

**Technology
development and
transfer, the Least
Developed Countries
and the future
climate regime
Considerations
for the post-2020
international response
to climate change**

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Acronyms and abbreviations

BR	biennial report
CDM	clean development mechanism
CTCN	Climate Technology Centre and Network
EGTT	Expert Group on Technology Transfer
GEF	Global Environment Facility
IPCC	Intergovernmental Panel on Climate Change
LDCs	Least Developed Countries
NCs	national communications
NDE	nationally designated entity
PSP	Poznan Strategic Program on technology transfer
TAP	technology action plan
TDT	technology development and transfer
TEC	Technology Executive Committee
TNA	technology needs assessment
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

In 2015, the world is to negotiate a new agreement under the United Nations Framework Convention on Climate Change (UNFCCC) that will govern the foreseeable future of international climate action. Known as the 2015 agreement, nations will adopt this treaty in Paris in December 2015, and it will enter into force in 2020.

Adopted in 1992, the UNFCCC has overseen global climate action for the past few decades. The ultimate objective of the Convention is to stabilise greenhouse gas concentrations at a level that prevents dangerous anthropogenic interference with the climate system, in order to allow ecosystems to adapt naturally to climate change and enable economic development to proceed in a sustainable manner (UN, 1992). The transferring of climate-friendly technologies between Parties was identified as one of the key means to achieve this objective from the beginning of the Convention.

Technology development and transfer (TDT) will form an integral part of the 2015 agreement. Currently, TDT makes up one of the 26 articles of the draft text of the 2015 agreement. In the run-up to the conference in Paris this December, negotiators will amend this draft into an agreed outcome. The current draft reflects the questions that the Least Developed Countries (LDCs) and other groups of Parties are asking about the future of technology development and transfer under the Convention.

Among them are questions about what should be done with the existing technology programmes conducted under the Convention, specifically the Poznan Strategic Technology Programme and the technology needs assessment outcomes. Another set of questions focuses on how to improve the recently operationalised Technology Mechanism. A third set asks how to take the lessons of effective delivery forward under the 2015 agreement.

This research paper explores these questions from the perspective of the LDC Group of negotiators. It begins with a brief history of the interaction between technology transfer and climate change, and the efforts of the UNFCCC. It then moves on to review the experience of the LDCs with the UNFCCC's technology programmes prior to the creation of the Technology Mechanism in 2010. With this foundation in mind, the following section discusses the questions raised by the LDC Group regarding the treatment of technology transfer and development in the 2015 agreement and subsequent future climate regime. The paper ends by offering proposals for how the UNFCCC process might design future efforts in order to best accommodate the technology needs of the LDCs.

Section 1. Technology transfer and climate change

The international response to climate change sets out as its ultimate objective the prevention of dangerous anthropogenic interference with the climate system. Over the past twenty years, numerous studies have emphasised that achieving this objective will only be possible through the large-scale deployment of climate change technologies. For example, the Stern Review of 2007 pointed out that, “the development and deployment of a wide range of low-carbon technologies is essential in achieving the deep cuts in emissions that are needed” (Stern, 2007: 19). Also in 2007, the Intergovernmental Panel on Climate Change (IPCC) report clearly stated that its range of stabilisation levels could be achieved by the deployment of a “portfolio of technologies that are currently available and those that are expected to be commercialised in coming decades” (IPCC, 2008: 16). Overall, academic literature presents general agreement and significant evidence that stabilising greenhouse gas levels and preventing dangerous anthropogenic interference with the climate system can be achieved by distributing a portfolio of climate-friendly technologies (Abdel-Latif, 2015; Jiani, 2014).

How, though, should the United Nations work to distribute climate-friendly technologies? The UNFCCC’s first efforts began with the concept of ‘technology transfer’. This term originates from theories of economic development in the late 1960s. The Convention adopted the IPCC’s definition, and refers to technology transfer as “a broad set of processes covering the flows of know-how, experience, and equipment for mitigating and adapting to climate change amongst different stakeholders such as governments, private sector enterprises, financial institutions, NGOs [nongovernmental organisations] and research/education institutions” (IPCC, 2000: 3). The broad and inclusive term ‘transfer’ encompasses the diffusion of technologies and technology cooperation across and within countries. It covers technology transfer processes between and among developed countries, developing countries, and countries with economies in transition. It comprises the process of learning to understand, utilise, and replicate technology, including the capacity to choose it and adapt it to local conditions and to integrate it with indigenous technologies (IPCC, 2000).

As the UNFCCC oversees international action to combat climate change, it has focused on fostering the successful transfer of climate-friendly technology from country to country. In defining a ‘successful transfer’, the Convention recognises the United Nations Conference on Trade and Development’s definition, which excludes the mere sale or lease of goods; such a transaction does not satisfy the UNFCCC notion of technology transfer. In order to fulfil the UNFCCC’s definition, any equipment that embodies a technology new to a country must be accompanied by the transfer of sufficient knowledge to successfully

install, operate and maintain the equipment (UNFCCC, 2011a). Thus, according to the UNFCCC, technology transfer refers to the *actions accompanying* the integration of environmentally sound technologies into nations where those specific technologies had not before existed.

This definition of the transfer of technology encapsulates the UNFCCC's thinking behind how climate-friendly technologies should be deployed throughout the world. While the focus of technology transfer's importance toward achieving the Convention's ultimate objective is based on technologies' role in limiting greenhouse gas emissions, it is important to remember that the transfer of climate-friendly technologies is meant to achieve two aims. First, mitigation – that countries use the technologies to bypass forms of development that have high greenhouse gas emissions. Technology transfer is meant to save nations the research and development necessary to pursue cleaner growth strategies than their native technologies currently allow. The second aim of UNFCCC technology transfer is adaptation – to better equip countries to deal with, and adapt to, the potentially devastating consequences of climate change.

Though the two aims of the UNFCCC technology transfer process are presented here as equals, the Convention does not allow for their equal implementation, as it belies a tension between mitigation and adaptation. While mitigation activities focus on confronting the source of climate change through the reduction of greenhouse gas emissions, adaptation activities address the consequences of climate change. Thus, the relationship between adaptation and mitigation is such that, in theory, the more mitigation that takes place, the less adaptation will be needed, and vice versa (Huq and Grubb, 2003). However, although the UNFCCC indicates both adaptation and mitigation as responses to climate change, a dichotomy between the two as policy approaches has emerged as one of the most striking features of the international discussions on how to respond (Schipper, 2006). Though the reasons for this tension vary, two emerge as primary causes of the Convention's overriding bent toward mitigation rather than adaptation. First, that the UNFCCC's original intention was to reduce the sources of climate change, rather than adapt to its changes (Schipper, 2006). Second, that the Convention largely omits establishing responsibility for climate change impacts, which is inherent in adaptation debates (Paavola and Adger, 2005).

This dichotomy reveals itself in the technology efforts undertaken by the UNFCCC, which are heavily weighted toward mitigation projects, and the research findings of academic literature, which again focus heavily on outcomes of technology transferred for the purposes of mitigation. The literature that does exist concludes that technology transfer for adaptation remains a critical but understudied issue (Biagini *et al.*, 2014). This dichotomy is important to bear in mind as one explores TDT options for the future international climate

regime. The presence of far more research findings and academic literature on technology transfer for mitigation than for adaptation does not reflect their relative importance.

As the world approaches the final negotiations of the 2015 agreement and the finalisation of its statutes prior to its implementation in 2020, defining how the UNFCCC will carry forward its technology activities has once again come under review. Broadly speaking, the lessons of the past have perhaps indicated three enduring points to consider, outlined below.

First, there are a series of lessons to learn from past technology efforts under the UNFCCC. Various factors have hampered past efforts, including: the failure of the 'linear innovation model'¹; selecting technologies to transfer that are not appropriate for local needs; the lack of capacity building attempted under assumed autonomy; the perpetuation of technological dependence; and the lack of sufficient funding. These demonstrate the real need for change in the TDT process. Though not the focus of this research paper, the lessons of the past need to inform current negotiations if future activities are to succeed in addressing the environmental problems of the twenty-first century.

Second, research findings continue to indicate the need for TDT to achieve the ultimate objectives of the Convention. For example, in reference to the UNFCCC's mitigation aims, scientists have developed a number of scenarios to analyse the feasibility of reducing emissions to meet the 2 degree Celsius target mentioned in the 2010 Cancún Agreements. The scenarios in which the emissions reductions were achieved depended on the accelerated development, investment and use of energy-saving and low-carbon energy technologies (Kainuma *et al.*, 2013). Developing an effective TDT system remains an integral part of the international effort to confront climate change.

Third, strong international agreements have the potential to instil powerful incentives and spur on international cooperation. For example, by including the principle of inevitable decarbonisation, the 2015 agreement would emphasise the risks that high-carbon business models will expose investors and their companies to. The agreement could drive home the point that investing in low-carbon technologies now would make for far greater returns than continuing with fossil-fuel reliant technologies (Gallagher, 2014). The 2015 agreement has the potential to not only direct investment in low-carbon technologies, but also enshrine the commitment for nations to increase international cooperation on the development and transfer of environmentally sound technologies.

1 The linear innovation model is a theory that suggests technical innovation is achieved through a linear progression from research to development to demonstration to diffusion.

Section 2. Technology efforts under the UNFCCC

Before exploring options for taking the UNFCCC's technology efforts forward, it is important to recall the technology measures the Convention has put in place since its adoption in 1992. The Convention's Articles 4.3, 4.5, 4.7 and 4.9 specifically relate to technology transfer. Article 4.5 states, "The developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention" (UN, 1992: 8). Since the beginning of the UNFCCC, all Parties have recognised the importance of technology transfer in meeting the Convention's aims. Through years of negotiations, the issue was developed into a programme of work. Those with the most relevant outcomes to technology transfer under the Convention are briefly highlighted below.

The first meeting of the Conference of the Parties (COP) – the supreme decision-making body of the Convention – took place in Berlin, culminating in the Berlin Mandate of 1995 (Gupta, 2010). The Berlin Mandate called for various technology issues to be addressed, including: establishing a technology transfer projects inventory; investigating technology transfer financing; establishing networks of technology centres; and identifying needed adaptation technologies (UNFCCC, 2004). In 1998, the Buenos Aires Plans of Action established at the fourth Conference of the Parties (COP 4) provided further impetus to technology transfer. It called on industrialised countries to provide lists of publicly owned environmentally sound technologies and on developing countries to submit reports outlining their technological needs. Furthermore, the COP asked all Parties to stimulate private sector investment; identify projects and programmes on cooperative approaches; and, most importantly, called for a consultative process to consider a list of nineteen specific issues and associated questions. To further this process, the secretariat organised three regional workshops – in Africa; Asia and the Pacific; and Latin America and the Caribbean – along with an informal consultation in the United States (UNFCCC, 2004).

The background papers and national submissions generated through these workshops spurred the development of a technology framework. In 2001 in Marrakesh, the work of the COP culminated in an agreed 'technology framework'. The framework covered five key themes and areas for action: technology needs assessments; technology information; enabling environments; capacity building; and mechanisms for technology transfer (UNFCCC, 2004). The technology framework oversaw the launch of a Technology Transfer Information Clearing House, the creation of a network of information centres, and the drawing up of a list of activities needed for capacity building. The Marrakesh Accords

also provided for the establishment of an Expert Group on Technology Transfer (EGTT). The EGTT consisted of twenty experts, drawn from developing countries, Small Island Developing States, developed country Parties, and relevant international organisations. Tasked with identifying ways to advance technology transfer activities under the Convention, the EGTT worked closely with the United Nations Development Program to prepare a handbook on methodologies for technology needs assessments (TNAs) (UNFCCC, 2010a; UNFCCC, 2004).

2007 saw the adoption of the Bali Action Plan of COP 13, which established a mandate to focus on key elements of long-term cooperation, including technology transfer (UNFCCC, 2012a). Parties agreed under this mandate to undertake an assessment of the gaps and barriers to the provision and access to financing for technology transfer. Though the EGTT's advisory role concluded in 2010, its findings, such as the technology transfer financial gap discovered under the 2007 mandate, continue to push the negotiating process toward completing its goals for technology transfer (UNFCCC, 2012a). In 2008's COP 14, the Parties initiated the Poznan Strategic Program on technology transfer (PSP) as a step towards scaling up the level of investment in technology transfer, in order to help developing countries address their needs for environmentally sound technologies (UNFCCC, 2010c). The programme's funding window of US\$50 million had three objectives: assisting developing country Parties in conducting technology needs assessments; completing a series of pilot priority technology projects; and disseminating UNFCCC experience and technology transfers demonstrated to be successful (GEF, 2010).

The successful review of the COP 14's PSP spurred negotiators to establish a Technology Mechanism in 2010, when Parties met at COP 16 in Cancún.² The Technology Mechanism, which became fully operational in 2012, is meant to facilitate the implementation of nationally determined mitigation and adaptation technology activities, including research, development, demonstration, deployment, diffusion and transfer of technology (UNFCCC, 2010b). The mechanism is composed of two branches: a Technology Executive Committee (TEC) and a Climate Technology Centre and Network (CTCN), and remains the UNFCCC's primary technology body. The operations and functions of the TEC and the CTCN are briefly outlined below.

The Technology Executive Committee acts as the policy component of the Technology Mechanism and sets the overall direction for accelerating technology development and transfer at the international level. The TEC also works to further implement the technology framework established as part of the Marrakesh Accords. Of this work, particular emphasis

2 The UNFCCC observed a change of terminology at COP 15 in 2009 when parties began to refer to 'technology development and transfer' rather than merely 'technology transfer' (Decision 1/CP.15).

is given to supporting the technology needs assessment process initiated by the PSP (UNFCCC, 2015a). The TEC has held 11 meetings since 2011, primarily located in Bonn, Germany and has undertaken a range of activities, such as providing recommendations to the COP and drafting a series of briefs (Abdel-Latif, 2015). The TEC has also undertaken an evaluation of the PSP with the aim of enhancing the effectiveness of the Technology Mechanism. This evaluation is further discussed in Section 4.

The Climate Technology Centre and Network acts as the implementation arm of the Technology Mechanism. One of the CTCN's primary functions is to respond to requests from developing country Parties, sent through their 'national designated entities' (NDEs), on matters related to technology development and transfer (UNFCCC, 2015a). In this way, the CTCN is meant to provide practical assistance to governments and establish national, regional, sectorial, and international technology centres relevant to both mitigation and adaptation technology actions and strategies (UNFCCC, 2010a). At COP 18 in Doha, the United Nations Environment Programme was selected to host the CTCN. In collaboration with the United Nations Industrial Development Organisation and a consortium of partners, the CTCN oversees technology activities in 22 regions of the world. It is guided by an advisory board and its secretariat, which meets twice yearly in Copenhagen (Abdel-Latif, 2015).

With this history of transfer and development technology activities in mind, this research paper goes on to explore the implications of these projects and programmes for the Least Developed Countries.

Section 3. UNFCCC technology efforts in the LDCs

Over the life of the Convention, Parties have sought to support the successful transfer of environmentally sound technologies to the LDCs. In fact, the Convention makes special provisions for the most vulnerable in the context of technology transfer. UNFCCC Article 4.9 states that, “The Parties shall take full account of the specific needs and special situations of the Least Developed Countries in their actions with regard to funding and transfer of technology” (UN, 1992: 9). Thus, all Parties to the UNFCCC have acknowledged the specific needs of the least developed in this context since 1992.

The LDCs include the following 48 nations that are party to the UNFCCC: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People’s Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen, and Zambia. 34 LDCs are African nations, 9 are in Asia, Haiti is the single LDC in the Caribbean, and 4 countries are islands of the South Pacific.

The UNFCCC has laid out a series of specific actions that developed country Parties, particularly Annex II countries,³ and developing country Parties are to undertake in an attempt to facilitate the process of technology transfer. Three ways in which the UNFCCC has gone about promoting national reporting of technology transfer needs and actions are briefly described below. This is followed by a review of the LDC experience with the UNFCCC’s technology programmes prior to the creation of the Technology Mechanism in 2010.

National reporting

In accordance with the UNFCCC reporting guidelines, developed country Parties agreed to provide details of the measures they take to implement their commitments under Articles 4.3 and 4.5 of the Convention (UNFCCC, 2011b). This reporting is done primarily through national communications (NCs) and biennial reports (BRs), which are periodic submissions covering all aspects of their implementation of the Convention to the COP (UNFCCC, 2012a). Among other things, NCs and BRs are meant to report information on the steps

3 Annex II countries to the Convention include: Australia, Austria, Belgium, Canada, Denmark, European Economic Community, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom of Great Britain and Northern Ireland, and United States of America.

taken by governments to promote technology transfer, and to support the development and enhancement of indigenous capacities and technologies of developing countries (UNFCCC, 2011b).

Developing countries also submit NCs and biennial update reports (BURs). Unlike the reporting requirements for developed countries, the objectives of these reports do not specifically reference technology transfer. Most developing countries and particularly LDCs, therefore, are not able to provide detailed technology needs and priorities in the NCs and BURs. Thus, while the reporting of developed countries may promote the distribution of information related to technology transfer activities, the communication of technology needs and activities of developing countries is pursued through other channels.

Technology needs assessments

Recognising that the critical first step to facilitating technology transfer involves identifying and communicating what the needs are, the COP asked developing country Parties to identify their prioritised technology needs, beginning in 2001 with the Marrakesh Technology Framework (Tadege, 2007). Developing countries thus submit TNAs that report on country-driven activities to identify and determine their mitigation and adaptation technology needs (UNFCCC, 2012a). To complete their TNAs, developing countries are meant to involve different stakeholders in a consultative process to identify the barriers to technology transfer, and measures to address these barriers (UNDP, 2010). As the Convention also recognises the LDCs' specific structural handicaps, the COP pledged to fully fund the TNA process for the least developed.

At present, many LDCs are still in the process of finalising their TNAs. Thus far, 24 of the 48 LDCs have completed a TNA and submitted it to the UNFCCC (UNFCCC, 2015b). The first round of TNAs, submitted prior to 2009, focussed on identifying the barriers to technology transfer. Countries developed these first TNAs without much guidance or clarity. The TNAs completed during the second round, however, were developed based on guidelines prepared by the United Nations Development Programme and Climate Technology Initiative. They also took into consideration country-wide stakeholder involvement, a technical level endorsement process, and were subject to a higher level of decision making. The TNAs developed in the second round thus include technology action plans (TAPs) and technology project ideas, which will be implemented with the support of the United Nations Environment Programme in two phases. The UNFCCC defines a technology action plan as a plan containing a group of measures which address identified barriers to the development and transfer of a prioritised technology. In the TNA context, project ideas contain concrete actions to implement prioritised technologies (UNFCCC, 2015b). While developing countries now include TAPs and project ideas in their TNAs, they have

not seen much in the way of implementation. This has begun to create concern, since the TAPs identified could become obsolete with the passing of time. Thus far, nine LDCs have developed technology action plans as part of their TNAs.

The clean development mechanism

The UNFCCC's Kyoto Protocol clean development mechanism (CDM) also provides a number of opportunities for technology transfer by offering a legal framework and a marketplace for Parties that are required to reduce greenhouse gas emissions (UNFCCC, 2010a). Though the CDM does not have an explicit technology transfer mandate, it may contribute to TDT by financing emission reduction projects using technologies currently not available in the host countries. In fact, of the 4,984 registered and proposed CDM projects in 2010, roughly 30 per cent of the projects – accounting for 48 per cent of the estimated emission reductions – claim to involve technology transfer (UNFCCC, 2011a). However, the majority of the CDM projects that include technology transfer go to large emerging economies such as Brazil, China, and India (Khan and Roberts, 2013). Of the 4,984 projects registered in 2010, Brazil received 338 projects, China 1,993, and India 1,254 (UNFCCC, 2011a).

To date, only a handful of LDCs have been able to participate in the clean development mechanism. At the end of 2012, 7 Least Developed Countries hosted 12 registered CDM projects (De Lopez *et al.*, 2009). The CDM's limited presence in the LDCs is due to a variety of reasons, including its market-based approach and focus on mitigation rather than adaptation technologies. As a market-based mechanism, the CDM looks to channel foreign private investments into development activities in developing countries. These investments tend to flow where CDM activities provide the highest returns with limited economic and political risks, that is, outside of the LDCs (De Lopez *et al.*, 2009). Furthermore, as the LDCs have only contributed 0.3 per cent of the world's cumulative carbon dioxide emissions, acquiring technologies that strive to reduce emissions is not their priority (Bowen and Fankhauser, 2011). Thus, though the CDM is an important component of the UNFCCC's effort to promote technology transfer, it has not played a large role in the LDCs.

Analysis of LDC technology needs

Over the past 20 years, the LDC Group has identified several needs in regard to technology development and transfer under the UNFCCC. An analysis of the LDCs' statements, UNFCCC submissions, NCs, TNAs and other reports reveals that three of these needs took priority: obtaining adaptation technologies; engaging in capacity-building activities; and acquiring adequate funding for technology. However, a comparison of the stated needs of the LDC Group and the 211 technology transfer projects conducted in the LDCs prior

to the operationalization of the Technology Mechanism in 2012 shows that the UNFCCC's technology activities have not met these needs (Craft, 2013).

Throughout the history of the UNFCCC's technology development and transfer efforts, the LDCs have continued to identify adaptation technologies as a clear priority. Though adaptation technology projects accounted for the majority of LDC technology transfer projects before the Technology Mechanism began its operations, the money spent on mitigation activities was more than double that devoted to adaptation. Whereas the 107 adaptation technology transfer projects received US\$464 million, US\$938 million went toward funding the 93 mitigation projects conducted in the LDCs (Craft, 2014). This mismatch reflects the history of preference for mitigation rather than adaptation activities under the UNFCCC, as briefly discussed in Section 1 of this paper.

The LDCs' second most-voiced technology need was for projects that involved capacity building. However, only one third of the 211 projects conducted in the LDCs prior to the operationalization of the Technology Mechanism identified capacity building as a project component. This may be due to the overall complexity of building capacity effectively. To do so requires two rather large paradigm shifts: 1) moving away from simply attempting to mirror developed country models in developing country systems; and 2) recognising that both developed and developing countries require capacity building, as defined by the UNFCCC. What is clear is that the majority of the technology projects conducted in the LDCs did not specify capacity building as a project component.

The LDCs also emphasised the need for adequate funding for technology development and transfer activities. From a reading of UNFCCC and LDC Expert Group reports, it is safe to assume that the LDCs would expect adequate funding for TDT to consist of, at the minimum, several billion US dollars per year (LDC Expert Group, 2009; UNFCCC, 2009; UNFCCC, 2010a). Over the first 20 years of the UNFCCC's lifespan, this range would amount to presumably no less than US\$20 billion. However, the total funding allocated to LDC technology projects during that time ranges from a low estimate of US\$1.43 billion to a high estimate of US\$3.35 billion (Craft 2014). Neither amount would adequately address the LDCs' technology development needs. Though perspectives conflict over the role finance should play in developing and transferring technology, the lack of finance for LDC technology projects reflects a perpetual underfunding of the LDCs' needs.

Research indicates that prior to the Technology Mechanism, the technology activities conducted under the UNFCCC did not adequately address the needs of the LDCs, particularly in regard to adaptation, capacity building and funding. As the negotiations seek to formulate a new international climate agreement, these considerations will be especially important to ensuring that future activities do effectively respond to the needs of the most vulnerable.

Section 4. LDCs and the future climate regime

Taking into account the history of the transfer of technology under the UNFCCC, the LDC Group is now in a position to consider its treatment in the 2015 agreement and subsequent future climate regime. As presented to the group by the LDC Technology Coordinator in a recent strategy meeting of the LDC Group (Onduri, 2015), the following questions form the focus of this research paper:

1. What should be done with the UNFCCC's existing technology programmes, specifically the Poznan Strategic Programme and the TNA outcomes?
2. How can the UNFCCC improve on the collaboration and effectiveness of the Technology Mechanism?
3. How can the UNFCCC improve collaboration and synergy for the delivery of effective technology development and transfer through the 2015 agreement, which will come into effect in 2020?

The following section brings together the thinking of several key LDC technology negotiators. The proposals generated by these discussions are recommended as actions in Section 5.

Existing technology programmes

Regarding the existing technology programmes, LDC negotiators are of the view that they should be enhanced in three primary ways. First, funding should fully support the formulation of detailed TNAs and implementation of technology activities, particularly in the LDCs. Second, the capacity of the LDCs to conduct TNAs and generate proposals for technology activities for implementation should be improved. Third, the aims of the PSP, such as assessing technology needs and developing technology projects, should be fully implemented under the Technology Mechanism.

The LDC Group recognises the role the Poznan Strategic Program has played in creating an understanding of technology's importance. As an output of the PSP, the technology needs assessments formed the starting point for countries to understand in detail their relevant technology needs in the areas of both mitigation and adaptation. While the TNAs conducted in the first round were brief, the TNAs currently being developed with improved guidelines provide much more information along with prioritised technologies and TAPs. It is the view of the LDC negotiators that the 24 LDCs that have yet to complete a TNA should be afforded the support necessary to enable them to carry out these assessments.

Most countries currently conducting their technology needs assessments indicate that limited funding prevents them from formulating detailed TAPs and technology project

proposals. In order for future TNAs and TAPs to provide details and clarity, as well as draw effectively on the lessons and experiences of the completed TNAs and TAPs, sufficient support is required. Providing such support would be highly beneficial, as thorough TNAs can provide direction to the Technology Mechanism as to how technology development and transfer can help countries undertake their mitigation and adaptation efforts. The future efforts of the UNFCCC must ensure that continuous support to the LDCs allows them to undertake the formulation and review of their TNAs, which form the basis of technology proposals for implementation.

There is also a need to improve the capacity of developing countries to conduct TNAs and generate proposals for technology activities for implementation, especially regarding adaptation. TNAs are valuable as enabling activities; however, there have been few sound projects implemented as a result. Furthermore, the imbalance between mitigation and adaptation technologies submitted for piloting indicates a lack of capacity for developing appropriate adaptation technology proposals. If the Poznan Strategic Program is to continue, it should improve the capacity of the LDCs to not only conduct thorough TNAs, but also to develop technology proposals for implementation.

Taking into consideration the need to enhance the level of funding and capacity building, the LDCs are of the view that the aims of the Poznan Strategic Program should be fully implemented under the Technology Mechanism. As the PSP has supported relatively few pilot projects to date, the mandate to help developing countries address their technology needs remains unfulfilled. As such, most developing countries and the LDCs believe that the full implementation of TNA outcomes, especially TAPs, should be carried forward. At this stage, it is critical to seek ways and means to bring the PSP within the Technology Mechanism.

While integrating the PSP into the Technology Mechanism would strengthen the technology transfer process, careful consideration needs to be given as to where the programme of work would sit. The future of the TNA outcomes has already been discussed both at meetings of the TEC in Bonn, Germany, and at the Advisory Board of the CTCN in Copenhagen, Denmark. Under the mandate of the UNFCCC's Subsidiary Body for Implementation, the TEC has also undertaken an evaluation of the PSP with the aim of enhancing the effectiveness of the Technology Mechanism.

In discussing the future of the TNA outcomes, the CTCN has indicated that nationally designated entities should play a key role in helping translate the outcomes and TAPs. Designed to act as national focal points for technology development and transfer activities, NDEs now exist in most developing countries, including LDCs. Their core role is to coordinate the translation of the technology needs of each respective country

into requests, and to submit them to the CTCN for appropriate responses, through the established members of the technology networks. Thus the outcomes of the TNAs could be submitted to the NDEs for translation into requests, and onward submission to the CTCN for conversion into bankable and viable project proposals, which can attract funding for implementation from both public and private sources.

If the NDEs are to take on this role at the forefront for implementing TNA outcomes, there is need to build their capacity to ensure effective delivery. The NDEs could also be empowered to review submitted TNAs and translate their outcomes into requests for submission to the CTCN for further response. If such an approach is to be undertaken, the TEC and the CTCN should work out guidelines detailing how NDEs should go about addressing the outcomes of TNAs. The NDEs would also require financial support to enable them to carry out these activities.

The various actions identified in this discussion of the UNFCCC's existing technology programmes are put forward as proposed decisions in Section 5.

Improving the Technology Mechanism

In addition to the proposal of bringing the PSP under the Technology Mechanism discussed above, LDC negotiators believe the collaboration and effectiveness of the mechanism can be improved in a number of ways. Further clarity is needed on how the two branches of the mechanism, the TEC and CTCN, can best coordinate to improve implementation and to ensure the needs of the LDCs are addressed. Furthermore, initiating and encouraging strong linkages between the Technology Mechanism and other bodies within the UNFCCC, particularly the Financial Mechanism, is key to improving overall effectiveness.

Establishing the Technology Mechanism brought the TDT agenda into a systemic process: the TEC guides developing countries' concerns, while the CTCN supports the implementation of technology activities. The linkages between the CTCN and TEC in terms of roles and responsibilities, however, remain unclear. As such, there is a need to review the architecture of, and collaboration within, the Technology Mechanism. There is no deliberate platform currently for the two components of the Technology Mechanism to meet and discuss, and the TEC's policy role in guiding the CTCN in implementing TDT activities is not very visible.

To take a practical example, the TEC chair and vice chair are members of the CTCN Advisory Board, participating in all CTCN discussions and in formulating resolutions and decisions. The CTCN Advisory Board chair and vice chair, on the other hand, attend TEC meetings

as observers. They have limited participation and are excluded from passing resolutions and decisions.

The imbalance of participation and lack of coordination between the two bodies makes it difficult for them to work effectively together, with implications for their ability to deliver their work. Decision 1/CP.16 requires that the TEC and CTCN submit a joint report to the COP on the progress made towards implementing the provisions of the Convention within their respective mandates. It has become technically difficult to determine what can be submitted jointly and what the structure of the report should take. As a way forward, the report has simply been divided into two parts, one for the TEC and one for the CTCN. There is a clear need to review the structure of the Technology Mechanism and streamline ways of collaborating to enable effective delivery.

As another means of improvement, the Technology Mechanism could more carefully consider the most vulnerable group within the UNFCCC process. Taking another practical example, membership and participation of the LDCs in the meetings of the CTCN Advisory Board currently alternates, with Georgia as an emerging economies representative. It is Georgia's turn at the moment, and therefore the LDCs would not be represented if the vice chair of the Advisory Board was not from an LDC. It is important to review membership guidelines to ensure the representation of the LDCs throughout the Technology Mechanism.

Apart from LDC representation, the CTCN has recognised the capacity building gaps among LDC national designated entities and introduced an incubator programme to support the NDEs in generating requests for submission to the CTCN. The LDCs have been guided on how to apply for this support from the CTC Secretariat; however, several LDCs are yet to submit requests for it. Furthermore, as the CTCN is currently only supporting requests for implementing software technologies, the LDCs will also require support in implementing proposals involving hardware technologies. Even in a post-2020 world, it is clear that the LDCs will continue to need targeted support.

Overall, it is critically important that the CTCN and the TEC create and establish linkages to improve the implementation of TAPs and other technology proposals. These linkages go beyond improving the coordination between the two bodies, however. If effective implementation of TAPs and TNA outcomes is the goal, strong linkages should be initiated and encouraged between the Technology Mechanism and other bodies, specifically the Financial Mechanism. While several options for linking these mechanisms exist, the critical outcome is to ensure inclusive, adequate, predictable and sustainable sources of funding for technology development and transfer under the Convention.

CTCN discussions have proposed obtaining funding through the existing mitigation and adaptation windows of the Green Climate Fund. This calls for talks and consultations to start immediately between the Technology Mechanism and the Green Climate Fund on collaborating and financial support. Another option is to consider enhancing and/or utilising the mandate of the Global Environment Facility (GEF) in accordance with the Decision 2/CP.17 paragraph 140, which states that the COP “requests the Global Environment Facility to support operationalisation and activities of the CTCN without prejudging any selection of the host” (UNFCCC, 2012b: 26). This decision was a result of the GEF’s application to become the host of CTCN, while remaining the Financial Mechanism of the UNFCCC. The decision has, however, been interpreted in different ways. The GEF feels it should not pay the operational costs of the CTCN, such as salaries and other overheads. On the other hand, the CTC gives the impression that its mandate is limited to supporting software technologies only. There is a need for legal advice to interpret this decision text, while seeking more inclusive and sustainable sources of funding for technology transfer under the Convention.

Decision 2/CP.17 paragraph 139 states further that the COP “decides that the costs associated with CTC and the mobilisation of services of the network should be funded from various sources, including the financial mechanism of the Convention, bilateral and multilateral and private-sector channels, philanthropic sources as well as financial and in-kind contributions from the host organisation and participants in the network” (UNFCCC, 2012b: 26). This decision is silent on how funds would be mobilised from the sources mentioned. It is also understood to be voluntary, which makes it difficult to ensure adequate, predictable and sustainable funding for TDT.

Another observation emerged during the 6th Advisory Board of the CTCN meeting. Members pointed out that the TEC is directly supported by the UNFCCC Secretariat in its operations and the implementation of its activities, while the CTCN is left to depend on unpredictable sources. It was suggested that such support should be extended to the CTCN and its activities as well. Currently, mobilising resources for the CTCN’s operations and activities is handled by the director. This engagement undermines his ability to effectively manage and coordinate CTCN operations.

For the effective and successful progression of the Technology Mechanism, LDC negotiators recognise that the TEC, as well as the CTCN, should build linkages with other bodies. In addition to the Financial Mechanism, linking technology activities with adaptation undertakings such as the national adaptation plans and others initiatives, like nationally appropriate mitigation actions, have also been suggested as a way of enhancing implementation. The TEC’s policy role could also be strengthened to include monitoring and evaluation the CTCN’s technology implementation, to ensure compliance with

established decisions and guidelines. It is equally important to evaluate both the TEC and CTCN in terms of the progress of their work, in addition to reviewing the linkages between the roles and responsibilities of the TEC and CTCN.

Technology in the 2015 agreement

The Parties to the UNFCCC will agree to a new agreement in December 2015. This new agreement will enter into force in 2020 and govern the foreseeable future of international climate action. Currently, technology development and transfer accounts for one of the articles in the agreement's draft text. Questions on how to improve the delivery of effective technology transfer activities through the 2015 agreement remain a key consideration of the negotiations, and will continue to be asked until the agreement enters into force in 2020.

The analysis and discussions generated in this research paper indicate several prevailing themes that the 2015 agreement will need to address. First, the agreement should continue to emphasise that TDT activities are those that address both mitigation and adaptation. The history of preference for mitigation rather than adaptation activities under the UNFCCC has been discussed throughout this research paper. In order to address this imbalance, the agreement should emphasise that its mechanisms will research, develop, demonstrate, deploy, diffuse and transfer both mitigation and adaptation technologies.

Second, as the UNFCCC's past technology activities have gone underfunded, the 2015 agreement will need to clarify the funding arrangements for post-2020 technology activities. If effectively implementing environmentally sound technologies in developing countries remains the goal of the Convention's technology activities, establishing inclusive, adequate, predictable and sustainable sources of funding is essential.

Third, the 2015 agreement needs to reaffirm the goal of effectively implementing technology development and transfer activities. The outcomes of past and current efforts have resulted in implementable projects as the result of highly consultative processes that take national development goals and priorities into account. Both the soft and hardware components of these projects need to be implemented, and the mandate to achieve this needs to form an important component of the 2015 agreement.

Fourth, the LDC Group believes that the 2015 agreement should continue to recognise the special needs and circumstances of the LDCs. As discussed throughout this paper, the needs of the most vulnerable have not been met by past UNFCCC technology programmes. In regard to technology, the new agreement should emphasise the need for continuous support to the LDCs to undertake technology development and transfer activities.

While negotiating continues on the placement of technology in the 2015 agreement, LDC negotiators believe the aims above could be achieved by including the following provisions in the agreement's text. Anchoring the Technology Mechanism in the agreement, including the TEC and the CTCN, will lay the foundations for bringing the existing components of the PSP under the Technology Mechanism post-2020. Furthermore, the agreement should include a technology framework, which would build on the Marrakesh technology framework referenced in Section 2 of this paper. Lastly, the agreement's transparency article should be enhanced by more thorough reporting requirements on technology and development transfer. These provisions, as well as the various actions identified throughout this section, are further discussed and put forward as proposed decisions in the following section.

Section 5. Proposals

The discussions generated by this research paper have identified several proposals for moving technology development and transfer forward, both in the current negotiation of the 2015 agreement and under the UNFCCC more broadly. This section draws together the proposals for the existing technology programmes, improving the Technology Mechanism and integrating technology in the 2015 agreement.

With regard to the UNFCCC's existing technology programmes, the LDCs have highlighted the importance of the Poznan Strategic Program's activities and the need to bring them under the Technology Mechanism. Doing so will require the COP to mandate the Technology Mechanism to undertake the PSP's technology programmes. In addition to this recommendation, and in order to ensure that detailed technology needs assessments are formulated and TNA process outcomes are implemented, the Least Developed Countries will need to receive full funding to support their engagement. Increasing the capacity of the LDCs to conduct TNAs and generate bankable proposals for technology activities to implement will be another important component of supporting their engagement. Furthermore, LDC negotiators recommend that the TEC and the CTCN draft guidelines for how the nationally designated entities could take up technology needs assessment outcomes for implementation, as well as recommending the COP to specify how the NDEs could access financial support to undertake this work. It is hoped that the LDCs would be able to complete the formulation of technology needs assessments and technology action plans before 2020; the technology development and transfer learning experiences gained through implementing TAPs would inform the Technology Mechanism, and its TEC and CTCN, in its work under the 2015 agreement.

In addition to the proposal of bringing the PSP under the Technology Mechanism discussed above, LDC negotiators believe the collaboration and effectiveness of the mechanism can be improved in a number of ways. A decision to review the architecture of, and collaboration within, the Technology Mechanism is needed. Among other improvements, LDC negotiators recommend establishing a platform for the TEC and CTCN to meet and guide each other to enable the effective and smooth implementation of the Technology Mechanism's work. Any review should also revisit guidelines for the composition and membership of advisory panels to ensure representation of the LDCs throughout the Technology Mechanism, especially on the CTCN Advisory Board. Furthermore, linkages should be established between the Technology Mechanism and other bodies, specifically with the Financial Mechanism, in order to ensure inclusive, adequate, predictable and sustainable sources of funding for TDT under the Convention. These linkages would be furthered by a decision for the GEF to coordinate and collaborate

with the Green Climate Fund on how the two institutions would continue to support the PSP and mobilise resources. Determining how the linkages established thus far are supplementing the work of the Technology Mechanism, and improving its overall effectiveness, are a recommended aim of any review.

To address technology development and transfer in the 2015 agreement, the LDC Group calls for the Technology Mechanism, including the TEC and the CTCN, to be anchored within it. This anchoring will lay the foundations for bringing the existing components of the PSP under the Technology Mechanism post-2020. Furthermore, the agreement should include a technology framework. The proposed framework would seek to provide direction and overarching guidance to the work of the existing institutions in the medium and long term, as well as to strengthen them. While the proposal throws into question the framework's relationship with the Technology Mechanism as it now operates, if the framework is to build on the five themes of the technology framework established in 2001 it would allow for the issues of importance to the LDCs to be comprehensively addressed. Lastly, the agreement's transparency article should be enhanced by more thorough reporting requirements on technology transfer, encouraging developed country Parties to report their share of contributions in terms of finance and technology support. Requiring developed countries to report on the specific technologies they support would greatly improve the UNFCCC's ability to track the provision of action and support post-2020.

It is clear that TDT will continue to be an important component of the international response to climate change for the foreseeable future. This research paper drew together the thinking of LDC negotiators on topical questions of how to carry forward technology initiatives and how the UNFCCC process might design its future efforts in order to best accommodate the technology needs of the world's poorest nations.

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