



Least Developed Countries' experiences with the UNFCCC Technology Mechanism

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Working in collaboration with partner organisations and individuals in developing countries, the Climate Change Group has been leading the field on adaptation to climate change issues.

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The Least Developed Countries (LDCs) have worked with the two branches of the UNFCCC's Technology Mechanism – the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN) – for several years. This paper presents information the LDC Group representatives on the TEC and CTCN Advisory Board have gathered on how LDCs are currently using technology initiatives and programmes. It aims to better understand the barriers and challenges LDCs face in implementing technology development and transfer and explores what changes to existing technology and financial institutions could lessen these barriers and challenges.

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Acronyms

| | |
|--------|---|
| CTCN | Climate Technology Centre and Network |
| GCF | Green Climate Fund |
| GEF | Global Environment Facility |
| INDC | intended nationally determined contribution |
| LDCF | Least Developed Countries Fund |
| LDCs | Least Developed Countries |
| LEG | LDC Expert Group |
| NAP | national adaptation plan |
| NDA | national designated authority |
| NDC | nationally determined contribution |
| NDE | national designated entity |
| NIE | national implementing entity |
| PSP | Poznan strategic programme on technology transfer |
| TAP | technology action plan |
| TEC | Technology Executive Committee |
| TNA | technology needs assessment |
| UNFCCC | United Nations Framework Convention on Climate Change |

Introduction

1

In signing the Paris Agreement, nations put forward a series of long-term goals that would further their efforts to combat climate change. One is the long-term vision to fully realise technology development and transfer, which countries identified as critical for improving resilience to climate change and reducing greenhouse gas emissions. Nations further agreed that the Technology Mechanism established under the 1992 United Nations Framework Convention on Climate Change (UNFCCC) would serve the Paris Agreement to achieve this goal.¹

The UNFCCC's Technology Mechanism is formed of two branches: its policy arm, the Technology Executive Committee (TEC) and its implementation arm, the Climate Technology Centre and Network (CTCN). Both branches have been working to guide the development and transfer of environmentally sound technologies to help people reduce greenhouse gas emissions and adapt to climate change impacts since they became fully operational in 2012.

BOX: WHAT IS TECHNOLOGY DEVELOPMENT AND TRANSFER?

Under the UNFCCC, technology transfer refers to the flow of know-how, experience and equipment for mitigating and adapting to climate change among different stakeholders.² In practice, the UNFCCC's definition of a successful transfer excludes the mere sale or lease of goods and includes the transfer of the knowledge needed to successfully install, operate and maintain any equipment that embodies a technology new to a country. It also includes the capacity to choose and adapt technologies to local conditions and integrate them with indigenous technologies. The Intergovernmental Panel on Climate Change drafted this definition, borrowing the model for a successful transfer from the United Nations Conference on Trade and Development.³ In 2009, the UNFCCC observed a change of terminology when Parties began referring to "technology development and transfer" rather than merely "technology transfer".⁴

As the world's poorest nations, the Least Developed Countries (LDCs) see technology development and transfer as an essential component of reaching the goals of the Paris Agreement. All 47 LDCs have submitted an intended nationally determined contribution (INDC) or nationally determined contribution (NDC)⁵ to reduce emissions and increase resilience under the Paris Agreement. Eighty-one per cent of these NDCs mentioned needing support

specifically for technology.⁶ The majority of the LDCs will be unable to meet the pledges they have made under the Paris Agreement without assistance to develop and efforts to transfer environmentally sound technologies.

To assess how the Technology Mechanism can best serve the implementation of the Paris Agreement, the LDC Group representatives on the TEC and the CTCN's Advisory Board used an online questionnaire to understand LDC experiences of working with the mechanism's various bodies, programmes and projects. This issue paper discusses the findings of their survey, giving a snapshot of LDC views on the UNFCCC's work on technology development and transfer. We then used these findings to identify barriers and challenges, form recommendations and draw conclusions.

The aim of the paper is to inform the LDC Group's representation at the Technology Mechanism's branches, negotiations of future UNFCCC decisions and the broader community of practice within and beyond LDCs.

1.1 Background: LDCs and UNFCCC technology initiatives

The LDCs are the world's 47 poorest nations: 33 are in Africa, eight in Asia, five are Pacific islands and one is a Caribbean island.⁷ The United Nations' criteria for classifying LDCs include low levels of development, severe financial constraints and limited institutional capacity.⁸ The UNFCCC's sessions take place primarily in Bonn, Germany and are conducted in English. As such, the national circumstances of the LDCs influence their ability to participate effectively in negotiations and analyse, interpret and implement decisions.⁹ At the UN climate negotiations, the LDCs have negotiated as a group since 2001.

The UNFCCC makes special provisions for the most vulnerable countries regarding technology development and transfer, stating that developed countries are to take all practicable steps to promote, facilitate and finance the transfer of environmentally sound technologies to developing countries. Article 4, paragraph 9 indicates that Parties shall take full account of LDCs' specific needs and special situations in all funding and technology transfer actions.¹⁰

The Paris Agreement, which was adopted in 2015 and entered into force in 2016, reinforces this pledge. Its preamble takes full account of LDCs' specific needs and special situations with regard to funding and

Table: UNFCCC technology development and transfer timeline

| | |
|------------------|--|
| 1992, CONVENTION | <ul style="list-style-type: none"> Articles 4.3, 4.5, 4.7 and 4.9 relate to technology transfer |
| 1995, COP1 | <ul style="list-style-type: none"> Berlin Mandate establishes a technology transfer projects inventory, investigates technology transfer financing, establishes networks of technology centres and identifies needed adaptation technologies |
| 1998, COP4 | <ul style="list-style-type: none"> Buenos Aires Plan of Action calls on industrialised countries to provide lists of publicly owned environmentally sound technologies Developing countries called to submit reports outlining their technological needs All Parties called to stimulate private sector investment, identify projects and programmes on cooperative approaches and engage in a consultative process to consider specific issues and questions |
| 2001, COP7 | <ul style="list-style-type: none"> The COP agrees to a technology framework that covers five key themes for action: technology needs assessments (TNAs); technology information; enabling environments; capacity building; and mechanisms for technology transfer The framework launches a technology transfer information clearing house (TT:CLEAR) and an information centres network and lists capacity building activities that are needed The Marrakesh Accords establishes the Expert Group on Technology Transfer (EGTT), which identifies ways to advance technology transfer activities and prepares a handbook on TNA methodologies |
| 2007, COP13 | <ul style="list-style-type: none"> Bali Action Plan mandates a focus on key elements of long-term cooperation, including technology transfer Parties agree to undertake an assessment of the gaps and barriers to the provision of, and access to, financing for technology transfer |
| 2008, COP14 | <ul style="list-style-type: none"> Poznan Strategic Programme (PSP) on technology transfer is established as a step towards scaling up the level of investment in technology transfer PSP's funding window of US\$50 million has three objectives: assisting developing countries to conduct TNAs and develop technology action plans (TAPs); completing a series of pilot priority technology projects; and disseminating UNFCCC experience and successes |
| 2010, COP16 | <ul style="list-style-type: none"> Technology Mechanism established to facilitate the implementation of nationally determined mitigation and adaptation technology activities The mechanism is composed of two branches: a Technology Executive Committee (TEC) and a Climate Technology Centre and Network (CTCN). Countries assign a National Designated Entity (NDE) the responsibility of interacting with the CTCN. |
| 2015, COP21 | <ul style="list-style-type: none"> Paris Agreement, Article 10 relates to technology development and transfer |

technology transfer. Article 11 states that capacity building under the Paris Agreement should facilitate the development, dissemination and deployment of technology to the LDCs. And Article 10 indicates that support – including financial support – shall be provided to developing countries to strengthen cooperative action on technology development and transfer.¹¹ Nations further agreed that the Technology Mechanism, established by the COP in 2010, would serve the Paris Agreement.

Before the negotiation of the Technology Mechanism, the LDC Group had expressed three primary needs for technology transfer under the UNFCCC: adaptation technologies, capacity building and adequate funding to support technology projects.¹² The group has continued to stress the need for funding and support for technology development and transfer since the establishment of the Technology Mechanism, the TEC and the CTCN.

1.2 Survey methodology

Currently, the LDC Group is represented by Stella Gama from Malawi at the TEC and Thinley Namgyel from Bhutan at the CTCN Advisory Board. They designed a questionnaire to assess current LDC experiences with the Technology Mechanism, covering national capacity, technology projects, the CTCN, the TEC and financial institutions.

The questionnaire, available in French and English, was active from 1–28 August 2017 and consisted of 50 questions. Multiple choice questions captured general LDC views on the UNFCCC's work on technology development and transfer, while open-ended questions explored barriers to and challenges in implementing technology development and transfer. The survey also asked participants to suggest changes to technology and financial institutions that would to lessen these barriers and challenges.

The questionnaire was hosted on the online platform, Survey Monkey. The LDC Group representatives emailed the link to the 43 LDC national designated entities (NDEs) and the UNFCCC focal point in countries that have not yet identified an NDE. Because there is no standard number of contact emails listed for NDEs and UNFCCC focal points, they sent the questionnaire to every email address listed, which ranged from one to three per country.

The questionnaire generated 28 responses from 23 countries, nearly half of all LDCs. Fifteen respondents – from Bangladesh, Benin, Bhutan, Burundi, Cambodia, Democratic Republic of Congo, Guinea, Haiti, Lesotho, Liberia, Mauritania, South Sudan, Sudan, Timor Leste and Zambia – completed the questionnaire. Eight – from Burkina Faso, Central African Republic, Comoros, Guinea-Bissau, Nepal, Rwanda, Solomon Islands and Yemen – completed a portion of the questionnaire. Multiple respondents from Burundi, Guinea Bissau and Sudan completed the questionnaire, giving a more comprehensive view of their countries' experiences.

LDC views on UNFCCC technology initiatives and programmes

2

In this section, we present the findings of the questionnaire. First, we explore how the LDCs view their national capacity to pursue climate technologies and what could be done to strengthen it. We then review the overall information on current technology projects provided by survey participants before examining the extent to which four UNFCCC initiatives – NDCs, CTCN technical assistance, technology needs assessments (TNAs) and technology action plan (TAPs) – influenced the design of these projects.

We explore TNAs in depth, with respondents reflecting on why some countries have not yet completed a TNA and how TNA guidance might be improved. We then go on to examine how the functions of the TEC and CTCN – specifically its trainings sessions, technical assistance and incubator programme – might adjust to meet the needs of the LDCs. Finally, we discuss the extent to which LDC respondents work with representatives from the financial institutions of the Global Environment Facility (GEF), Least Developed Countries Fund (LDCF) and the Green Climate Fund (GCF).

2.1 National capacity

The questionnaire sought to establish how LDC respondents viewed their national capacity to pursue climate technology priorities and access international support for technology development and transfer. Respondents were asked to complete two multiple choice questions to indicate their country's level of capacity to pursue climate technology priorities, in their experience. They could also select unknown.

The majority of respondents indicated that their national capacity was limited (see Figure 1). Four respondents thought it was good or very good and three reported that it was poor or unknown.

The same number of respondents said their national capacity for accessing international support for technology development and transfer was limited (see Figure 2). But only two respondents indicated their capacity was good, while seven thought their capacity was poor. This could indicate that even when a country

Figure 1. National capacity to pursue climate technology priorities

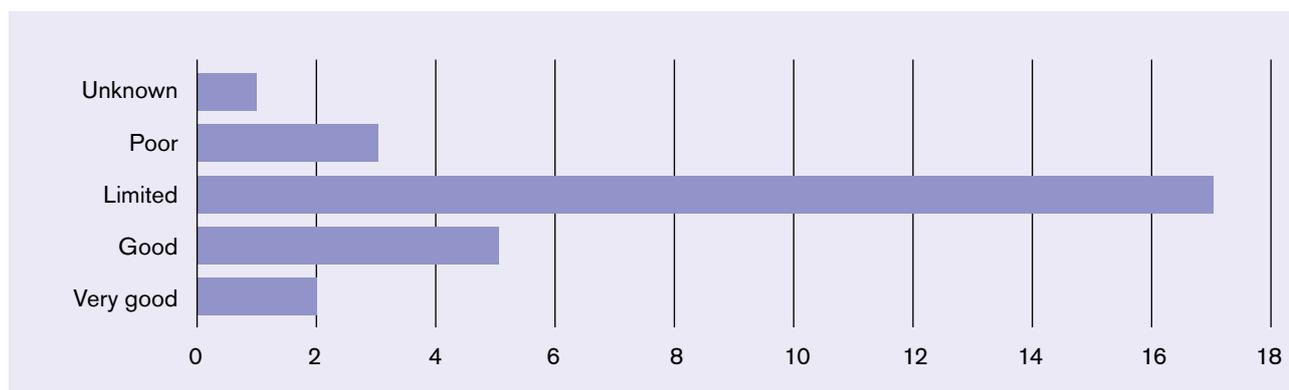
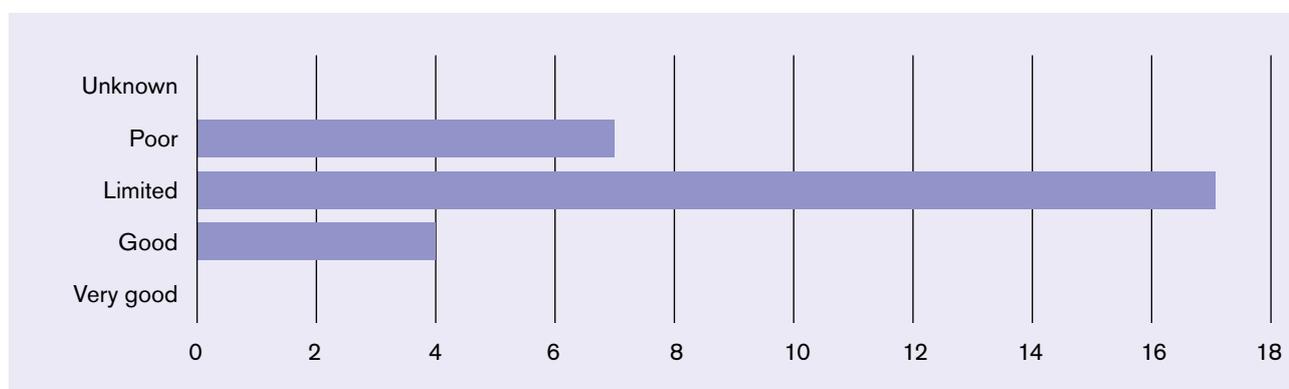


Figure 2. National capacity to access international support for technology development and transfer



has good national capacity to pursue climate technology priorities, they may not have the capacity to access international support. Overwhelmingly, respondents indicated that their national capacity for both is limited.

In an open-ended question, participants were then asked what could be done to strengthen national capacity. The two major themes to emerge from the 27 responses were increased funding and additional training and capacity building. We discuss other comments below as well.

2.1.1 Funding

Nine respondents stated that funding would strengthen national capacity, particularly financial support for:

- NDEs, to help them operate effectively (two respondents)
- Easing access to funds and facilitating access processes to international aid (two respondents)
- Carrying out an assessment of capacity building needs
- Building capacity of focal points to make submissions and organising workshops to boost inclusive ownership by national stakeholders
- Promoting projects with potential donors
- The CTCN, to enable projects to function effectively, and
- Adaptation and mitigation technology projects.

2.1.2 Training and capacity building

Nine respondents said that training and training courses – tailor-made training; national training; staff training; technical training; training for setting up large-scale projects; and technology and technology transfer training for national stakeholders and NDEs – would strengthen national capacity.

Ten responses indicated that capacity building is key to strengthening national capacity. These included building various national stakeholders' capacity for climate change technologies, writing bankable projects and attracting finance for technology development, transfer and implementation. One respondent called for intensive capacity building programmes to improve the technical capacities of institutional staff to access climate finance. This would allow them to strengthen local knowledge of heritage technologies such as water harvesting systems to ensure successful planting and to calculate the rate of carbon capturing from different trees. Three respondents focused on improving national coordination and one indicated that the NDE should be supported to coordinate national capacity. Another explained that their country was building technical and institutional capacities to revitalise their structure for coordinating all climate change measures.

2.1.3 Other

Several responses fell outside the themes of funding, training and capacity building. Measures that would strengthen national capacity included:

- Technical assistance (three respondents, one which specified increased assistance to NDE operations, such as logistical support)
- Networking with developing and developed countries
- Supporting awareness targeting the private sector
- Qualified staff, stakeholder committees and better equipment and trade facilities
- Strengthening UNFCCC institutions, such as the Technology Mechanism
- Immediately activating the Paris Committee on Capacity Building, and
- Improved political, social and economic environment.

2.1.4 Analysis

It is clear that there are gaps and needs in the local capacity of LDC representatives and NDEs to pursue climate technology priorities and access international support. There are many causes that limit national capacity. For LDC NDEs, this role is often not their only job. Other national priorities demand their time and the human resources available to fill the role are often limited. NDEs are the gateway linking the national level to the Technology Mechanism, so improving their capacity is key to an effective Technology Mechanism.

The design of technology transfer programmes and the work of the Technology Mechanism should recognise measures to strengthen national capacity. Building capacity has many components – such as exposure visits, office and documentation support, enabling environments and access to resources – that go beyond training and providing technical assistance.¹³ Because gaps in capacity are differential, capacity-building programmes with NDEs and Parties should be ongoing. Building capacity in LDCs should also focus on key stakeholders such as research, development and implementation practitioners.

LDC NDEs are also voicing a strong need for financial support to enable them to do their work effectively. Creating capacity for sustainable development requires real effort and investment, and if LDCs are to implement the technology components of climate action, they will need both finance and capacity building.

2.2 Technology projects

The questionnaire asked respondents to provide overall information about any current projects involving technology development and transfer in their country funded through UNFCCC financing mechanisms. Eleven countries indicated that they have funding for a total of 16 technology projects (see Figure 3).

Five of the projects had funding of less than US\$75,000; ten had US\$75,001–200,000 and one had US\$200,001–500,000. Burundi had the most funded technology projects, with three. Seven countries had only one project funded by UNFCCC financing mechanisms; three countries had two.

The questionnaire then asked participants about the type of technology development and transfer project

they had funded through the UNFCCC financing mechanisms. Only 14 respondents replied to this question, so two of the projects identified in Figure 3 were not classified. Of the 14, respondents identified five as enabling activities and four as technical assistance and project implementation. One respondent selected 'other', specifying that the project was a TNA.

Several other respondents left comments explaining their classification of the projects. The respondent from The Gambia classified their TNA project as technical assistance, while the respondent from Burundi classified theirs as an enabling activity. The Zambian respondent classified a road map on conservative farming as project implementation, but indicated that the contract has yet to be signed and the project is at an initial stage.

Figure 3. UNFCCC-funded technology projects in LDCs (2017)

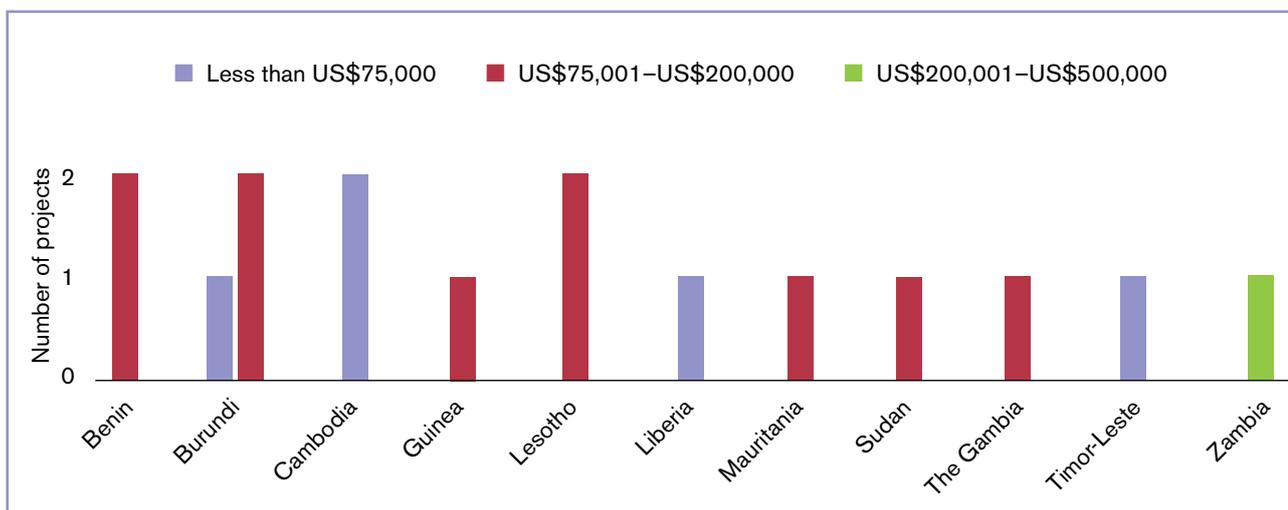
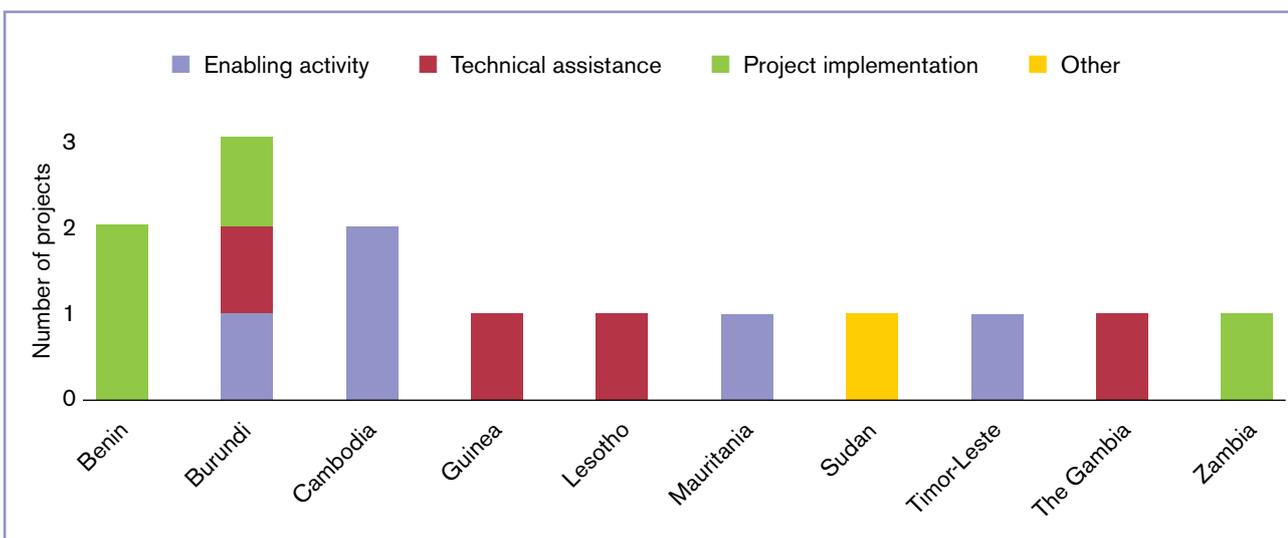


Figure 4. UNFCCC-funded technology projects in LDCs by project type (2017)



Respondents from the two countries that did not indicate they had funded projects commented that they are looking for funding, with the respondent from South Sudan stating that they are looking forward to the implementation of technical assistance.

An open-ended question asked participants to specify the in-kind value of their projects and where the funding was spent. Among the 11 countries that indicated they had funded projects, individual respondents indicated that:

- Their project had no in-kind value
- There was very little information on in-kind value, as projects are often developed by consultants and the implementing organisation
- The in-kind value was limited to the outcomes of the study, which was mainly on technology priorities for mitigation and adaptation, and
- The in-kind value was about US\$350,000, with the fund spent mostly on technical assistance. This respondent also suggested that funding be broadened out to the grassroots level.

Respondents could also add comments. Three said that their projects were to develop a TNA and a TAP, with one specifying that they were working on this with the UN Environment (UNEP) – Danish Technical

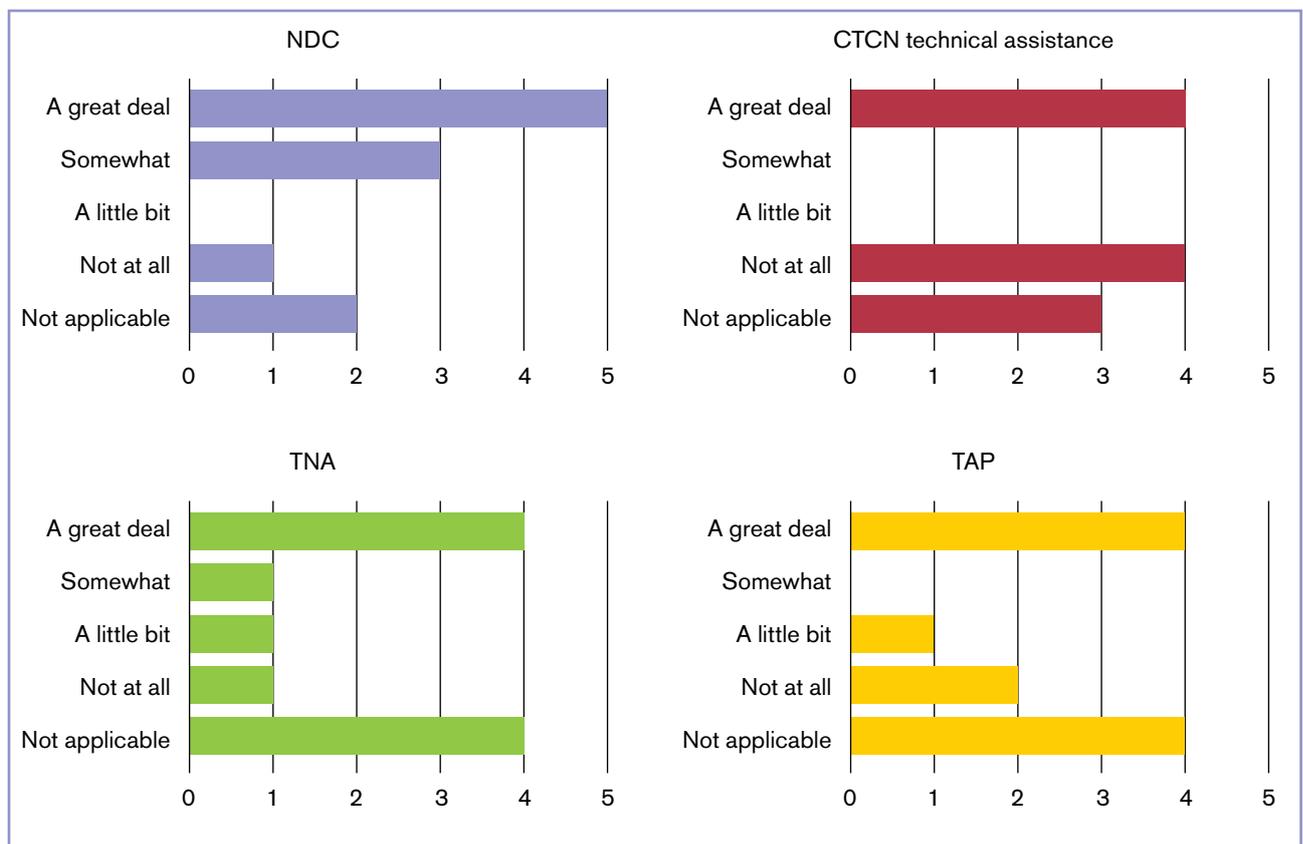
University (DTU) Partnership, formerly UNEP Risø Centre in Denmark. Another respondent wrote that the funding was for preparing three reports on identifying technologies, barriers, remedial action and how to create a favourable environment. Another indicated that the project funding had not been released and the barrier of accessing funds could be reduced by sending money directly to their NDE.

Overall, most of the currently funded technology projects were in the preparatory phase. Eleven of the 14 projects were identified as enabling activities, technical assistance and TNAs. Another project that was classified as project implementation – the road map on conservative farming – also appears to be preparatory work. Therefore, we see twelve of the 14 projects as preparatory, leaving only two projects as implementable technology development and transfer activities. Several participants commented that a lack of funding prevents the implementation of preparatory work.

2.3 Influencing initiatives

The survey then asked participants the extent to which four other related UNFCCC initiatives – NDCs, CTCN technical assistance, TNAs and TAPs – influenced the design of their funded technology projects. Figure 5 illustrates the responses from the 11 countries that had funded technology projects.

Figure 5. Extent to which technology project design was influenced by UNFCCC initiatives



Eight of the 11 respondents indicated that NDCs had some or a great deal of influence on technology projects. CTCN technical assistance had the least influence, with seven respondents indicating that it was not applicable or at all influential on the design of their technology projects. But four respondents indicated that each of the TNA, TAP and CTCN technical assistance had a great deal of influence on the design of their national technology projects. This could indicate that when countries receive CTCN technical assistance or undertake a TNA or TAP, they are very influential. But the ability to access this assistance is limited. On the other hand, all LDCs have submitted an INDCs or NDC.

2.4 Technology needs assessments

The questionnaire asked seven questions about TNAs, beginning with whether or not the respondent's nation had conducted a TNA. Fourteen respondents from ten countries – Bangladesh, Bhutan, Burundi, Cambodia, Lesotho, Mauritania, Sudan, The Gambia, Timor-Leste and Zambia – indicated that they had.

Representatives from eight of these countries said they had access to the UNFCCC secretariat's TNA guidance. One did not have access to the guidance and another did not know. Of the eight countries that reported having access to the guidance, five said it was very useful in formulating their TNA; three that it was somewhat useful.

Respondents from six nations said that their country had not conducted a TNA. Of the five who answered the open-ended follow-up question, three indicated a lack of funding as the reason for this. One respondent said: "To date, Guinea has not been selected amongst the countries benefiting from a TNA development fund. The State does not have the necessary funding." Another respondent, from Benin, indicated that they had not conducted a TNA because their request for assistance in preparing it was submitted late. Another said that their nation was still waiting for technical assistance.

Two respondents whose countries had conducted a TNA also gave feedback on the TNA process, saying it should be conducted in a more comprehensive way and that there was a lack of involvement from – and incentives for – the private sector.

Ten respondents replied to an open-ended question on how the TNA and TNA guidance could be improved. Among their suggestions were:

- The TNA guidance could reflect a broader awareness of economic sectors and players (two respondents)
- Adding a time period for reviewing and updating TNAs (two respondents)

- Translating the TNA guidance into Arabic
- Making the guidance and tools easier to use by introducing multiple criteria for selecting technology which is based on clear technical, environmental, economic and social indicators, and
- Providing guidance on enhancing and aligning the TAP with funding proposals that meet the requirements of financial entities.

Five respondents talked about TNA funding and implementing TNA outputs, with one stating that all countries should receive support to conduct a TNA as soon as possible, rather than some countries being selected and others not. Three suggested supporting the implementation of TNA outputs. Another stated that, while their TNA is OK, its implementation needs to be based on the plan. Two mentioned the need for financial resources to implement their TNA's project ideas; and others thought the CTCN should offer capacity building on TNA development.

2.4.1 Analysis

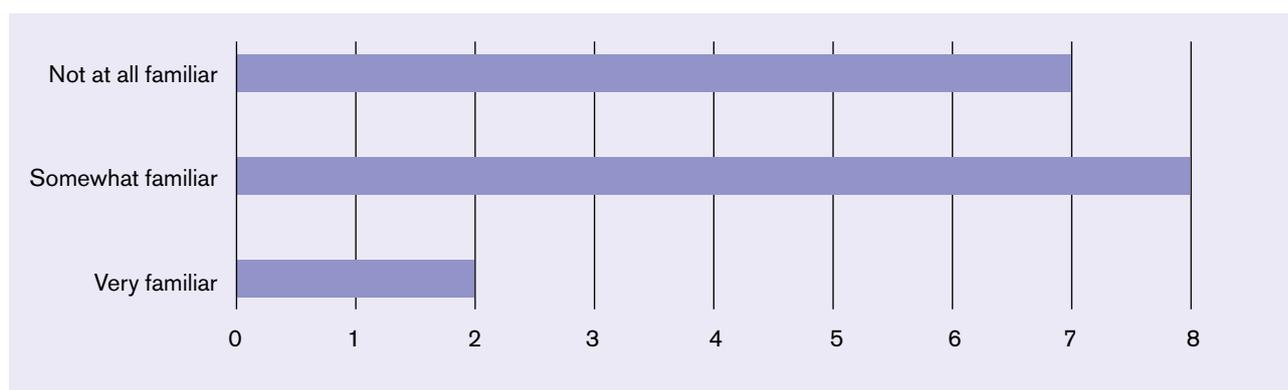
To date, TNAs are likely the LDCs' main experience of technology development and transfer initiatives. But only 26 of the 47 LDCs have completed a TNA, and only nine have gone on to formulate a TAP.¹⁴ Our survey indicates that LDCs find TNAs and the guidance for conducting them useful. However, the real value of a TNA lies in using them to design and implement projects in response to identified needs. This points to a need to cyclically update TNAs and use them to feed into other processes such as national adaptation plans (NAPs) and NDCs. So the funding structures for TNAs – the Poznan strategic programme on technology transfer (PSP) and others – will need to continue and financial flows are required to support this work through to implementation of TAP project ideas.

2.5 Technology Executive Committee

There were four questions about the TEC, the Technology Mechanism's policy arm. The multiple choice questions asked respondents about their familiarity with the TEC's work and whether they attended its meetings. Most were either somewhat familiar or not at all familiar with it (See Figure 6).

Ten respondents were aware that NDEs can attend TEC meetings either online or in person, while eight were not. But only three of 17 respondents had attended a TEC meeting themselves. Of those, two had attended one to two meetings and the other – the former TEC representative from Bhutan – had attended more than seven.

Figure 6. LDC familiarity with the TEC's work



Given their limited familiarity with and participation at TEC meetings, 16 respondents made various suggestions for improving the TEC's work in an open-ended question. We discuss these suggestions in the next few sections.

2.5.1 Better participation and engagement

Most suggestions for improvement involved increasing the TEC's engagement with LDC representatives. Three respondents would like support for their NDEs to participate in TEC sessions. One specified that this could be online participation, if the CTCN helped them with the connection, as network disruptions are a hindrance to their full participation in online discussions. Another respondent indicated that there should be a formal electronic platform between the NDEs and the TEC. Some respondents suggested that the TEC should work more closely with countries to expand participation – for example, by organising some TEC meetings in developing countries. Others stated that the TEC should actively seek ideas from NDEs and keep an updated list of NDEs' names. Two respondents said NDEs need support to attend UNFCCC negotiations so they can get to know what the TEC is doing.

2.5.2 Improving TEC's role in finance

Four respondents suggested that improving the work of the TEC should involve finance, including:

- Prioritising support for urgent technologies related to human lives
- Bringing together NDEs and GCF national designated authorities (NDAs) to share country experiences and challenges in accessing technology support and financial support, and
- Making more resources available to the CTCN to ensure that NDEs get the logistical support they need.

Some of these comments recommended financial policies for the TEC to investigate, such as:

- Ensuring enhanced access to GCF resources for technology transfer
- Increasing the lowest level of funding for technical assistance from US\$50,000–150,000 and the highest level from US\$250,000–500,000, and
- Ensuring that five per cent of project funding goes towards NDEs' operational and administrative costs.

2.5.3 Other suggestions for improvement

Two respondents suggested raising awareness of the TEC's work, either by disseminating its work more widely through a report or specifically targeting the private sector. Other suggestions on how the TEC could improve its work included monitoring effective technology transfer to developing countries – especially LDCs – and authoring a handbook for prioritising technologies in different countries.

2.5.4 Analysis

LDC NDEs and other survey participants seem to have limited familiarity with the work of the TEC. Given the TEC's mandate to provide policy guidance, this limited interaction with NDEs may be understandable. But those who are aware of the TEC's work and role see these as important. And limited familiarity means that LDC representatives cannot effectively access the policy guidance, key messages and recommendations that the TEC develops and releases for technology development and transfer.

Respondents gave a clear call for the TEC to develop ways to further enhance its interaction with NDEs and Parties. With much of the TEC's work disseminated through the TT:Clear website,¹⁵ creating an NDE email thread could inform NDEs when key publications,

reports, key messages and recommendations are made available. It could also be used to send observer invitations to NDEs for TEC meetings. While TEC meetings are open for participation, making facilities available for LDC representatives to communicate with UN regional agencies and other entities that can provide a secure internet connection would actively promote their participation in meetings. Most of TEC's outreach outside the TT:Clear website takes place at the UNFCCC negotiations, which most NDEs do not attend. Webcasting these events or enhancing communications channels surrounding them may facilitate greater LDC participation.

2.6 Climate Technology Centre and Network

The survey included several questions about respondents' familiarity with CTCN training sessions, its response plan template and guidance notes. It also asked about experience in requesting technical assistance from the CTCN through channels such as the incubator programme.

2.6.1 CTCN training sessions

The questionnaire posed five questions about CTCN training sessions. The first, which asked respondents how familiar they were with the training sessions offered by the CTCN, elicited 17 responses (see Figure 7).

Eighteen respondents replied to the question on the number of CTCN training sessions attended: nine had never attended one; four had attended one to two sessions; and five had attended three to four. Of those who had attended sessions, seven found them very useful, one found them somewhat useful and one said it had been of limited use.

Seven respondents who had attended a CTCN training session answered an open-ended question on whether they had taken further action at national level to implement or use the knowledge from the trainings. Of these, two indicated that there had been further national-level actions to implement or use the knowledge from the trainings; one said there had been very little and one said there had been none.

Three mentioned enhancing the involvement of stakeholders, by informing them of the CTCN's readiness to offer technical assistance to LDCs or running informational workshops to encourage them to develop innovative technology projects that bring something new to existing projects and are likely to attract donors.

One respondent said that, due to a lack of financial responses, training participants had only informed the relevant ministries – rather than a broader range of stakeholders – of the services offered by the CTCN.

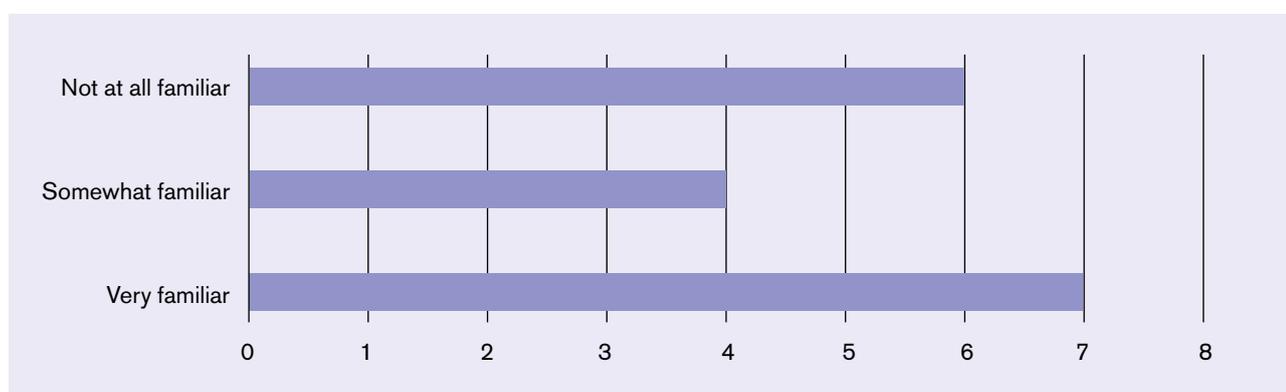
Another, who had not attended a CTCN training session, said that participants from their country who had attended would be involved in country trainings and workshops.

Suggestions for improvement

When asked how the CTCN training sessions could be improved, 15 respondents made suggestions related to location, logistics, style and content.

Most of those who suggested improvements talked about location and logistical arrangements. Two favoured regional trainings and one said they would prefer to see more participants at the sub-regional level. Another indicated that spreading training across the local level would allow all sectors to benefit. One indicated a need for short trainings within the NDEs, while another suggested that training should be organised in-country and involve both the private sector and civil society.

Figure 7. Respondents' familiarity with CTCN training sessions



Regarding logistical arrangements, one respondent stated that the CTCN should continue to offer – and extend – training sessions. Another suggested increasing the number of days to more than three to avoid the rush to deliver the sessions and allow participants travelling long distances to rest before returning home, noting that some participants missed closing ceremonies due to their flight schedules. Others suggested additional support for travel and subsistence, and prioritising countries that have not benefitted from previous trainings for invitations to future trainings.

Four respondents thought the content and style of the trainings could be improved. Two suggested basing them on the priorities and common interests of the countries being trained. Another said that the training should focus on project formulation and implementation. Two respondents thought that offering hands-on or personal attention in the training would be better than the current workshop-style delivery.

Three respondents' comments did not fall into the categories above. One remarked that improving the training sessions would not be very effective without expediting the very slow process of technology transfer. Another suggested the CTCN maintain a database where each developing country could list their areas of training need. Another stated that training should be followed by action at national level.

Analysis

Our survey indicates that most participants are familiar with the CTCN training sessions. This is to be expected, as the CTCN's mandate as the Technology Mechanism's implementation arm requires direct interaction with countries through trainings and technical assistance support. The majority of respondents who had attended a training session found them very useful. But there is a need for more direct

interaction with countries, to raise awareness about the CTCN and its work. Several of the respondent's recommendations give good suggestions for how to accomplish this.

2.6.2 CTCN response plan template and guidance note

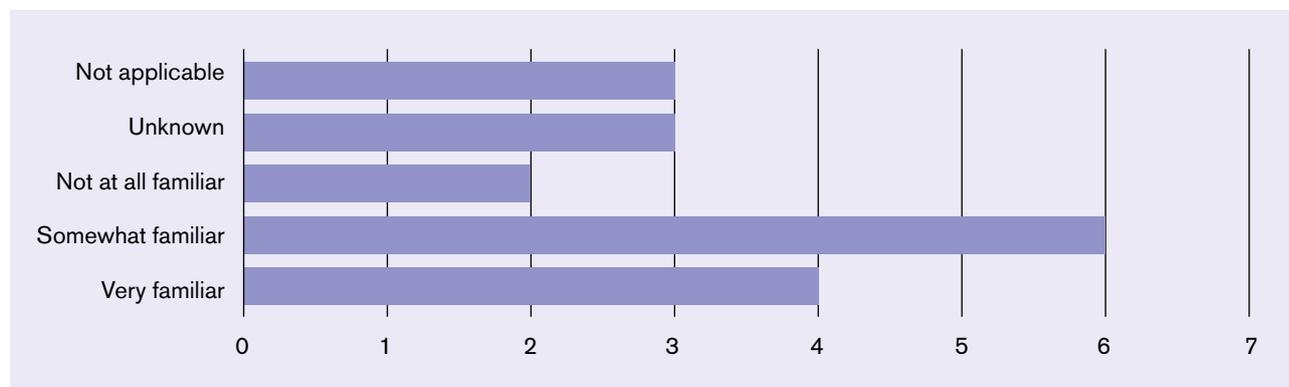
Of the 18 respondents who indicated familiarity with the CTCN response plan template and guidance note, the majority were either somewhat or very familiar (see Figure 8).

The questionnaire asked whether respondents thought the CTCN response plan template and guidance note were useful. Of the ten who were familiar with the template and guidance note, four found them very useful, four somewhat useful, one said it was not applicable and the other did not respond. Nobody said they were of limited use.

Of the nine who gave feedback on how the CTCN response plan template and guidance note could be improved, one said the existing model is fine. Another stated that the response plan should always take into consideration the local realities of the country that made the request and another suggested aligning the response plan with the concept notes of funding entities, such as the GCF and the GEF.

Three respondents provided feedback that was broader than the response plan template and guidance note. One stated that ongoing training and implementation are prerequisites for improvement; another suggested organising awareness workshops in-country; and another that the CTCN should facilitate internet connections to ensure materials are accessible via the NDE.

Figure 8. Respondents' familiarity with the CTCN response plan template and guidance note



2.6.3 CTCN incubator programme

The CTCN incubator programme offers support for LDCs to implement the climate change actions included in their NDCs.¹⁶ Of the 19 respondents from 16 countries who indicated familiarity with the incubator programme, nine were very familiar and said their country had used the programme. Two were somewhat familiar, seven were not at all familiar and one said that it did not apply.

Although most respondents were familiar with the incubator programme, it is worrying that seven respondents were not familiar with a programme that is specifically for LDCs, and one thought it did not apply to them. This implies that these Parties will not submit requests to benefit from the programme. There needs to be further awareness raising with LDC NDEs so they might take a proactive role in understanding the process of accessing technical assistance through the incubator programme.

2.6.4 Requests for technical assistance

Eighteen respondents from 15 LDCs replied to the question on the number of technical assistance requests their country had submitted to the CTCN. Six of these countries had not submitted a request; four had submitted one to two; one had submitted three to four; three had submitted five to six and one had submitted seven or more.

Twelve respondents from 11 countries answered a further question on the time elapsed between submitting a request for technical assistance and getting a response from the CTCN. Five got a response within less than three weeks; two within one to two months; and two between three and six months. Another two said it took from 12 to 18 months, while one said they did not receive a response.

The majority of countries who responded to the questions above had submitted requests for technical assistance to the CTCN. And the vast majority of

Figure 9. Respondents' familiarity with the CTCN incubator programme

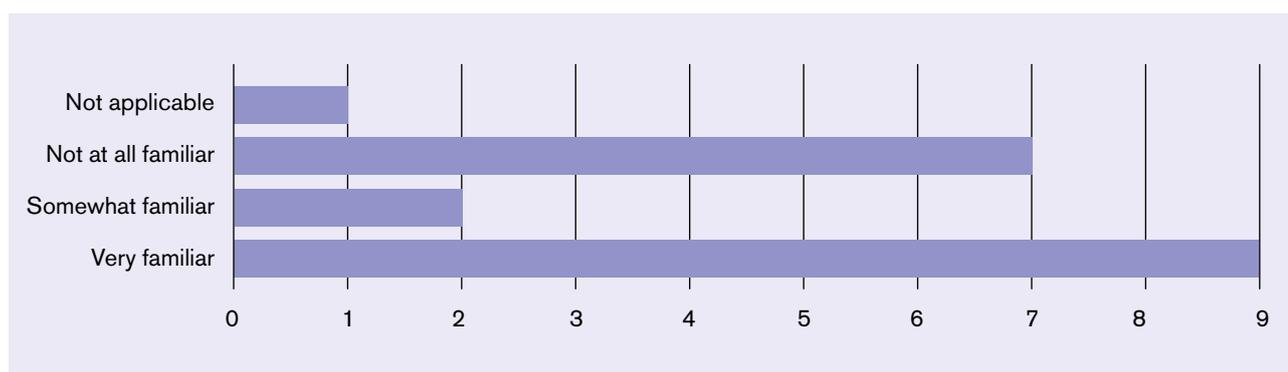


Figure 10. Number of requests for technical assistance LDCs have submitted to CTCN

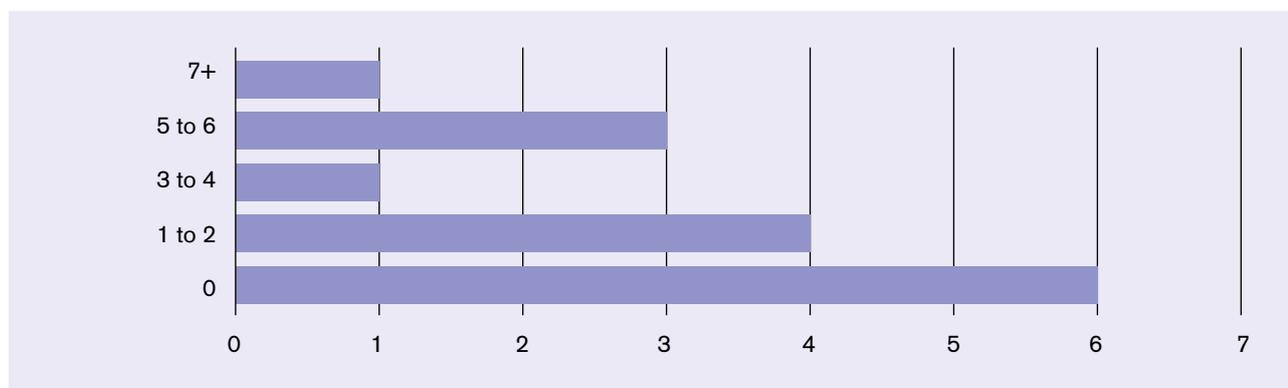


Figure 11. Time between submitting a request for technical assistance and getting a response



these requests were met with a response in less than six months. But it remains to be seen why some countries had not submitted requests for technical assistance – for example, was this due to a lack of capacity, awareness or interest? Sharing case studies and lessons learnt from NDEs that are champions in accessing CTCN technical assistance could help build the capacity of other LDCs.

2.6.5 Improving the CTCN's work

An open-ended question asked participants for suggestions to improve the work of the CTCN. Seventeen respondents left feedback, primarily related to finance, engaging with countries and supporting NDEs.

Finance

Six respondents mentioned finance. This included allocating additional financial resources to the CTCN so it can reply to country requests and support focal points to prepare requests that will benefit local communities. One respondent attributed limited funding to the CTCN's inability to entertain many country requests and its slow response times. Other suggestions included:

- Financial support for implementing the incubator programme to improve the CTCN's work and allow all countries to benefit from its support
- Promoting collaboration and partnerships between the CTCN and other players – especially other financial mechanisms – to ensure support for technology transfer to LDCs, and
- The GCF creating a window for technology projects valued above US\$250,000.

Country engagement

Seven respondents said that improving the CTCN's engagement with countries would improve its work. Three recommended providing direct support to countries, two specified that this should be done via contact with in-country structures. Others suggested:

- CTCN representatives periodically visiting developing countries and sitting with their NDEs
- CTCN discussing its work with government representatives and national implementing agencies or companies
- Providing cyclical support to LDCs for assessing their adaptation and mitigation technology needs
- Following up planning with continuous trainings and implementation at all levels, and
- Bringing technology providers to workshops and trainings to engage countries.

Supporting NDEs

Five respondents said that supporting NDEs would improve the work of the CTCN. One respondent, an NDE representative, indicated that strengthening the NDE would be an effective way of disseminating the CTCN's work in-country. Supporting NDEs –through training, capacity building or other means – would help make NDEs familiar with CTCN activities and how to access them, allowing them to perform their role effectively. Two respondents suggested providing logistical funding to the NDE – for example, for dedicated transportation or awareness-raising meetings with stakeholders. Other suggestions included funding NDEs to facilitate secondments and cover the salary of a post dedicated to CTCN work. One respondent recommended creating special incentives for improving NDE offices, noting that they were personally funding even the cost of the email to respond to the survey.

Analysis

The general conclusion we can draw from the feedback is that the CTCN is short of funding and requires additional financial resources to do its work effectively. National-level capacity is also important. Because the NDEs are the channel of engagement, they need support – including with financial resources – if they are to serve all LDCs effectively. At present, LDC NDEs lack operational funds to support and strengthen country-level initiatives. The CTCN should also improve its engagement and interaction with NDEs and stakeholders at country level.

2.7 Financial institutions

The questionnaire asked respondents which financial institutions support their technology projects and how regularly they work with representatives from the GEF, LDCF and GCF. Sixteen people from 14 countries responded to these questions.

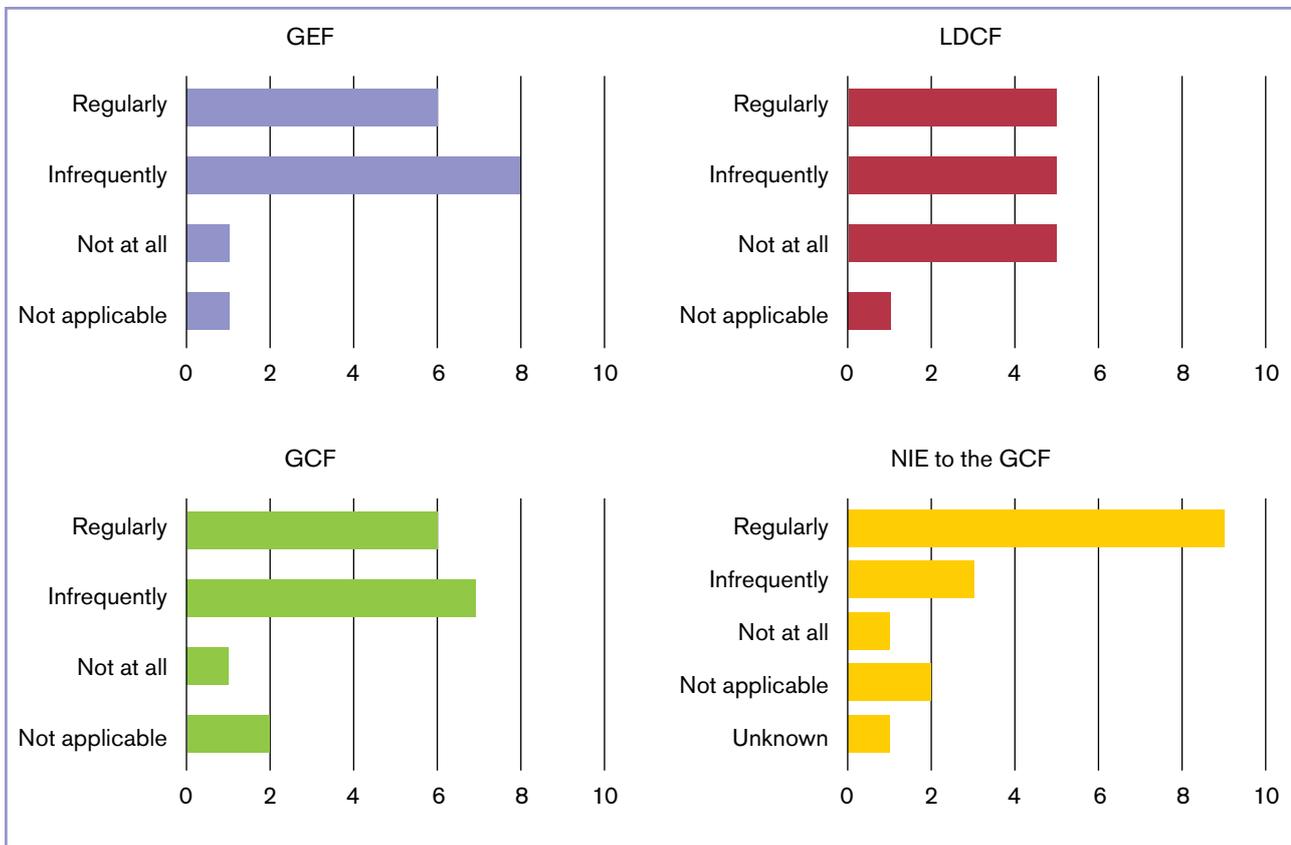
Respondents indicated that they engage most frequently with their country's NIE to the GCF, with nine of the 16 saying they work with them regularly. They engage least frequently with LDCF representatives – five respondents indicated that they do not work with them at all. At least one respondent indicated that the question did not apply to them for each institution.

NDE engagement with financial institutions appears to reflect the current availability of funds in each institution. The GCF has had billions pledged to it since its operationalization, whereas the LDCF struggles to attract donations. At the same time, the LDCF has not directly addressed technology development and transfer projects, while the GEF has dealt with technology under the PSP. Levels of interaction with each institution seem consistent with the current funding landscape.

If the LDCF remains a priority for the LDC Group, it needs to increase its interaction with NDEs and other LDC representatives. The LDCF has a mandate to implement the whole LDC work programme, which includes technology. But if there is no money coming in to the LDCF, it will be unable to support projects.

Respondents' limited engagement with representatives of the financial institutions could reflect a distinction of roles within each country. If NDEs took an active role in climate project development this may help ensure their country's technology needs are effectively integrated during design. NDEs could also be part of their countries' NAP and NDC teams to ensure technology needs are part of these national strategies. But NDEs need both the human and institutional capacity to perform these functions. This is a limitation we have discussed in other sections.

Figure 12. Extent to which respondents work with representatives from the GEF, LDCF and GCF



Barriers and challenges

3

The final section of the questionnaire posed four open-response questions about the barriers and challenges respondents face in relation to technology development and transfer, particularly regarding accessing climate finance for technology development and transfer. Respondents were asked what actions at global and national level could address these barriers and challenges and invited to make further comments on the overall questionnaire.

3.1 Identifying barriers and challenges

Fifteen respondents described the primary barriers and challenges that they had experienced around accessing climate finance for technology development and transfer. The primary themes to emerge from these responses were: a lack of capacity and awareness, difficult processes and limited funding. Many responses touched on two of these themes.

3.1.1 Lack of capacity and awareness

Ten respondents noted that a lack of capacity, awareness or information was their primary barrier to accessing climate finance for technology development and transfer. Two of these specified the need to build capacity to write funding proposals, while two others simply stated that lack of capacity was a barrier. Another said their country needed institutional capacity building as they did not have an institution accredited to directly access finance from the GCF. One mentioned the low absorptive capacity of climate financing.

Three respondents said their primary barrier was a lack to awareness; one suggested in-country trainings on financing mechanisms for technology development and transfer to improve awareness. One said there was low awareness among their country's key players in various sectors and that they had few project management specialists. Another mentioned the need to raise awareness among decision makers, academics, the private sector and non-governmental organisations.

Two respondents said their primary barrier was limited information on climate finance for technology development and transfer, and one pointed to a lack of understanding of the existence of suitable technologies. Another said they needed technical assistance to identify technology priorities and opportunities for carbon credit.

3.1.2 Difficult processes

Four respondents remarked that difficulties in process were the primary barrier to accessing climate finance. One simply stated that the process is difficult, while another noted that the sheer number of steps made it difficult to access funding. One respondent said that, when the NDA and NDE are from different agencies, there are coordination gaps between them that complicate the process of accessing funding for technology development and transfer.

3.1.3 Limited availability of funding

Two respondents said their primary barriers were inadequate funding and difficulty in mobilising additional resources.

3.1.4 Analysis

Capacity to access finance appears to be major barrier to the LDCs. This includes awareness and capacity to prepare proposals. It is also linked to difficult processes: the more difficult the process, the more capacity countries need to navigate it.

The lack of awareness and understanding of actual and suitable technologies was an interesting point arising from the responses. This may relate to the fact that many LDCs have not yet having conducted a TNA or undertaken a road mapping exercise. LDCs need more capacity building to prepare proposals for funding and to identify the technologies they need.

3.2 Actions to address barriers and challenges

Respondents were asked what actions at the global and national level could help address these barriers and challenges. Fifteen respondents made suggestions for international and domestic actions to strengthen capacity and raise awareness; increase resources and innovative funding; foster exchange and learning; and simplify access to financing.

Respondents were also invited to make further comments at the end of the questionnaire. We have included some of their responses here.

3.2.1 Strengthen capacity and raise awareness

Most suggestions for addressing barriers to technology development and transfer involved strengthening capacity and raising awareness. Several respondents indicated that UNFCCC bodies could play a role in building capacity at an international level. Their suggestions included the early operationalisation of the Paris Committee on Capacity Building; GCF secretariat training the younger generation on the processes and requirements for accessing funding; and the CTCN or GEF playing a role in strengthening NDE capacity.

Eleven respondents mentioned capacity building. Four of these specified national capacity to directly access climate finance (two respondents) and to write bankable proposals (two respondents). Two suggested building institutional capacity among government officers, bankers and private sector workers. One respondent stated that a stronger coordination mechanism and improved team spirit would help overcome barriers and challenges.

Five respondents suggested that raising awareness would address barriers and challenges. One pointed to a need for wider understanding of the importance of climate technology projects to addressing both adaptation and mitigation concerns; another saw a need to increase awareness of how to access financial mechanisms. Two respondents thought that stakeholders at all levels of the technology development and transfer process need an increased awareness of the availability and role of climate finance.

Four respondents suggested training to strengthen capacity – for example, training NDE focal points on accessing financing mechanisms and local and national-level managers on how to develop large-scale projects. Another indicated that relevant research institutions and universities should lead trainings on technology development and transfer, and one called for training on technology appropriateness and adoption.

3.2.2 Increase resources and innovative funding

Nine respondents thought that increased funding would address the barriers and challenges to technology development and transfer. One called for more donors to support efforts to mitigate climate change; another suggested allocating more resources to technology transfer to LDCs. Three specified that these resources should go to the CTCN to facilitate the transfer of technologies to LDCs, and two called for the funding to go directly to NDEs so they can fulfil their mission and improve the services of the CTCN.

One respondent proposed creating a separate fund for technology development and transfer, prioritising funding for specific technologies first and training all countries on how to access this fund. Another respondent suggested encouraging governments to create enabling environments for steering efforts to address climate change.

3.2.3 Foster exchange and learning

Seven respondents proposed bringing various people together to overcome the barriers to technology development and transfer. Their suggestions included:

- GCF and CTCN bringing together focal points, NDEs and NDAs to build a common understanding of technology and finance matters (three respondents)
- CTCN sponsoring NDEs to participate at COP meetings
- A regional experience exchange between African and Arab countries
- Sharing success stories from India and other developing countries with other countries with similar technology priorities
- In-country showcases , and
- Accrediting local rather than international institutions to assist technology development and transfer.

3.2.4 Simplify access to financing

Five respondents suggested simplifying access to financing. Several stated that the process for mobilising funds is too complex and should be simplified and made more flexible. One respondent indicated that everyone involved needs to take the initiative to expedite the technology transfer process.

3.2.5 Analysis

Respondents' suggestions provide tangible approaches to overcoming the barriers and challenges they face in relation to technology development and transfer. There is a need to build capacity at national level and to increase funding to NDEs. At international level, there is a need to increase funding for the CTCN, LDCF and GEF. LDCs need simplified processes for accessing international funding.

Encouraging synergies between NDEs, stakeholders, CTCN and finance bodies such as the GCF and GEF could help LDC representatives navigate the process of developing and transferring environmentally sound technologies. But there is more work to do, at both national and international level.

Conclusions and proposals



Although there appears to be a fair amount of awareness about the Technology Mechanism and its work among LDC representatives, the level of capacity to undertake work on technology development and transfer is low. A tangible example of this is the relatively low response rate to questionnaire. A fully functioning NDE should be able to respond on matters related to its primary task. A non-response from more than half of all LDCs could indicate poor capacity in those LDCs.

Furthermore, only half the LDCs have completed a TNA, revealing a large gap in awareness and the ability to identify needed technologies. Those LDCs that have engaged in technology development and transfer projects are in the early phases of preparing and identifying technology needs and priorities. And most of the support to date has gone into these early phases.

But LDCs also need support to ensure they can deploy and implement technology. This is critical to demonstrating that technology transfer under UNFCCC works. Throughout the questionnaire, LDC respondents identified several actions that could help them reach this phase. We have synthesised these points into the following recommendations for the primary actors of the Technology Mechanism: the TEC and CTCN, LDCs and other UNFCCC bodies.

4.1 Proposals for the TEC and CTCN

1. Strengthening national-level capacity is a central role of the CTCN. Because NDEs are the primary channel of communication to the CTCN, more capable LDC NDEs will mean a more effective CTCN. The CTCN should use innovative ways to engage NDEs and Parties to address their capacity building needs and gaps – for example, by teaming up with UNITAR to deliver training programmes. It should work closely with the LDC Expert Group (LEG), which also works to strengthen national capacity and support LDCs to develop NAPs.
2. To enhance technology projects, the CTCN should prioritise providing support to those LDCs that have not yet accessed their assistance, particularly through the LDC incubator programme. CTCN has a direct role in providing technical assistance to help identify technologies and prepare roadmaps for implementation. It should extend this work and link TNAs and preparatory work to implementation.
3. To improve TNAs, the Technology Mechanism should translate its tools such as TNA guidance documents into French and Arabic, as this will make them accessible to more LDC stakeholders.
4. The role of TEC is to provide policy guidance and recommendations based on analysis. To strengthen the TEC, the committee should work to understand the challenges and barriers that LDCs face in accessing climate technologies and technology financing. It should also organise climate technology expos like those organised by the LEG for NAPs to present TEC materials for additional outreach. These could be organised jointly or within existing forums such as the Africa Carbon Forum, the annual community-based adaptation conference or other events.
5. CTCN should continue raising awareness about its work and functions, including about the LDC incubator programme. The LEG and other UNFCCC bodies, particularly those that regularly interact with the LDCs, can help with this effort. CTCN should ensure it regularly interacts with LDC NDEs.
6. CTCN should continue working closely with financial institutions, particularly the GCF, so it can help countries access readiness support to prepare proposals for technology transfer projects. It should also work with the GCF, GEF and TEC to help countries access finance for technology development and transfer activities.

4.2 Proposals for LDCs

1. LDCs should invest in building their own national capacity and supporting their NDEs. NDEs should take initiative to understand their role within the CTCN, as well as the outputs of the TEC so that they can contribute effectively to policy making for technology development and transfer.
2. They should take advantage of the LDC incubator programme and request support from the CTCN to translate their TNAs and NDCs into implementable projects.
3. All LDCs should undertake TNAs or other processes to identify technology needs. These technology needs should be based on national adaptation and mitigation priorities, such as those identified in NDCs, NAPs and national adaptation programmes of action.
4. LDCs should raise the issue of the lack of funding for technology development and transfer available to the CTCN, LDCF, GEF and GCF with negotiating partners.
5. LDCs should put their concerns and ideas forward in the review of the CTCN's work, the periodic assessment of the Technology Mechanism and negotiations for the technology framework under the Paris Agreement.

4.3 Proposals for other UNFCCC bodies

1. LEG should take up further work on technology transfer in accordance with Article 4.9 and the LDC work programme in close collaboration with the Technology Mechanism. LEG could work with CTCN to deliver training programmes and ensure those LDCs that have yet to do so start working on technology.
2. GEF should prioritise those LDCs for further funding to complete their TNAs under the PSP and for support to develop roadmaps for technology transfer. GEF could also provide support for capacity building and awareness raising, working in collaboration with the CTCN.

The gaps and needs expressed by LDCs in this survey provide valuable information for multiple stakeholders. This includes bodies such as the LEG and CTCN who are engaged in supporting LDCs, the Technology Mechanism in general, donor countries and other UN bodies. The LDCs themselves can use the information to inform their own work towards filling these gaps and asking for support. It is also a valuable input to the ongoing work of technology development and transfer under the UNFCCC, which includes reviewing the work of the CTCN, establishing a periodic assessment of the Technology Mechanism and defining the technology components established under the Paris Agreement, such as the technology framework that will provide overarching guidance to the Technology Mechanism post-2020.

Moving forward, there is a need for all actors to integrate the processes for developing and transferring technology, especially with view to completing the implementation steps of the cycle when deploying and diffusing the technology. For mitigation, links should be drawn to NDC implementation. The LEG and the CTCN should continue working together to integrate the technology process into NAP formulation and implementation.

The Technology Mechanism's efforts to build capacity – a primary theme in our survey findings – should be carried forward in coordination with the Paris Committee on Capacity Building. And all technology development and transfer work should aim to integrate with the work and processes of the UNFCCC's financial mechanisms. At both national and international level, successful technology development and transfer is built on synergy.

Effectively transferring environmentally sound technologies to LDCs is the mandate of the original UNFCCC, enshrined in Article 4.9 and reemphasised in the Paris Agreement more than 20 years later. Today, there remains need for climate action to reduce vulnerability, mitigate greenhouse gas emissions and improve conditions in the LDCs. We hope the recommendations in this paper will inform the UNFCCC's continued work to achieve its ultimate objective.

Notes

- 1 UNFCCC (2015) Adoption of the Paris Agreement, Article 10, paragraphs 1 and 3. UNFCCC document FCCC/CP/2015/L.9/Rev.1. See <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- 2 IPCC (2000) Methodological and technological issues in technology transfer: summary for policymakers. Special Report of Working Group III. Intergovernmental Panel on Climate Change.
- 3 Craft, B *et al.* (2015) Technology development and transfer, the Least Developed Countries and the future climate regime: considerations for the post-2020 international response to climate change. LDC paper series. <https://tinyurl.com/ybcbv6hf>
- 4 UNFCCC (2009) Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009. UNFCCC document FCCC/CP/2009/11/Add.1. See <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf>
- 5 For the purposes of this paper, the terms INDCs and NDCs are used interchangeably.
- 6 UNFCCC (2016) INDCs and technology: a synthesis of technology issues contained in intended nationally determined contributions. See <https://tinyurl.com/ybc7wqlq>
- 7 Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, 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, Tanzania, Timor Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, and Zambia.
- 8 UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States. Criteria for identification and graduation of LDCs. <http://unohrrls.org/about-lidcs/criteria-for-lidcs/>
- 9 Andrei, S *et al.* (2016) A study of LDC capacity at the UNFCCC: engaging in negotiations and interpreting outcomes. IIED issue paper. See <http://pubs.iied.org/10167IIED/>
- 10 United Nations (1992) United Nations Framework Convention on Climate Change. UNFCCC document FCCC/INFORMAL/84. See <http://unfccc.int/resource/docs/convkp/conveng.pdf>
- 11 UNFCCC (2015) Adoption of the Paris Agreement, Article 10, paragraph 6 and Article 11. See <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- 12 Craft, B (2014) Technology transfer for Least Developed Countries. IIED Backgrounder. See <http://pubs.iied.org/17256IIED/>
- 13 UNDP (2009) Capacity Development: A UNDP Primer. See <http://www.undp.org/content/undp/en/home/librarypage/capacity-building/capacity-development-a-undp-primer.html>.
- 14 According to the information available on TT:Clear as of December 2017. See <http://unfccc.int/ttclear/tna/reports.html>
- 15 <http://unfccc.int/ttclear/>
- 16 www.ctc-n.org/capacity-building/request-incubator

The Least Developed Countries (LDCs) have worked with the two branches of the UNFCCC's Technology Mechanism – the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN) – for several years. This paper presents information the LDC Group representatives on the TEC and CTCN Advisory Board have gathered on how LDCs are currently using technology initiatives and programmes. It aims to better understand the barriers and challenges LDCs face in implementing technology development and transfer and explores what changes to existing technology and financial institutions could lessen these barriers and challenges.

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