee Son (Republic of Korea)
Mr. Dumisani Mthembu (South Africa)

United Nations organizations and specialized agencies

Mr. Jukka Uosukainen (Climate Technology Centre and Network)
Mr. Spencer Thomas (Advisory Board of the Climate Technology Centre and Network)
Ms. Sara Traerup (UNEP DTU Partnership¹)
Mr. Manfredi Caltagirone (United Nations Environment)
Mr. Zitouni Ould-Dada (United Nations Environment)
Ms. Masako Ogawa (Global Environment Facility) (also a resource person for the thematic dialogue)
Mr. Juan P. Hoffmaister (Green Climate Fund)
Mr. Victor Owade (World Intellectual Property Organization)

Intergovernmental organizations

Mr. Roland Roesch (International Renewable Energy Agency)

Non-governmental organizations

Ms. Brigitta Barbara Huckestein (BASF)
Mr. Kolja Kuse (European Business Council for Sustainable Energy)
Mr. John Scowcroft (Global Carbon Capture and Storage Institute)
Mr. Miroslaw Motyka (HIPH/Polish Steel Association)
Mr. Abdessalem Rabhi (Institute for Global Environmental Strategies)
Ms. Brianna Marie Craft (International Institute for Environment and Development)
Mr. Stephen Matthew Minas (King's College, School of Law)
Mr. Jonathan Paul Casey (Practical Action)
Ms. Hilary Chiew (Third World Network)
Ms. Marilyn Averill (University of Colorado at Boulder)
Ms. Heleen De Coninck (Radboud University, Nijmegen)
Ms. Shikha Bhasin (Council on Energy, Environment and Water)

Virtual participation

Mr. Deo Saran (Ambassador of the Republic of Fiji to the European Union)
Ms. Karin Costa Vasquez (Brazilian Center for International Relations)
Mr. Phil La Rocco (Columbia University SIPA and School of Professional Studies)
Mr. Wytze van der Gaast (JIN Climate and Sustainability)

¹ The partnership, formerly known as the UNEP Risoe Centre, operates under a tripartite agreement between Denmark's Ministry of Foreign Affairs, the Technical University of Denmark (DTU) and United Nations Environment (UNEP).

Resource persons for the thematic dialogue on industrial energy efficiency and material substitution in carbon-intensive sectors (29 March 2017)

Mr. Mikael Henzler (Adelphi consult GmbH)
Ms. Jing Ding (China Guodian Corporation)
Mr. Jan-Willem Van De Ven (European Bank for Reconstruction and Development)
Mr. Benoit Lebot (International Partnership for Energy Efficiency Cooperation)
Mr. Eric Masanet (International Energy Agency)
Mr. Antonio Pflüger (Federal Ministry for Economic Affairs and Energy)
Ms. Kanako Tanaka (Japan Science and Technology Agency)
Mr. Hiroyuki Tezuka (Japan Iron and Steel Federation)
Mr. Peter Therkelsen (Lawrence Berkeley National Laboratory)
Mr. Lars Nilson (Lund University)
Mr. Alfred Hartzenburg (National Cleaner Production Centre)
Mr. Marco Matteini (United Nations Industrial Development Organization)

Annex II

Recommendations for entry points for collaboration with the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts

I. Background

1. In October 2015, the Chair and Vice-Chair of the Technology Executive Committee (TEC) for 2015 received a letter from the Co-Chairs of the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (Executive Committee). The letter informed them of the outcome of the discussion on the workplan of the Executive Committee at its 1st meeting, in September 2015. It also invited the TEC, as it undertakes its work, to consider making efforts to reduce and avert loss and damage among particularly vulnerable developing countries, vulnerable populations and the ecosystems that they depend on and to share the outcomes with the Executive Committee.
2. In response to the letter from the Executive Committee, TEC 12 agreed to engage with the Executive Committee to exchange views and explore areas of common interest relevant to the work of both bodies, with the aim of: (a) enhancing understanding of technologies that reduce or avert loss and damage, and adaptation technologies that could be relevant to loss and damage, particularly in vulnerable developing countries; and (b) identifying a specific intervention related to technology that the TEC can contribute relevant to work on loss and damage, as reflected in its rolling workplan for 2016–2018. The TEC also agreed to assign its task force on emerging and cross-cutting issues to deal with these matters and requested the Chair and Vice-Chair of the TEC to lead the initial engagement with the Executive Committee on behalf of the TEC.
3. TEC 13 agreed on the importance of further engagement with the Executive Committee to enhance understanding of technologies that reduce or avert loss and damage, and requested its task force on emerging and cross-cutting issues¹ to undertake further work on this matter by:
 - (a) Identifying TEC outputs that may be relevant to this collaboration;
 - (b) Examining further the information provided by the Executive Committee and any relevant information resulting from the Marrakesh outcomes related to loss and damage;
 - (c) Preparing recommendations for entry points for collaboration with the Executive Committee for consideration at TEC 14.
4. TEC 14 considered the recommendations prepared by the task force on emerging and cross-cutting issues. It agreed to finalize the recommendations taking into account inputs from TEC members at the meeting. The recommendations will be communicated to the Executive Committee, in the light of the fact that the Executive Committee is in the process of developing activities for its five-year rolling workplan.

II. Objectives

5. The objectives of this document are to provide recommendations for entry points for collaboration with the Executive Committee, consisting of: (a) an analysis of common areas of interest of both bodies; and (b) possible means of collaboration in those areas.

III. Scope and approach

6. As the basis for considering the recommendations for the entry points, it was considered important to first review the work of the TEC that may be relevant to the issue of loss and damage. To complement

¹ In implementing its task, the task force on emerging and cross-cutting issues has engaged non-Party stakeholders by including a representative of each of the constituencies of business and industry non-governmental organizations, environmental non-governmental organizations, and research and independent non-governmental organizations.

this, the TEC also looked at the work of the CTCN as the implementation arm of the Technology Mechanism and identified areas that may be relevant, particularly around capacity-building activities.

7. In considering what kind of technological areas could be relevant to the issue of loss and damage, the latest developments of the five-year rolling workplan of the Executive Committee were first reviewed. At its twenty-second session, the Conference of the Parties (COP) approved the indicative framework for the five-year rolling workplan of the Executive Committee,² which contains the indicative strategic workstreams (see the annex). The following elements of the indicative strategic workstreams were identified as the areas where the TEC may find it relevant to contribute views:

- (a) Slow onset events;
- (b) Emergency preparedness, including early warning systems;
- (c) Measures to enhance recovery and rehabilitation and build back/forward better.

8. Secondly, (technological) sectors³ relevant to the three areas identified above (hereinafter referred to as the three loss and damage areas) were identified and then the work/output of the TEC and capacity-building activities of the CTCN in those sectors were reviewed.

9. On the basis of the review of the work/output of the TEC and the CTCN, common areas of interest of both bodies and possible means of collaboration were identified.

IV. Outputs and work of the Technology Executive Committee that may be relevant to potential collaboration with the Executive Committee

A. Slow onset events

10. The Cancun Adaptation Framework (decision 1/CP.16) states that slow onset events cover: sea level rise; increasing temperatures; ocean acidification; glacial retreat and related impacts; salinization; land and forest degradation; loss of biodiversity; and desertification. Sectors that may be relevant to the scope of slow onset events are:

- (a) Agriculture and forestry;
- (b) Coastal zones;
- (c) Infrastructure and urban planning;
- (d) Marine and fisheries;
- (e) Water.

11. In this context, the TEC reviewed the TEC work/outputs that could be relevant to the topic of slow onset events in accordance with the elements of slow onset events and the relevant sectors specified above. These include the work of the TEC in two thematic areas: technology needs assessments (TNAs) and technologies for adaptation.

Technology needs assessments

12. According to the third synthesis report on TNAs,⁴ the most commonly prioritized sectors for adaptation in Parties' TNA reports were agriculture (prioritized by 84 per cent of the Parties) and water resources (prioritized by 77 per cent). Within the agriculture sector, the majority of the technologies prioritized were related to crop management. Biotechnologies, including technologies related to crop improvement, new varieties and drought-resistant, salient-tolerant and short-maturing varieties, were the most prioritized technologies.

² FCCC/SB/2016/3, annex I.

³ Unless reference materials have used their own classification, the classification of sectors in this document is based on the classification that the CTCN uses for adaptation sectors on its website, namely agriculture and forestry, coastal zones, early warning and environmental assessment, human health, infrastructure and urban planning, marine and fisheries, and water.

⁴ FCCC/SBSTA/2013/INF.7.

13. Within the water sector, Parties prioritized technologies relating to rainwater harvesting and water catchments. It may be noted that 93 per cent of the total number of water technologies prioritized can be categorized as supply-side measures, with the remaining 7 per cent relating to demand-side measures.

14. Further, 32 per cent of Parties included their technology needs for infrastructure and settlements (including coastal zones) in their TNA reports as the third prioritized sector. Within this sector, most of the prioritized technologies were related to coastal protection, including both hard and soft measures. The most often prioritized technology was wetland restoration, with other prioritized technologies including seawalls, community-based early warning systems for natural disaster prevention, and beach reclamation.

Technologies for adaptation

Discussion at the workshop on technologies for adaptation

15. The TEC held a workshop on technologies for adaptation in March 2014⁵ in conjunction with TEC 8 and with the support of the Adaptation Committee. At the workshop, the following information relevant to slow onset events was shared:

- (a) The background paper on technologies for adaptation,⁶ an overview and synthesis of experience and lessons learned from successes and failures in the three sectors of agriculture (e.g. seasonal forecasts and insurance, water-saving irrigation, and diversification and resilient crop varieties), water (e.g. boreholes and tube wells, and desalination) and infrastructure and settlements including coastal zones (e.g. wetland restoration, seawalls, and storm surge barriers);
- (b) The presentation on adaptation to climate change in the cold tropics: challenges from the Andes, on experience and challenges in addressing land degradation in the Andes;
- (c) The presentation on development and transfer of water technologies for agriculture in Africa, on good practice for the distribution of pressure irrigation pumps in Africa.

TEC Brief #4 (agriculture sector) and #5 (water sector)

16. The TEC Briefs on technologies for adaptation may also be relevant as they touched upon a number of issues related to slow onset events. The TEC published two TEC Briefs⁷ in November 2014, which focused on technologies for adaptation in the agriculture and water sectors. TEC Brief #4 addressed the application of adaptation technologies in the agriculture sector (e.g. seasonal forecasts, water-saving irrigation, and resilient crop varieties). TEC Brief #5 addressed the application of adaptation technologies in the context of water scarcity (e.g. boreholes and tube wells, rainwater harvesting and desalination).

B. Emergency preparedness including early warning systems

17. The following TEC work/outputs could be relevant to the topic of emergency preparedness including early warning systems.

Technology needs assessments

18. According to the third synthesis report on TNAs, 10 per cent of Parties included their technology needs for climate observation and early warning systems in their TNA reports as the fourth prioritized sector.

Technologies for adaptation

Discussion at the workshop on technologies for adaptation

19. At the workshop, the following information relevant to emergency preparedness including early warning systems was shared:

- (a) The background paper on technologies for adaptation, providing information on experience and lessons learned from community-based early warning systems;

⁵ http://unfccc.int/ttclear/events/2014_event1.

⁶ http://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/events_workshops_adaptationtechs/e7be62ce709c401a82424d8ada44362b/89c4a1f821144621a09dcd3654ecfa6.pdf.

⁷ <http://unfccc.int/ttclear/tec/documents.html>.

(b) The presentation on the power of information and communication technology for adaptation, detailing how information and communication technology can contribute to adaptation, including disaster prevention.

C. Measures to enhance recovery and rehabilitation and build back/forward better

20. In the light of climate change, recovery and rehabilitation would be needed when communities and/or infrastructure have been severely damaged by extreme events such as floods or typhoons, or also when ecosystems or natural resources have been degraded due to the impact of climate change. In this context, sectors that may be relevant are:

- (a) Agriculture and forestry;
- (b) Coastal zones;
- (c) Infrastructure and urban planning;
- (d) Marine and fisheries;
- (e) Water;
- (f) Energy.

Technology needs assessments

21. According to the third synthesis report on TNAs, most of the prioritized technologies within the infrastructure and settlements (including coastal zones) sector were related to coastal protection, including both hard and soft measures, and the most often prioritized technology was wetland restoration, which may have relevance to recovery and rehabilitation.

Technologies for adaptation

22. Among the above sectors, the agriculture and water sectors have been taken up in the work of the TEC on technologies for adaptation. However, the TEC has not done any work that touches upon recovery and rehabilitation so far.

23. As can be seen from the review above, there are many works of the TEC that appear to be relevant to the issues considered under loss and damage from technological perspectives. The synthesis of TNAs provides a good picture of where countries prioritize their technological needs. For some of the themes, the TEC has undertaken deeper analysis, focusing on the technological aspects and lessons learned from the successful implementation of such technologies, for example the TEC Briefs on technologies for adaptation in the agriculture and water sectors. For other sectors, such as coastal zones, infrastructure and early warning systems, the TEC has not done so much work in relation to the themes.

V. Information on the capacity-building activities of the Climate Technology Centre and Network

24. The CTCN, as the implementation arm of the Technology Mechanism, has provided various types of support for developing countries in enhancing their climate technology efforts, including capacity-building activities. The following sections provide information on capacity-building activities of the CTCN that may have relevance to loss and damage, focusing on the three loss and damage areas and relevant sectors identified in chapter IV above.

A. Webinars

25. Webinars are part of the capacity-building activities of the CTCN. They provide interactive presentations on technology topics, highlighting technology opportunities and barriers and offering concrete examples of successful policies and tools that can be replicated in other regions. Webinars are free to the public, conducted by experts from around the world and organized by Climate Technology Centre consortium and Network members.

26. As at 23 February 2017, 74 webinars had been recorded on the CTCN website.⁸ Table 1 shows the number of the recorded webinars that may have relevance to the three loss and damage areas, and examples of the titles of them, for each relevant sector.

Table 1

Recorded webinars that may have relevance to loss and damage

Sector	Number of webinars	Examples of the titles of the webinars
Water	13	<ul style="list-style-type: none"> • Green infrastructure for development and climate resilience • Use of satellite data for drought and flood management • Introduction on technologies for adaptation to climate change in the water sector
Coastal zones	1	<ul style="list-style-type: none"> • Coastal management technologies for climate change adaptation
Agriculture and forestry, early warning and environmental assessment, and infrastructure and urban planning	1	<ul style="list-style-type: none"> • Risk mapping for climate change adaptation – using open GIS data and tools in order to build resilience

B. Technical assistance

27. The CTCN provides technical assistance in the following areas: technology identification and prioritization; research and development of climate technologies; feasibility of climate technology options; law, policy and regulatory reform recommendations; finance facilitation and market creation; and training, awareness-raising and sharing experience. According to the CTCN website,⁹ more than 16 per cent of the technical assistance requests made so far were classified under training, awareness-raising and sharing experience. Further, even if requests were classified as other types of assistance, capacity-building elements were embedded in many cases.

28. As at 23 February 2017, 170 technical assistance requests from developing countries had been submitted to the CTCN and 101 of them were published as active technical assistance on the CTCN website.¹⁰ Table 2 shows the number of the published requests that may have relevance to the three loss and damage areas, and examples of the titles of them, for each relevant sector. The cases that obviously had no relevance to the three loss and damage areas were omitted (e.g. “Financing strategy for light rail transit” under infrastructure and urban planning).

⁸ <https://www.ctc-n.org/news-multimedia/recorded-webinars>.

⁹ <https://www.ctc-n.org/technical-assistance/request-visualizations>.

¹⁰ <https://www.ctc-n.org/technical-assistance/data>.

Table 2

Published technical assistance requests that may have relevance to loss and damage

Sector	Number of requests	Examples of the titles of the requests
Agriculture and forestry	9	<ul style="list-style-type: none"> Technology development for climate resilience and efficient use of resources in the agricultural sector in Thailand Capacity-building in ecosystem-based methods and green infrastructure for sustainable agriculture intensification and disaster risk management
Early warning and environmental assessment	5	<ul style="list-style-type: none"> Preparing an integrated flood management plan for Dungsumchu Basin in Samdrupjongkhar Strengthening Bangkok's early warning system to respond to climate-induced flooding
Coastal zones	5	<ul style="list-style-type: none"> Technology for monitoring and assessment of climate change impact on geomorphology in the coastal areas of Bangladesh Development of technology tools for the assessment of impacts, vulnerability and adaptation to climate change in the coastal zones of Uruguay
Water	4	<ul style="list-style-type: none"> Climate-resilient decision-making methods for Lake Victoria Identification and prioritization of technologies to address water scarcity and climate change impacts in Namibia
Infrastructure and urban planning	1	<ul style="list-style-type: none"> Hydrodynamic modelling for flood reduction and climate-resilient infrastructure development pathways in Jakarta
Marine and fisheries	1	<ul style="list-style-type: none"> Technical assistance and capacity-building for the development of a climate change strategy for the sector of fisheries and aquaculture

29. The CTCN has undertaken several capacity-building activities and provided technical assistance to countries on issues considered under loss and damage upon countries' specific requests.

VI. Recommendations

30. Having reviewed the work of both the TEC and the CTCN, the TEC would propose recommendations for collaboration with the Executive Committee from two aspects:

- (a) Common areas of interest of both bodies;
- (b) Possible means of collaboration.

A. Common areas of interest of both bodies

31. Table 3 presents a matrix of the sectors/technological areas of work of the TEC (and the Technology Mechanism) against the three loss and damage areas identified from the indicative framework for the five-year rolling workplan of the Executive Committee.

32. According to the third synthesis report on TNAs, the most commonly prioritized sectors for adaptation in Parties' TNA reports were agriculture and water resources, followed by infrastructure and settlements including coastal zones, and climate observation and early warning systems. Within the sector of infrastructure and settlements including coastal zones, most of the prioritized technologies were related to coastal protection, including both hard and soft measures. Further, the information on the CTCN technical assistance requests shows that the most frequent sector for which developing countries requested assistance was agriculture and forestry, followed by early warning and environmental assessment, coastal zones and water (see table 2).

Table 3

Matrix of common areas of interest based on the work of the Technology Executive Committee and the Executive Committee

Loss and damage area Technological sector	Slow onset events	Emergency preparedness including early warning systems	Measures to enhance recovery and rehabilitation and build back/forward better
Agriculture and forestry	X		X
Coastal zones	X		X
Early warning and environmental assessment		X	
Infrastructure and urban planning	X		X
Marine and fisheries	X		X
Water	X		X
Energy			X

33. Consequently, the following sectors could be regarded as the sectors in which developing countries have greater interest:

- (a) Agriculture and forestry;
- (b) Water;
- (c) Coastal zones;
- (d) Early warning and environmental assessment.

34. Among these sectors, the TEC has addressed the agriculture and water sectors as part of its work on technologies for adaptation, including publishing TEC Briefs thereon. Also, it may be noted that the CTCN has provided many webinars on the water sector compared with on other sectors (see table 1). On the contrary, there has been little work done by the TEC relevant to **coastal zones** and **early warning and environmental assessment** so far. The TEC may be able to further fulfil its role by addressing those new areas.

35. Therefore, it is suggested that those two sectors could be the common areas of interest of both bodies. Further analysis also shows that technologies for coastal zones could contain some technological elements for early warning and environmental assessment, as described in the TNAs and the TEC work on adaptation technologies. The proposed focus is highlighted below:

Technologies for coastal zones, including:

- (a) **Coastal protection (hard measures)**, for example sea walls, storm surge barriers, beach reclamation, flood gates and tidal barriers;
- (b) **Conservation and restoration of coastal zones (soft measures)**, for example conservation/restoration of wetlands, mangroves or dunes;
- (c) **Early warning systems for coastal zones**, for example community-based early warning systems;
- (d) **Tools for risk management in coastal zones**, for example monitoring and evaluation of coastal land loss, modelling for impact assessment, and integrated management of coastal zones.

36. Integrated management of coastal zones is not only a tool, but could also be a broader concept that covers, for example, building the resilience of energy facilities in coastal zones and land-use planning.

37. In this context, the TEC wishes to emphasize that the precautionary principles should be the guiding principles in considering and formulating action and technological intervention. Application of the

precautionary principles could mean identifying potential risks and their management in order to reduce or avert risks that would cause loss and damage. For example, efforts to conserve existing wetlands in advance could make the extent of wetland restoration (i.e. the need for recovery and rehabilitation) less extensive. Such proactive approaches could include measures to address the impacts or risks in the short, medium and long terms, as appropriate, some of which may be relevant to slow onset events or emerging preparedness.

B. Possible means of collaboration

38. In addition to technological areas that represent a common interest and guiding principles for formulating technology intervention, the TEC also identified possible means of collaboration with the Executive Committee, including:

- (a) **Development of a joint policy brief**, for example on the area of technologies for coastal zones;
- (b) **Collaboration on identifying technical experts who can contribute to expert groups and events/meetings organized by both bodies;**
- (c) **Exchange of inputs and advice between the two bodies to enhance their work**, One example is to continue the dialogue with regard to how enhanced measures of preparedness and resilience-building could help reduce and avert loss and damage.

Annex

Indicative framework for the five-year rolling workplan of the Executive Committee of the Warsaw International Mechanism

1. The Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts presents the following framework, including the table below, as the basis for its five-year rolling workplan. The workplan will be undertaken in the context of the Paris Agreement, decisions 1/CP.16, 3/CP.18, 2/CP.19, 2/CP.20, 1/CP.21 and 2/CP.21 and future relevant decisions and will implement the following three functions of the Warsaw International Mechanism:

- (a) Enhancing knowledge and understanding of comprehensive risk management approaches to address loss and damage associated with the adverse effects of climate change, including slow onset impacts;
- (b) Strengthening dialogue, coordination, coherence and synergies among relevant stakeholders;
- (c) Enhancing action and support, including finance, technology and capacity-building, to address loss and damage associated with the adverse effects of climate change.

2. The workplan will also take into account, in a cross-cutting manner:

- (a) Actions to complement, draw upon the work of and involve other bodies under and outside the Convention;
- (b) Particularly vulnerable developing countries, segments of the population that are already vulnerable owing to geography, socioeconomic status, livelihood, gender, age, indigenous or minority status or disability, and the ecosystems that they depend on;
- (c) The role of sustainable development, including policy and regulatory enabling environments;
- (d) Events that may involve irreversible and permanent loss and damage.

Indicative strategic workstreams of the five-year rolling workplan of the Executive Committee of the Warsaw International Mechanism

- | |
|---|
| <ul style="list-style-type: none"> (a) Slow onset events; (b) Non-economic losses; (c) Comprehensive risk management approaches (including assessment, reduction, transfer, retention), to address and build long-term resilience of countries, vulnerable populations and communities to loss and damage, including in relation to extreme and slow onset events, inter alia, through: <ul style="list-style-type: none"> • Emergency preparedness, including early warning systems; • Measures to enhance recovery and rehabilitation and build back/forward better; • Social protection instruments, including social safety nets; and • Transformational approaches. (d) Migration, displacement and human mobility, including the task force on displacement;^a (e) <i>Placeholder for finance-related topics;</i> (f) <i>Placeholders for additional results from the initial two-year workplan;</i> (g) <i>Placeholder for emerging needs.</i> |
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^aTask force as referred to in decision 1/CP.21, paragraph 49.

Annex III

Updated procedures for preparing the joint annual report of the Technology Executive Committee and the Climate Technology Centre and Network to the Conference of the Parties

The Technology Executive Committee and the Advisory Board of the Climate Technology Centre and Network agreed on the following procedures for preparing their joint annual report to the Conference of the Parties:

- a) It should be a single document covering three sections:
 - i. Joint chapter of the TEC and the CTCN;
 - ii. Report of the TEC;
 - iii. Report of the CTCN;
- b) It should be completed in a timely manner and not exceed the word limit of the UNFCCC, in order to ensure its translation into all six official United Nations languages;
- c) **The joint chapter of the report will be prepared as follows:**
 - i. **The Chair and Vice-Chair of the TEC and the Chair and Vice-Chair of the CTCN Advisory Board will together prepare a draft of the joint chapter, with the support of the secretariat and the CTCN;**
 - ii. **Members of the TEC and members of the CTCN Advisory Board will be invited to independently provide their comments on the draft of the joint chapter, either by electronic means or at a meeting of the TEC and a meeting of the Advisory Board, as applicable;**
 - iii. **The TEC and the CTCN Advisory Board will endeavor to hold a joint meeting to consider and agree on the final joint chapter;**
 - iv. **Should the joint chapter not be finalized at a joint meeting, or should there be no joint meeting, the Chair and Vice-Chair of the TEC and the Chair and Vice-Chair of the CTCN Advisory Board will together finalize the joint chapter, taking into account comments provided by members of the TEC and members of the CTCN Advisory Board.**