Ninth meeting of the Technology Executive Committee

Langer Eugen, Bonn, Germany
18–21 August 2014

Background note

TEC Brief on technologies for adaptation - Water

I. Introduction

A. Background

1. At its 7th meeting (TEC 7) the Technology Executive Committee (TEC) established a Taskforce on Adaptation (hereafter referred as "taskforce") and agreed to hold a workshop on technologies for adaptation in conjunction with TEC 8 in March 2014. One objectives of the exercise was to define one or more topic(s) for TEC Brief(s) on technologies for adaptation. The taskforce was requested to lead the organization of the workshop, with support from external experts and secretariat, and to complete the preparation of the TEC Brief(s) by June 2014.

2. The Workshop on Technologies for Adaptation has been successfully held on 4 March 2014. Subsequently at TEC 8, the TEC considered the outcomes of the workshop and requested the taskforce to conduct further work to define topic(s) for TEC Brief(s) on technologies for adaptation, in consultation with the Adaptation Committee members, and report back to the TEC for final approval intersessionally via electronic means.

3. On 13th May 2014 the taskforce sent to TEC its proposal on topics and key elements of TEC Briefs on technologies for adaptation ("the Briefs") for approval by the TEC. Two Briefs were proposed with topics on Agriculture and on Water, while the key elements that should be included in each Brief are policy development/formulation based on lessons learned so far, the complementarity of hard-, soft-, and org- ware, and knowledge management.

4. Subsequent to the approval by the TEC the taskforce, supported by the secretariat and external experts, prepared the two Briefs with inputs from members of Coherence small group of the Adaptation Committee and representatives of non-governmental organisations and inter-governmental organisations representatives participating as members of the taskforce.[1]

5. The taskforce agreed that the draft of the Briefs will be presented at TEC 9 for consideration and approval by the TEC.

B. Scope of the note

6. The annex to this note contains the draft of TEC Brief on Technologies for Adaptation in the Water Sector.

C. Possible action by the Technology Executive Committee

7. The TEC may wish to consider this draft Brief and provide further guidance to the taskforce with a view to finalising this Brief after TEC 9.

---

[1] The representatives of NGOs and IGO in this taskforce are from: Munich Climate Insurance Initiative, Action Aid, College of the Atlantic, and South Centre

Annex

Draft TEC Brief Technologies for Adaptation in the Water Sector

TEC Brief: Technologies for Adaptation in the Water Sector

Box: *Why this TEC Brief?*

Climate change is expected to have significant effects on water safety and security, altering patterns of availability and distribution and increasing water contamination (UN Water, 2007). Such changes have caused a multitude of impacts, which are expected to escalate due to future climatic changes (IPCC, 2014). Countries have therefore prioritised the water sector as a critical area of focus for adaptation, alongside agriculture. Technologies employed to respond to changes in the water sector are highlighted as a crucial resource for ensuring that adaptation is effective. The Fifth Assessment Report of Working Group 2 of the Intergovernmental Panel on Climate Change (IPCC WGII AR5) has emphasised the role of technology in supporting adaptation to changes in water (IPCC, 2014). Moreover, the Third Synthesis Report of the Technology Needs Assessments (TNAs) reflects the prioritisation of adaptation in the water sector by 77% of Parties (UNFCCC, 2014a). The Technology Executive Committee (TEC) recognises the need for appropriate policies to support countries in employing technologies for adaptation in order to meet the objectives of the United Nations Framework Convention on Climate Change (UNFCCC). This policy brief draws upon existing examples of water technologies to highlight lessons learned and provide recommendations for policy to support the application of technologies for adaptation to climate induced changes in the water sector, in consideration of the Principles for Effective Adaptation as outlined in the IPCC WGII AR5 (accessed at: www.ipcc-wg2.gov/AR5). Insights and recommendations have been developed based on the UNFCCC Background Paper on Technologies for Adaptation (UNFCCC, 2014a). As such, the brief emphasises technologies employed for addressing decreases in water availability, particularly in rural and developing contexts, though some examples from beyond these margins have also been included.

A separate policy brief for agriculture can be referred to for further information and an understanding of symmetries, co-benefits and integration between the agriculture and water sectors.

Part 1: Technologies for Adaptation

The use of adaptation technologies has been broadly defined as "the application of technology in order to reduce the vulnerability, or enhance the resilience, of a natural or human system to the impacts of climate change" (UNFCCC, 2005). The integrally context-specific nature of adaptation determines synchronised approaches as inappropriate and therefore, aggregated definitions are difficult to apply (UNFCCC, 2014b). In fact, all adaptation action must account for specific political, economical, social and ecological contexts together with climate stressors. This has been shown to be particularly true for applying adaptation technologies in the water sector. A lack of consideration of particular circumstances, alongside poor planning, overemphasis of short-term outcomes or failure to account for possible climatic consequences and adaptation limits can result in maladaptation, or "an adaptation that does not succeed in reducing vulnerability but increases it instead" (IPCC, 2001: 378). Water represents a particularly complex sector due to the intrinsic linkage between freshwater resources and other sectors and ecosystems (UNFCCC, 2012). For instance, dam and water diversions in one location can impact the water balance and micro-climate in a different part of an ecosystem. In addition, there are significant synergies, trade-offs and co-benefits with mitigation to be considered. Trade-offs are particularly significant in the water sector where there is a conflict between the security potential from large-scale projects and the energy costs that such projects demand. As such, climate change poses a major challenge to water managers, users and policymakers at different levels who must examine all potential and probable impact scenarios and interrelated issues both within and between regions and sectors throughout planning and implementation processes.

In less developed countries, certain procedures have been devised to support technological application. These include the production of TNAs, which identify, prioritise and highlight technology needs, and Technology Adaptation Plans (TAPs), which are developed on the basis of TNAs to address specific barriers, and identify targets, budgets and responsible stakeholders (UNFCCC, 2014a). TAPs specifically relevant to the water sector have been created by many countries. For example, Cambodia has addressed the transfer and diffusion of small dams, reservoirs, and micro catchments, whilst Lebanon specifically focuses on the Water Users' Association and Zambia seek to enable the implementation of boreholes and tube wells (UNFCCC, 2014a). Resources for such plans and processes can be accessed from the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), which prioritise the water sector, allocating it 14% and 23% of their budgets, respectively (UNFCCC, 2014c).

Box 1: *Complementarity of hard-, soft-, and org- ware*

Technologies are often classified into three types: hardware, software, and orgware. In considering adaptations, it is important to understand the differences between these technology types, as well as their synergies and complementarities. Hard technologies, or hardware, refer to physical tools; soft technologies, or software, refer to the processes, knowledge and skills required in using the technology; and organisational technologies, or orgware refers to the ownership and institutional arrangements pertaining to a technology (Christiansen et al., 2011, UNFCCC, 2014b). In the water sector, hard technologies are exemplified by structures such as ponds, wells, reservoirs and rainwater harvesting equipment, whereas 'soft' technologies are those applied to enhance water use efficiency through, for example, water recycling techniques. Orgware is exemplified in institutional mechanisms such as water user associations and water pricing specifications. The Highland Water Forum in Jordan exemplifies the employment of soft and orgware to support the appropriate adoption of hardware. The forum brought together multiple stakeholders to assist farmers in securing the technical, financial and institutional resources to switch to more sustainable irrigation methods (UNFCCC, 2014a). This formed a basis for planned adoption of hardware in the form of sustainable irrigation technologies (UNFCCC, 2014a). Though all types of technology are necessary, there is a concern that hard technologies are often applied in isolation, their perceived impact being prioritised over soft- and org-wares (Christiansen *et al.*, 2011; UNFCCC, 2014a; UNFCCC, 2014b). As such, countries require encouragement and assistance in implementing all three technology types in support of one another, in order to ensure sustainable and effective application of technologies for adaptation in the water sector.

Part 2: Lessons Learned

Key lessons have emerged from experiences in employing technologies in support of adaptation in the water sector, as summarised below. Significantly, consideration of the complexity of water-related issues and the diversity of impacts must be central to the application of any technologies for adaptation.

Consideration of Interrelated Issues

The use of water technologies for adaptation must be assessed in consideration of complex systems that encompass interrelated issues, including those resulting directly and indirectly from climatic changes. Direct impacts include fluctuating weather patterns that can lead to both drought and floods in one area. Indirect issues include the impacts of climate changes on freshwater resources affecting ecosystems and biodiversity, agriculture and food security, land use and forestry, water supply and sanitation, health, urban settlements and infrastructure, and energy supply and electricity generation (UNFCCC, 2012). In addition, compounding factors such as population and economic growth and decline have significant impacts on water availability (UNFCCC, 2014a). Water Resource Management (IWRM) approaches broadly encompass comprehensive management strategies devised to address such complexity. The International Union for Conservation of Nature are involved in an ecosystem-based strategy designed to reduce the vulnerability of those affected by rain and floods in the transboundary Sixaola river basin (UNFCCC, 2012). Sustainable river basin management can strengthen climate resilience whilst also contributing towards economic development, food security and environmental protection (de Madrid, 2012). However, an analysis of this initiative has highlighted the need for consideration of the dynamics between institutional structures and approaches and local socio-cultural contexts (Blanco and Durán, 2014). Stakeholder co-operation in transboundary contexts such as this is crucial to address interrelated issues and limit the vulnerability of water resources.

Ensuring Locational Sensitivity in Technology Application

The anticipated benefits of water technologies must be considered in accordance with the specific location of it application. A lack of consideration for local geology, climatic conditions and precipitation of minerals can lead to a lack of effectiveness or even maladaptation. For example, preliminary base-line monitoring for the introduction of rainwater catchment management in the Andes has highlighted differentiation in effectiveness across different locations in the same area (UNFCCC, 2014c). Moreover, in the case of water extraction technologies, such as boreholes, implementation in an unsuitable location can lead to over-extraction of groundwater resources. Comparisons of urban and rural water issues further indicate the need for differentiation in technological application according to location. Whilst the emphasis in rural areas is often on a lack of water, urban areas are usually referred to as having too much water, leading to critical health and safety issues. In fact, both rural and urban areas suffer from great fluctuations in water supply, which impacts a variety of activities and needs. As the majority of the global population now lives in urban centres, emphasis on technologies for adaptation in the water sector must be applied to both contexts. However, careful consideration should be given to what technologies are appropriate. Land use and spatial planning require special attention, particularly in urban settings (UNFCCC, 2012). Locational sensitivity and comprehension of interrelated issues can be heightened through Community-Based Adaptation approaches (see Box 2).

Marketing and Incentives to Engage Citizens

Citizen engagement with a new technology can be encouraged through appropriate marketing and incentivising strategies, that are developed in consideration of differing cultural perspectives. Marketing approaches adapted to the context of a technology's introduction, alongside a comprehensive understanding of indigenous knowledge systems and appropriate and effective information sharing and communications, is crucial to encourage users to incorporate new technologies into their existing adaptation strategies (UNFCCC, 2014c). Market incentives, including pricing structures, can provide some encouragement for citizen engagement. To increase water supplies, it is necessary to change business models that reward water providers for the volume pumped out, rather than the amount that reaches consumers. On the demand reduction side, ensuring that end users are conserving water requires individual metering and billing. Market incentives are also necessary at the consumer level to encourage investment in water saving technologies, such as low flow toilets or rain barrels. Non-market incentives, such as information provision, have also proven to be successful in encouraging technological adoption. The introduction of the California Irrigation Management Information System (CIMIS) by the California Department of Water Resources, in 1982, actually resulted in farmers paying into public weather information provision and, as a result, new irrigation technologies, due to the value of such information for water saving strategies (Osgood, 2011). Such past examples can be transferred to the context of adaptation technologies to inform incentivising strategies for adopting new technologies.

Maximising Resource Use for Efficiency and Sustainability

The cost and time efficiency of technologies must be comprehensively calculated to ensure employment and sustainability of a technology after its introduction. Experiences have shown that such efficiency can be secured through the rehabilitation and repairing of existing strategic water sources, such as wells and boreholes. This is in contrast to large-scale methods such as water trucking and water desalinisation, which have often proved to be unsustainable. The Torrevieja desalinisation plant in Spain, exemplifies the need to address cost efficiency from the preliminary stages in order to ensure a technology is engaged with by targeted users (UNNFCCC, 2014a). Here, the costs of completing the plant's construction and running the infrastructure outweigh the prices consumers are willing to pay for purified water outputs. Moreover, it has been estimated that the plan's operational equipment will require major refurbishment and maintenance work within the next two decades, exacerbating the imbalance of costs versus profits (Nicol, 2012). As such, this represents huge oversight in planning processes by water planners and can be drawn upon in advising future large-scale projects.

Knowledge Management

Comprehensive knowledge management if critical to the development, transfer and diffusion of technologies for adaptation. As water presents such a complex issue, it is important that water and climate work running in parallel is consolidated through comprehensive knowledge sharing. Some institutions, such as the World Water Forum, the Global Water Partnership, and the International Water Association (IWA) seek to do this. The IWA's Water, Energy and Climate Conference 2014: Solutions for Future Water Security was held in May, to allow such knowledge sharing on an international platform. In particular, knowledge and know-how related to the South-South transfer of technologies is crucial (UNFCCC, 2014b). Reflecting this need, international networks often have a regional focus. The Asian Cities Climate Resilience Network (www.acccrn.org) prioritises water as a major theme. The network brings knowledge from ten cities, in India, Thailand, Vietnam and Indonesia onto one platform to strengthen and encourage institutional action towards urban climate change resilience. It is currently being expanded to include Bangladesh and the Philippines and aims to grow beyond this to encompass a wider reach throughout Asia, allowing a diversity of issues and the links between them to be explored. Appropriate knowledge management is also critical at the micro-scale, where knowledge networks are also employed (e.g. The Highland Water Forum in Jordan – see Box 1). Here, communication barriers, such as literacy and language must be addressed, alongside equity in access to information, which is often determined by cultural, social and political structures.

Box 2: *Community-Based Adaptation*

Community-Based Adaptation (CBA) aims to achieve climate change adaptation in tandem with development goals through employing bottom-up processes to enhance community capacity and ensure contextual suitability and local acceptance of projects instigated. Such practices aim to identify local-level knowledge, including technological innovations, and strengthen and replicate it to enhance effective adaptation. Spreading local innovations requires coordination and collaboration between many different stakeholders, including governments, farmer groups, NGOs and local leaders, and in many cases, financial, cultural, natural, institutional barriers, or lack of information, hampers wider adoption of innovative approaches. As a long-term, adaptive and reflective process, CBA allows such barriers to be addressed in consideration of the specific contexts within which they are experienced. CBA is an ever evolving process and whilst many projects have now been established, particularly in Asia and Africa, comprehensive monitoring and evaluation processes now need to be developed and applied to assess how effective and sustainable attempts have so far been. A positive experience comes from the Suid Bokkeveld tea farmers in Nothern Cape Province, South Africa, where NGOs have been providing training and mentoring to farmers to encourage expansion and diversification in small-scale local practices to respond to fluctuations in rainfall patterns, which have induced drought. Here, farmers diversified their practices through employing roof water harvesting and storage in big tanks, sinking of more boreholes, construction of concrete water dams for expanded water storage, and the sharing of implements to clean fountains (Owuor, 2010).

Technologies for Adaptation in Water Sector and their enablers and barriers (UNFCCC, 2014a)

A range of technologies have been developed for adaptation in the water sector. Some are very sophisticated, such as remote sensing, , water-smart metering, hydraulic sea walls and water reuse systems, and some are simpler, such as land trenching for ground water replenishment, flood management for wetlands and water filtration. The roles, enablers and barriers of some are highlighted below, and examples of each technology provided.

Adaptation Technology	**Boreholes and tube wells**	**Rainwater harvesting**	**Desalination**	**Water management fora**
Role of Technology	To extract water from subsurface and groundwater levels	To collect rainwater from rooftop and other catchments to supplement domestic and institutional water supply	To purify saline water through removal of sodium chloride and other dissolved constituents	To bring multiple stakeholders together, to discuss options and develop comprehensive plans
Enablers	Cost and time efficiency, international aid, institutional support, reuse of resources through rehabilitation	Linking to climate forecasts in area of implementation	Political and financial support, comprehensive environmental assessments	Cost efficiency, training provision, institutional and individual enthusiasm for collaboration
Barriers	Governance issues, differentiated stakeholder access, lack of geological assessment, inadequate energy supplies, technical barriers	Lack of rainwater, lack of house and land ownership, lack of initial investment capital, lack of technical knowledge and resources	Cost and energy requirements, negative ecosystem effects, lack of disposal options for removed minerals, political opposition	Diverse objectives of stakeholders, governance needs, poverty, cultural traditions, lack of technical and financial resources to access identified needs
Examples	UNICEF's rehabilitation and reparation of boreholes in Somalia: www.unicef.org	World Agroforestry Centre's rainwater harvesting projects in Africa: www.worldagroforestry centre.org/	Reverse Osmosis Desalination Plant in Egypt: www.citeseerx.is t.psu.edu/viewdoc/summary?d oi=10.1.1.302.2597	GIZ-JOHUD 'Water Wise Women' initiative in Jordan: http://www.gender-in-german-development.net/jordan.html

Part 3: Stakeholder involvement and collaboration

Adaptation planning and implementation can be enhanced through complementary actions across and between scales, from individuals to governments. Similarly, the successful application of adaptation technologies demands the engagement of multiple stakeholders. One example of effective collaboration comes from the PACC project in Ecuador, where alternative water management approaches aiming to reduce vulnerability to climate change are being applied by alliances of communities, non-governmental organisations, sub-national governments and research centres (UNFCCC, 2014c). It has been found that the intimate involvement of the community, or user group, is integral to ensuring effective collaboration between stakeholders. The diverse roles assumed by different stakeholders are broadly indicated here:

- **Communities develop and adopt technologies, and are the central users of technologies**, having contextual interaction with hard-, soft- and org-wares.
- **The research community devise and test new technologies**. Whilst this has often been in isolation, efforts are now being made to ensure testing in-situ.
- The **local government support users and assist the scaling-up of small-scale or community-led technologies**.
- The **national-level government are responsible for devising necessary policies**. They must also be aware of maladaptation and how to curb this. An enabling environment for effective adaptation across multiple levels of intervention implies responsive, accessible, inclusive and equitable institutional capacity, especially in the context of governance, where change can be promoted at the local, provincial, national and regional levels and beyond.
- **Non-governmental organisations (NGOs) play a combinative role in researching, implementing, facilitating, monitoring, evaluating and financing technologies for adaptation**. They tend to have close links with multiple stakeholders, acting as vehicles for communication from and to the local-level and advocating for appropriate technologies.
- **Private sector stakeholders can assist by securing financial and non-financial resources**. The co-operation and co-ordination of these stakeholders is now assumed to be crucial for achieving adaptation. Consistency in legislation to regulate the water sector can enable positive engagement of the private sector (UNFCCC, 2014a). Insurance schemes for protection against losses incurred from flood or drought represent a clear entry point for private companies. The United Nation University's Munich Climate Insurance Initiative has reflected some success, yet given the certainty of escalating climate change, the sustainability of weather-index based approaches is now challenged. As such, alternatives for private sector engagement are increasingly explored.

Part 4: Policy Formulation

Experiences have highlighted that the legitimacy of water policies can be enhanced through ensuring effective multi-stakeholder participation in their development. Wide-reaching involvement can ensure multiple perspectives are considered, illuminating previously overseen issues by providing stakeholders with the opportunity to raise concerns or make suggestions. Such participatory decision-making can elicit widespread support for resulting policies and actions. These recommendations draw upon the discussions within this brief, and seek to guide policies developed for the support of water technologies for adaptation:

- The **integration of hard-, soft-, org-ware** can be supported by appropriate policy to reduce barriers to technological application (UNFCCC, 2014a)

- Policies can encourage **iterative risk management approaches** to aid decision making and address uncertainty (IPCC, 2014). The flood risk management plan for the Thames Barrier approaches this through recommending actions to be taken respectively for the short, medium and long term, that are flexible to updates from the latest climate change projections, in order to reduce flood risks (Radunsky, 2012)
- Policies need to **address contrasting and complex socio-political inter-relations**, such as complex land tenure dynamics that can otherwise render technology use and management inappropriate (UNFCCC, 2014a)
- Stakeholders can be brought together through a **comprehensive participatory framework** that also enhances **effective knowledge management** across scales. Such a framework should be defined and communicated from the initial stages, in consideration of all involved, from farmers, farmer groups, and NGOs to governments, government services (such as agricultural extension networks) and private sector organisations
- Policies are needed to **strengthen collaborative Research and Development and Monitoring and Evaluation of technologies** in context. Examples of this include in-situ piloting of water technologies, including ongoing assessment after initial implementation (UNFCCC, 2014a)
- Policies **addressing political will and capacity barriers for financing technologies can enhance the scaling-up of ada**ptation technologies. Consistency and continuity in policies lowers the risks of private investment, making it a feasible option for financing technologies (UNFCCC, 2014a)
- Policy can support **appropriate planning for national level adaptive processes**, such as Integrated Water Resources Management (IWRM), and serve **to mainstream and integrate the use of appropriate technologies** in national development planning through addressing challenges in water distribution and safety and enhancing scaling-up of successful responses through social safety networks, disaster risk reduction approaches or extension services (UNFCCC, 2014a)
- Cross-cutting policies can enable **international and regional co-operation to help overcome legal barriers** that hinder the application of successful water technologies. International cooperation is particularly required on transboundary water management issues (UNFCCC, 2014a)

Box: *Summary*

The demand for water technologies for sustainable adaptation within the water sector is high and experiences to date show much potential. Effective policy development in support of water technologies for adaptation can therefore support an efficient and meaningful approach to applying water technologies. However, experiences have highlighted the need for caution and consideration of the technology users and specific geological and political circumstances of a technology's application to avoid unsustainable adaptation and maladaptation. Where water technologies enhance response to climate change through adaptation and mitigation as additional co-benefits, due recognition and credit or incentives should be given nationally and internationally through a formally established system. Collaboration between stakeholders in planning, implementing, managing and formulating related policy will strengthen the success of water technologies. With appropriate application, good health, sanitation and human survival at a basic level, as well as sustainable growth and development, can be realized.

References

Blanco, A.M. and Durán, D.U., 2014. Peace and Conflict Monitor: Water Security in the Sixaola River Basin. Accessed from: http://www.monitor.upeace.org/printer.cfm?id_article=1043 [21 July 2014]

Christiansen, L., Olhoff, A., and Trærup, S., 2011. (eds.): Technologies for Adaptation: Perspectives and Practical Experiences, UNEP Risø Centre, Roskilde, 2011

de Madrid, M.P. 2012. Building adaptation solutions from IWRM and EbA. Presentation from the Technical workshop on water, climate change impacts and adaptation strategies, 18-20 July, 2012, Mexico City. Accessed from: http://unfccc.int/adaptation/workshops_meetings/nairobi_work_programme/items/6955.php [22 July 2014]

IPCC, 2001. IPCC Third Assessment Report (TAR).Glossary.

IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. IPCC Working Group II Contribution to AR5.

Metz, B., O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds) 2007. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Nicol, K. 2012. Desalination plant to open in January. Available from: http://www.torrevieja.com/eng/torrevieja/desalination-plant-to-open-in-january.html [Accessed 23 July 2014]

Osgood, D.E. 2011. Water Conservation Technology: The Adoption Response to Incentives. Accessed from: http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1145&context=jcwre [22 July 2014]

Owuor, B. 20120. Review of Community Based Adaptation To Climate Change in Africa (CBAA) Projects in Kenya, Uganda, South Africa and Zimbabwe. African Centre for Technology Studies. Accessed from: http://idl-bnc.idrc.ca/dspace/bitstream/10625/45414/1/131878.pdf [22 July 2014]

Radunsky, K. 2012. Communication, stakeholder engagement, knowledge sharing and management – perspective from the EU and its MSs. Presentation from the Technical workshop on water, climate change impacts and adaptation strategies, 18-20 July, 2012, Mexico City. Accessed from: http://unfccc.int/adaptation/workshops_meetings/nairobi_work_programme/items/6955.php [22 July 2014]

UNFCCC, 2005. Report on the seminar on the development and transfer of technologies for adaptation to climate change. FCCC/SBSTA/2005/8

UNFCCC, 2006. Application of environmentally sound technologies for adaptation to climate change. Technical Paper FCCC/TP/2006/2

UNFCCC, 2012. Report on the technical workshop on water and climate change impacts and adaptation strategies. Subsidiary Body for Scientific and Technological Advice. UNFCCC/SBSTA/2012/4.

UNFCCC, 2013. Third synthesis report on technology needs identified by Parties not included in Annex I to the Convention. Document FCCC/SBSTA/2013/Inf.7. Subsidiary Body for Scientific and Technological Advice, Thirty-ninth Session, Warsaw, 11–16 November 2013.

UNFCCC, 2014a. Background Paper on Technologies for Adaptation: Background Paper for the UNFCCC Technology Executive Committee (TEC) Workshop on Technologies for Adaptation, Bonn, Germany, 4 March 2014

UNFCCC, 2014b. Report of the workshop on technologies for adaptation. Langer Eugen, Bonn, Germany, 4 March 2014. Available from: http://unfccc.int/ttclear/pages/ttclear/pages/ttclear/pages/ttclear/pages/ttclear/templates/render_cms_page?s=events_workshops_adaptationtechs [Accessed 21 May 2014]

UNFCCC, 2014c. Presentations from the workshop on technologies for adaptation. Available from: http://unfccc.int/ttclear/pages/ttclear/pages/ttclear/pages/ttclear/pages/ttclear/templates/render_cms_page?s=events_workshops_adaptationtechs [Accessed 21 May 2014]

UN Water, 2007. Coping With Water Scarcity: A strategic issue and priority for system-wide action. UN Water.

Contact Details

The Technology Executive Committee may be contacted through the United Nations Climate Change Secretariat (UNFCCC):

Martin-Luther-King-Straße 8, 53175 Bonn, Germany

Telephone +49. 228. 815 10 00 / Telefax +49. 228. 815 19 99

E-mail: secretariat@unfccc.int

Website: ttclear.unfccc.int

About The Technology Executive Committee

The Technology Executive Committee (TEC) is the policy and guidance component of the Technology Mechanism established by the Conference of the Parties (COP) in 2010 by decision 1/CP.16 to facilitate the implementation of enhanced action on technology development and transfer to support action on mitigation and adaptation. Along with the other component of the Technology Mechanism, the Climate Technology Centre and Network, the TEC is mandated to facilitate the effective implementation of the Technology Mechanism.