Adaptation Finance Fellowship Programme

International adaptation finance to address planned priorities in Least Developed Countries

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Abstract

International climate finance plays an important role in enhancing adaptation action by supporting on-the-ground measures, mobilizing other sources of finance, and strengthening the enabling environment for investment. In particular, the funds under the United Nations Framework Convention on Climate Change (UNFCCC) will play a key role in assisting developing countries in their adaptation efforts, raising the need to better understand countries' progress in accessing finance through these funds and the type of adaptation measures being implemented to address adaptation needs. The purpose of this research was to better understand the ways and extent to which international adaptation finance has supported implementation of planned adaptation priorities in Least Developed Countries. The findings of the study include a greater understanding on countries' progress in accessing international finance to address adaptation priorities and the type of adaptation activities being supported. The findings of this study can support future adaptation planning and project design to increase efficiency and effectiveness of adaptation finance. It can also help to improve coordination at the country level to strengthen the strategic use of funds to promote synergies, avoid duplication of efforts, and guide policy implementation.

Key words Climate change adaptation • Least Developed Countries • International adaptation finance

1. Introduction

Adaptation to climate change has increasingly been incorporated in national policies as part of the countries' response to climate change, however, implementation remains limited (Berrang-Ford et al.2011; Dupuis and Peter Knoepfel 2013; Ford et al. 2011; Mimura et al. 2014; Mullan et al. 2013) raising concerns on whether the current progress on adaptation is sufficient to keep pace with the increasing adaptation needs (Eisenack et al. 2014). Inadequate or insufficient funding is one of the barriers for the conversion of plans into action that is commonly highlighted in the literature (Dupuis and Knoepfel 2013; Mimura et al. 2014; Preston et al. 2011; Wise et al. 2014). Adaptation finance plays an important role in enhancing adaptation action by supporting on-the-ground measures, mobilizing other sources of finance, and strengthening the enabling environment for investment (Ford et al. 2015; Nakhooda 2013; Bouwer and Aerts 2006; Pillay et al. 2017). While finance for adaptation has increased steadily in the last decades, it is estimated that the gap between adaptation needs and available finance that developing countries are already facing is likely to increase in the future unless significant progress is made in the mobilisation of additional finance (UNEP 2016).

National adaptation planning and the provision of finance have been two key themes of the adaptation support for developing countries under the international climate change regime, anchored by the 1992 United Nations Framework Convention on Climate Change (UNFCCC). National adaptation planning has been supported through the processes to formulate and implement National Adaptation Programmes of Action (NAPAs), focused on identifying and addressing urgent adaptation needs in Least Developed Countries (LDCs); and National Adaptation Plans (NAPs), aimed at identifying medium and long-term adaptation needs in all developing countries. Under the UNFCCC, states have committed to assist developing countries that are particularly vulnerable to climate change to adapt to climate change (UNFCCC 1992: Article 4(4)). Adaptation resources are channeled through the funds under the UNFCCC's financial mechanism. These themes are also included in the Paris Agreement, which promotes adaptation planning (Article 7 para. 9), and highlights the need to provide financial resources to developing countries to assist them in their adaptation efforts (Article 7(13), Article 9(1) and (4)).

The UNFCCC has acknowledged the need for climate finance to consider the priorities and needs of developing countries (Decisions 1/CP.16 para 97 and 6/CP.23 para. 10). The Paris Agreement specifically recognizes the importance of supporting adaptation efforts that are consistent with the needs of developing countries, and in particular those that are most vulnerable to climate change impacts (Article 7 para. 5 and 6). In addition, some studies have highlighted that international finance can be more effective if it responds to the needs and priorities identified by developing countries (Bizikova et al. 2015; Mace 2015; UNFCCC 2018). Adaptation finance that does not respond to country priorities and needs can result in decreased ownership of the results achieved through international projects or initiatives; missed opportunities in strengthening national capacity; an adaptation agenda that is more aligned to external organizations' focus or priorities rather than the government's; and/or overlapping or contradicting activities that do not support a coordinated approach towards adaptation in the country (Conway and Mustelin 2014).

Developing countries have progressively communicated their adaptation needs and priorities through the NAPAs, NAPs, National Communications (NCs) and Nationally Determined Contributions (NDCs) submitted to the UNFCCC. However, there is limited information on how and to what extent finance provided through the UNFCCC's financial mechanism is consistent with these national adaptation priorities communicated to the UNFCCC. While several studies have examined the funds under the UNFCCC's financial mechanism, providing information on their characteristics and governance arrangements (Ayers 2009; Biagini et al. 2014; Flåm and Birger S. 2009, Klein and Persson 2008; Kato et al. 2014b; Pillay et al. 2017), fund allocation and distribution (Cui and Huang 2018; Grasso 2010; Halimanjaya 2015; Halimanjaya and Papyrakis 2015; Morita and Matsumoto 2015) and adaptation measures supported by the projects (Conevska et al. 2018; Sovacool 2012; Sherman and Ford 2014); fewer studies have examined the consistency of finance with national adaptation priorities (for example Bizikova et al. 2015) and the type of adaptation activities being supported. Biagini et al. (2014) examined the type of adaptation activities being supported by international adaptation finance; however, this analysis did not cover all UNFCCC funds nor was it focused on LDCs as is addressed in this research project. As the funds under UNFCCC's financial mechanism are expected to play a key role in assisting developing countries in their adaptation efforts, there is a need to better understand countries' progress in accessing finance through these funds and the type of adaptation actions being implemented to address their priority needs.

This study seeks to better understand in what ways and to what extent international adaptation finance-and in particular the funds under the UNFCCC's financial mechanism, has supported implementation of planned adaptation priorities in LDCs. To this end, I propose a conceptual measurement to better understand the progress of different countries in accessing international finance to address planned adaptation priorities. This study also seeks to increase understanding on the type of on the ground adaptation actions being supported. My work complements the findings from Baigini et al. (2014) by expanding the analysis to all UNFCCC funds until 2019, and by introducing two periods of analysis to allow comparison on the type of adaptation actions over time. Understanding the ways and the extent to which international adaptation finance is addressing adaptation priorities can support future adaptation planning and project design to increase effectiveness and coordination of adaptation finance in a context of limited resources and increasing adaptation needs by increasing ownership of the projects, preventing contradictory actions across sectors and promoting that project investments sustainably strengthen in-country adaptation processes.

The paper is structured as follows. Section 2 presents an overview of adaptation priorities and needs in LDCs. I then provide updated information of the funds that finance adaptation under the UNFCCC's financial mechanism and their role under the Paris Agreement (section 3), and explain the methodology in section 4. The findings from the research are presented in section 5, finalising with the conclusion (section 6).

2. Adaptation priorities in Least Developed Countries (LDCs)

The Least Developed Countries (LDCs) are a group of 47 countries, classified in this category by the United Nations according to criteria including per capita income; human assets (involving a composite index based on indicators of nutrition, child and maternal mortality, school enrolment and literacy); and economic vulnerability (UNCTAD 2019). The LDCs are among the countries most vulnerable to the impacts of climate change but with the least capacity to adapt (Huq et al. 2004). LDC's are particularly vulnerable to climate change because of their geographic location; dependence on natural resources for their economies; and social, economic and political issues that result in low adaptive capacity (Reid et al. 2009; Huq et al. 2004), which is determined by factors such as human and political capital, economic resources and infrastructure; information and skills; and institutions and equity (Lemos et al. 2013).

Adaptation to climate change is defined as the adjustment of a system to moderate the impacts of climate change and can involve building adaptive capacity and implementation of adaptation decisions (Adger et al. 2005; IPCC 2014; Tompkins et al. 2010). The Intergovernmental Panel on Climate Change (IPCC) refers to adaptation needs as "circumstances requiring information, resources, and action to ensure safety of populations and security of assets in response to climate impacts" and may include biophysical and environmental; social; institutional; information, capacity, and resource needs (Noble et al. 2014). Adaptation needs can be both activities or measures that are required to build adaptive capacity or reduce vulnerability, as well as the finance needed to implement those actions. In assessing the financial needs in developing countries, studies have estimated adaptation costs to be in the range of US$70-100 billion for the period 2010-2050 (IPCC 2014); or potentially higher—between US$280 and US$500 billion by 2050 (UNEP 2016). While there is not a single estimate on adaptation costs, it is recognized that costs will not be equally distributed, particularly affecting countries with higher adaptation needs such as LDCs (UNEP 2016). As future adaptation needs are closely linked with mitigation efforts, the costs of adaptation are expected to increase as increased accumulation of greenhouse gas emissions in the atmosphere create more extreme impacts.

Planned adaptation refers to "adaptation that results from deliberate policy decisions aimed at returning, maintaining or elevating resilience conditions to a desired state" (UNEP 2016), using information about present and future climate risks to assess the suitability of current and planned practices (Füssel 2007). A critical part of developing planning instruments for adaptation is identifying and prioritizing options to address key climate risks (Mullan et al. 2013).
National Adaptation Programmes of Action (NAPAs) are planning documents in which LDCs identified and communicated priority activities to address their urgent and immediate adaptation needs (UNFCCC 2001, Decision 28/CP.7). Collectively, the NAPAs signal the type of adaptation activities that were considered by national governments in LDCs as urgent or priority needs (DANIDA and GEF 2009; Klein and Persson 2008), highlighting the importance of the food security, forests, and water resources sectors (UNFCCC 2013). The NAPAs also included an estimation of the costs needed to implement the identified adaptation priorities. However, cost estimates in the NAPAs were developed through consultative processes and failed to reflect the actual cost of adaptation in LDCs, estimated to be "several orders of magnitude higher than the costs presented in the NAPAs" (LDC Expert Group 2009). The priority activities in the NAPAs, are mostly presented as project type interventions as it was expected that once NAPAs were submitted to the UNFCCC countries would be eligible to access funding from the LDC Fund and other sources of funding to implement these activities (Decision 28/CP.7).

The results from the NAPA process are mixed and unclear. The NAPAs have been criticized for their short-term and project-based focus, rather than medium or long-term strategies, and studies have highlighted a limited focus on mainstreaming wider development issues (Harde and Mutunga 2009; Pauw and Pegels 2013; Preston; Saito 2013). Studies focusing on NAPA implementation found that translation to country

action remains limited (DANIDA and GEF 2009; Kalame et al. 2011; Wise et al. 2014), while studies focusing on the results of the planning process, found that NAPAs were relevant for raising awareness (Osman-Elasha and Downing 2007), promoting stakeholder engagement (LDC Expert Group 2009), and, in some cases, enabling institutional arrangements for adaptation planning (DANIDA and GEF 2009).

Since the NAPA process, LDC countries have progressed in identifying medium- and long-term adaptation priorities through National Adaptation Plans (NAPs), and more recently have communicated their adaptation priorities through the formulation of NDCs as part of the Paris Agreement. All African countries and 92% of Asian countries that submitted NDCs included adaptation targets, highlighting water, agriculture and health as key sectors (Micale et al. 2018). The majority of LDCs (37 countries) prioritized adaptation measures in the agriculture and food security sector, followed by measures related to water resources, coastal zones and forests (35 countries) (Patel et al. 2019). Indicative adaptation costs included in the NDCs are comparable to the range of adaptation costs estimated by the IPCC (UNEP 2016), and while they provide an indication of adaptation needs and finance that will be required in LDCs, differences in definitions, assumptions and baselines used by countries limit the extent to which adaptation costs and needs can be compared and aggregated (UNEP 2015).

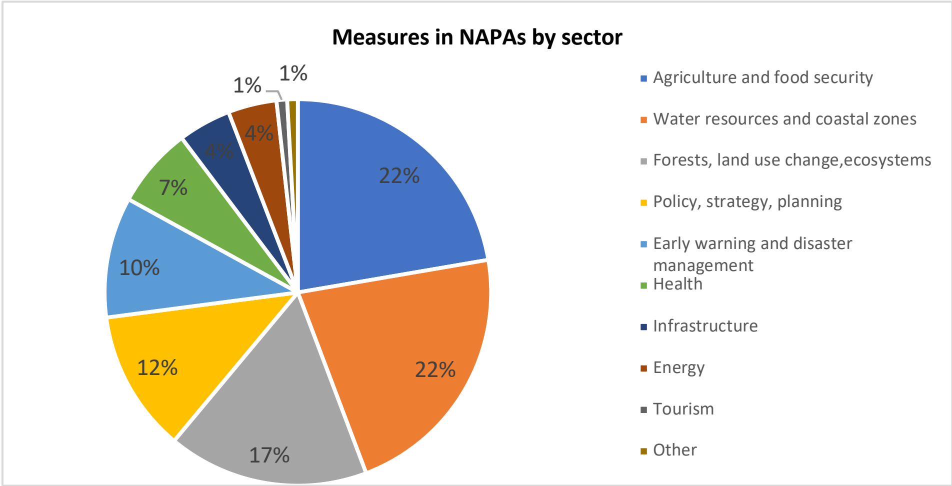

Figure 1. Measures in NAPAs by sector. Source: Adapted from UNFCCC 2013.

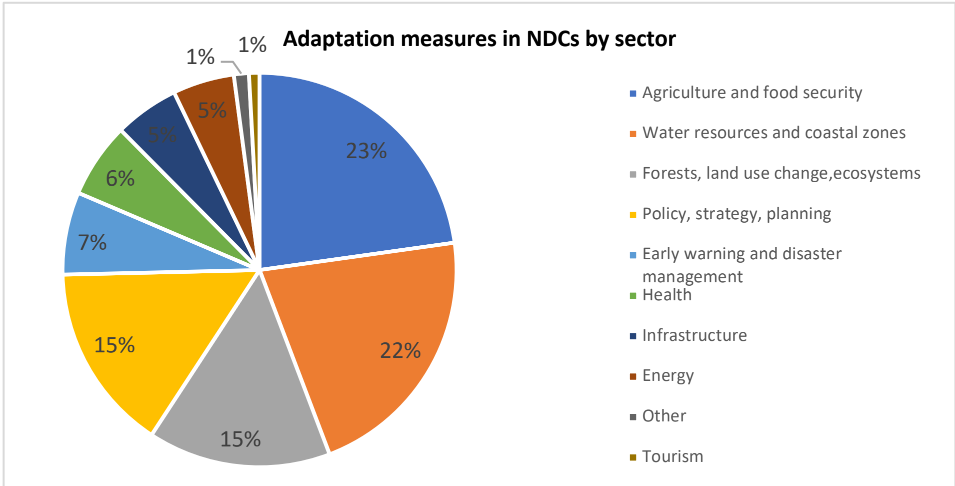

Figure 2. Measures in NDCs by sector. Source: Patel et al. 2019.

Implementation of adaptation plans and the provision of adaptation finance are closely linked. Under the UNFCCC, preparing and submitting national adaptation plans has been a condition for developing countries to secure project funding (Mace 2003; Paw and Pegels 2013). Insufficient or inadequate funding was identified as a barrier for adaptation in many of the NAPAs (Paw and Pegels 2013) and has been a main constraint for their implementation (Kalame et al. 2011; Osman-Elasha and Downing 2007). In addition, countries that have been able to access international adaptation finance are likely to have more adaptation actions (Ford et al. 2015).

3. International adaptation finance: the funds under the UNFCCC's financial mechanism

Adaptation finance has been a key policy response in the international climate change regime and discussions on how to meet adaptation finance needs have been a central issue in the UNFCCC policy agenda (Noble et al. 2014; Shipper 2006; UNEP 2016). It is widely recognised that international public finance alone will not be sufficient to meet adaptation needs (Ayers 2009; Bouwer and Aerts 2006; Pauw and Pegels, 2013; Pauw 2015). However, international public finance, including multilateral climate funds, plays a key role in enhancing adaptation action in developing countries and catalysing the impact of investment by mobilizing other sources of finance, placing adaptation on the political agenda, and enhancing the enabling environment for investment (Ford et al. 2015; Nakhooda 2013; Bouwer and Aerts 2006; Pillay et al. 2017; UNEP 2016).

The majority of public climate financing flowing to developing countries has been provided through channels outside the institutional arrangements under the UNFCCC (Nakhooda et al. 2016). However, UNFCCC funds are expected to play a key role in mobilizing adaptation finance in the context of the Paris Agreement. UNFCCC funds function under the guidance of and are accountable to the Conference of the Parties (COP), and therefore provide more opportunities for countries to exercise control over funding decisions, including priorities, funding conditions, targets, and eligibility criteria (Bouwer and Aerts 2006; Scoville-Simmonds 2016). The funds also aim to support national priorities, through country-driven projects, provided on a grant basis to take account of the specific needs of LDCs (Decision 11/CP.1), and bring together various institutions and donors that could potentially enhance impact and coordination from the implementation of adaptation projects and programs. The financial architecture under the UNFCCC includes five funds that channel adaptation finance to developing countries: The Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), the Strategic Priority for Adaptation —a special allocation under the Global Environment Facility (GEF) Trust Fund; the Adaptation Fund (AF) and the Green Climate Fund (GCF).

The GEF was the first entity established under the UNFCCC's financial mechanism. The GEF's initial mandate on adaptation was limited to supporting planning and assessments for the identification of adaptation options and capacity building (Decision 11/CP.1). The Marrakech Accords agreed in 2001, extended the GEF's mandate on adaptation by establishing the Strategic Priority "Piloting an Operational Approach to Adaptation" (SPA) under the GEF Trust Fund (Decisions 5/CP.7 and 6/CP.7). The Marrakech Accords also created three new funds to support adaptation: The LDCF and the SCCF under the Convention and managed by the GEF; and the AF under the Kyoto Protocol (Decisions 5/CP.7, 7/CP.7, 10/CP.7), entrusted to an operating entity under the guidance of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The newest entity under the financial mechanism, the GCF, was established in 2010 to support projects, programs, policies and other activities in developing countries (Decision 1/CP.16 para 100). The GCF is accountable to and operates under the guidance of the Conference of the Parties (COP). The GEF, LDCF, SCCF and GCF are financed by voluntary contributions from donor countries. The AF is financed from a levy on the Clean Development Mechanism (CDM) in addition to contributions by developed countries. The SPA allocated all its resources between 2006 and 2010, thus the GEF now finances adaptation projects mainly through the LDCF and SCCF.

The operating entities under the Convention's financial mechanism will also serve the Paris Agreement, accountable to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) (Decisions 1/CP.21, para.58 and 13/CMA.1, para.1). The AF will continue to receive the share of proceeds if available, from activities under the market mechanisms of the Kyoto Protocol (Articles 6, 12 and 17), and shall exclusively serve the Paris Agreement and no longer serve the Kyoto Protocol until the share of proceeds under Article 6, paragraph 4, of the Paris Agreement becomes available (Decisions 13/CMA.1, para. 1 and 1/CMP.14, para. 2 and 3). In addition, the Adaptation Fund will continue to be financed from a variety of voluntary public and private sources (13/CMA.1 para 5).

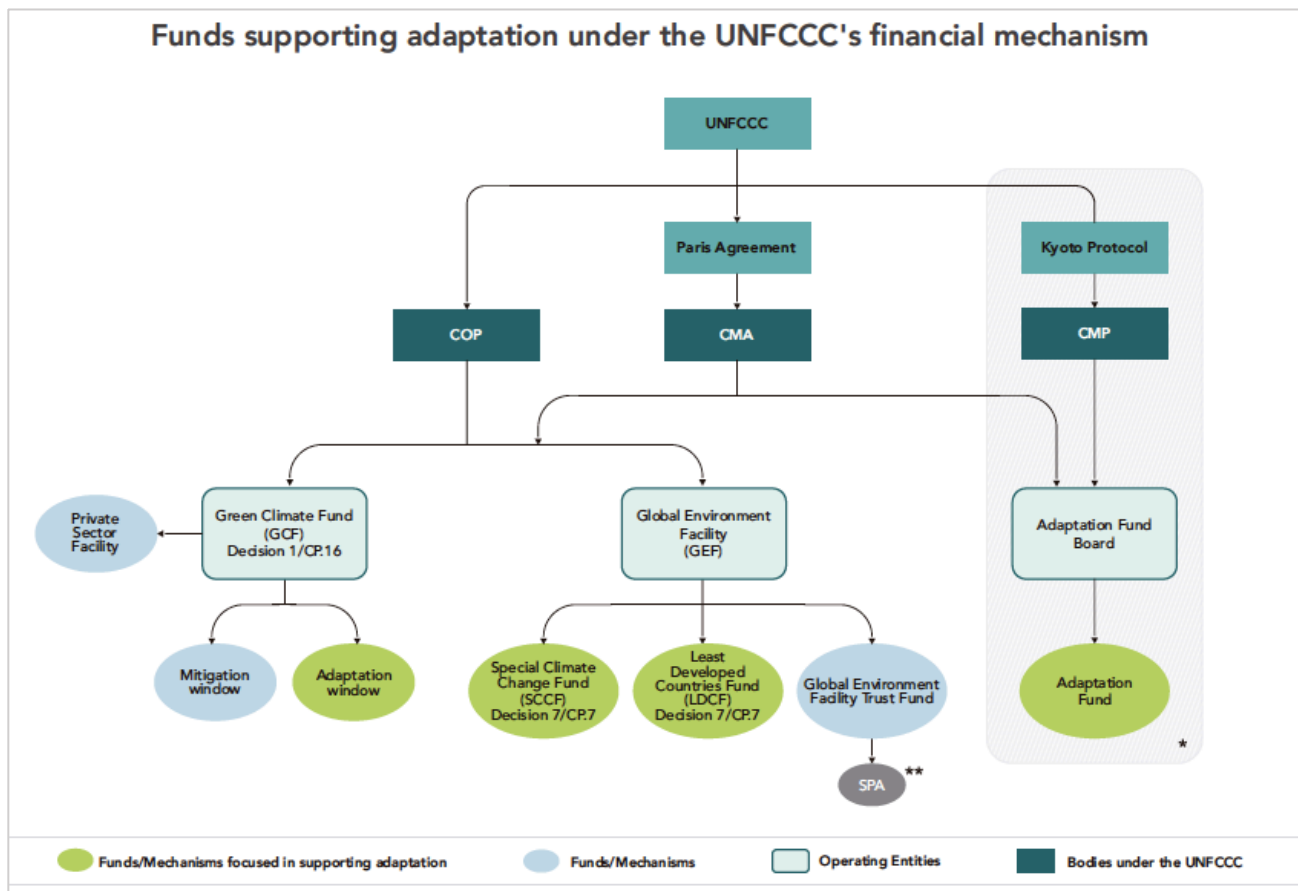

Figure 3. Funds supporting adaptation under the UNFCCC's financial mechanism. Adapted from Kato T. et al. 2014.

* The Adaptation Fund shall no longer serve the Kyoto Protocol once the share of proceeds becomes available under Article 6, paragraph 4 of the Paris Agreement. The Adaptation Fund shall continue to receive the share of proceeds, if available, from activities under Articles 6, 12 and 17 of the Kyoto Protocol (Decisions 13/CMA.1, para. 1; 1/CMP.14, para. 2 and 3).

** The SPA allocated all its resources between 2006 and 2010.

Least Developed Countries Fund (LDCF). Established to support the special needs of LDCs, and particularly the preparation and implementation of NAPAs. The LDCF finances the additional costs—the costs imposed on vulnerable countries to meet their adaptation needs—of activities to adapt to climate change as identified and prioritized in the NAPAs (Decision 3/CP.11). As of June 2019, the fund had approved USD 1334.1 million for 223 projects, mobilizing an additional USD 5.84 billion in co-financing. Cumulative pledges to the LDCF amounted to USD 1.40 billion, with 1.37 billion received (UNFCCC 2019a). The fund's governing body is the LDCF/SCCF Council, which has the same composition as the

GEF Council, with 14 seats for contributing countries and 18 for recipients.[1] The LDCF has been a key source for adaptation finance, holding the largest portfolio of adaptation projects in LDCs (UNEP 2016).

Special Climate Change Fund (SCCF). Aims to finance climate change activities, programs, and measures that are complementary to those funded by the climate change focal area of the GEF and catalyze additional resources from bilateral and other multilateral sources. The SCCF established four financing windows to support projects related to: a) adaptation; b) Transfer of technology; c) energy, transport, industry, agriculture, forestry and waste management; and d) economic diversification. The SCCF was mandated to prioritize adaptation (Decisions 7/CP.7 and 5/CP.9), and only the first two windows are active. As of June 2019, the SCCF has provided USD 282.7 million for 67 projects under the climate change adaptation window, mobilizing USD 2.1 billion in co-financing; and USD 60.7 million for 12 adaptation projects under the technology transfer window, mobilizing USD 382.3 million in co-financing. By June 2019, USD 356.1 million have been pledged to the SCCF, of which 347.8 million were received (UNFCCC 2019a). The main governing body of the SCCF is the LDCF/SCCF Council.

Strategic Priority "Piloting an Operational Approach to Adaptation (SPA)". The SPA, a special program with a USD 50 million allocation within the GEF Trust Fund, was launched in 2005 to establish pilot projects with adaptation benefits that could be integrated into national policy and planning (Decision 5/CP.7, para.7 (b)). The SPA reached its financial close by June 2010, with a portfolio of 26 projects totaling USD 48.35 million financed by the GEF with co-financing of USD 780 million (GEF 2010). Financing of adaptation activities under the SPA followed the principles of the GEF Trust Fund, including criteria on financing incremental costs and supporting global environmental benefits (GEF 2005).

Adaptation Fund (AF). Established to finance concrete adaptation projects and programmes in developing countries that are Parties to the Kyoto Protocol (Decisions 10/CP.7, 28/CMP.1, 5/CMP.2). As of June 2019, the AF had received USD 887.1 million, comprising of USD 201.4 million from the monetization of CERs, USD 657.9 million from additional contributions and USD 27.8 million from investment income, and approved 84 projects and programs amounting to USD 619.05 million (UNFCCC 2019b). In addition to the traditional access modality in which resources are channelled through international agencies, the AF pioneered the direct access modality. In the direct access modality, resources are channelled through National Implementing Entities, that are nominated by a country government and accredited to the Fund. The Fund is governed by the AF Board. The board follows a one-country-one-vote rule for decision making, and is composed of 16 members and 16 alternates, with the majority of members from developing countries.

Green Climate Fund (GCF). The GCF seeks to promote a paradigm shift towards low-emission and climate-resilient development by providing support to developing countries in their mitigation and adaptation efforts (GCF 2011). The fund aims to support adaptation and mitigation in a balanced manner (50:50), uses an integrated approach to allow for cross-cutting projects and programs, and seeks to channel at least 50% of funds to SIDS, LDCs and African countries. As of June 2019, the Fund had approved USD 5.2 billion to support the implementation of 111 climate change adaptation and mitigation projects and programs in 99 developing countries, with USD 13.5 billion of co-financing mobilized, and with the largest proportion of funding (42%) allocated to Africa (UNFCCC 2019c). By July 2019, pledges to GCF amounted to USD 10.3 billion (UNFCCC 2019c). In October 2018, the process for the first formal replenishment was launched with the objective of securing funding for the 2020-2023 period, with USD 9.78 billion expected (GCF 2019). The GCF considers both international access and direct access modalities to channel resources to developing countries, and provides financing for projects in the forms of grants and concessional lending. The GCF is governed by a board of 24 members, comprised of an equal number of members from developing and developed countries. In contrast to the other UNFCCC funds, the GCF has an independent secretariat, which service and is accountable to the GCF Board.

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[1] GEF/C.01/03/Rev.01. https://www.thegef.org/sites/default/files/council-meeting-documents/GEF.C.1.3.Rev_.1_5.pdf

Table 1. Summary of main characteristics of the funds under the UNFCCC's financial mechanism

Fund	Objective and geographical focus	Start operation year	Decision making body	Managing organization	Financial instrument	Eligible funding	Project portfolio	Amount Pledged (USD)
LDCF	Preparation of NAPAs and implementation of adaptation priority projects under the NAPAs Least Developed Countries who have completed a NAPA	2002[2]	LDCF/ SCCF Council	GEF	Grant	Additional costs of adaptation measures	223 projects USD 1334.1 million from LDCF[3]	1.40 billion pledged; 1.37 billion received[4]
SCCF	Finance climate change activities that are complementary to the GEF Focal Areas All developing country Parties to the Convention	2004[5]	LDCF/ SCCF Council	GEF	Grant	Additional costs of adaptation measures	79 projects USD 343.4 million[6] from the SCCF	356 million pledged; 347 million received[7]
SPA	Pilot projects with adaptation benefits that could be integrated into national policy and planning Developing countries	2005	GEF Council	GEF	Grant	Incremental costs to achieve global environment al benefits	26 projects USD 48.35 million from the GEF	50 million allocated
AF	Finance concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol and are particularly vulnerable to the adverse effects of climate change.	2009/2010	Adaptation Fund Board	Independent board GEF secretariat	Grant	Concrete adaptation projects and programmes	84 projects USD 619.05 million	887.1 million received
GCF	Promote a paradigm shift towards low-emission and climate-resilient development All developing country Parties to the Convention	2011 but the first projects were approved in 2015	GCF Board	Independent board and secretariat	Grant Loan Equity		111 projects USD 5.2 billion from the GCF[8]	10.3 billion pledged 10.2 billion converted to contribution arrangements[9]

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[2] The GEF released the Operational Guidelines for Expenditure Funding for the Preparation of NAPA by LDCS, in April 2002.
[3] As of June 2019
[4] As of June 2019
[5] In 2004, the GEF Council approved a programming document which provides the operational basis for funding activities under the SCCF. GEF/C.24/12 https://www.thegef.org/sites/default/files/council-meeting-documents/C.24.12_5.pdf
[6] 282.7 million (adaptation window); USD 60.7 million (technology transfer window). As of June 2019
[7] As of June 2019
[8] As of June 2019
[9] As of July 2019

5. Methods

I considered international adaptation finance as the resources being provided through the UNFCCC's funds that support adaptation, and specifically the SPA, LDCF, SCCF, AF, and GCF; and adaptation priorities as those specified under the NAPAs. I used NAPAs because they provide a large database with the adaptation priorities in a diverse group of LDCs, are comparable because they were developed based on predefined guidelines[10], and link financing with projects addressing the identified priorities (Klein and Persson 2008, Pauw and Pegels 2013). The NAPAs may not represent the most recent adaptation priorities in many countries, as countries have progressed in defining and communicating adaptation priorities to the UNFCCC through their NAPs, national communications, and most recently through the NDCs, as described in section 2. While all LDCs submitted NAPAs these countries are in different stages in the development of their NAPs, and therefore NAPAs provide larger coverage. In addition, NAPAs were produced as a first stage in the planning process promoted under the UNFCCC (most NAPAs were produced between 2006 and 2010), and therefore it is possible to have a broad range of projects over time to examine their link with adaptation priorities.

I reviewed 221 projects supported by the SPA, LDCF, SCCF, AF, and GCF in 44 countries in Asia and Africa[11]. Project information was retrieved mainly from the funds' databases as well as from international organizations implementing the projects. The analysis included only approved and concluded projects, with projects that were in the concept stages excluded. This choice was based on the potential changes on the amount and type of activities that could emerge from further developing the project into a funding proposal from the concept stage. The projects that were analysed also included those that specified a link with the NAPA (in terms of alignment with objectives, priority areas or addressing priority activities).[12]

I extracted information from the project documents related to the amount of finance approved, approval year, outcomes, outputs, accredited and implementing agencies, and priorities addressed. Project documents included PIF, CEO endorsement requests and project documents for the LDCF, SPA and SCCF; approved funding proposals for the GCF; and project documents for the AF. Details of the projects were analyzed, and qualitative and quantitative data was summarized using excel spreadsheets. To measure the amount of finance allocated to the countries, I considered the amount provided by the funds, rather than the total project cost. To identify the adaptation priorities being addressed by the projects, I compared these to those identified under NAPAs for each country. It is important to note that I did not assess if and how the projects address adaptation priorities. Rather, I used the information about adaptation priorities as being addressed or partially addressed by the projects as specified by the project proponents in the project documents. In addition, I did not assess if the projects' objectives and expected results were achieved.

The analysis also included the identification of the sectors in which NAPA priorities are being addressed. To classify the projects by sector, I used the 12 sectors in which the UNFCCC classified the NAPA priorities (UNFCCC 2013), which are: 1) cross-sectoral (including various sectors), 2) food security (including agriculture, fisheries, livestock, land management and sustainable livelihoods projects); 3) coastal zones and marine ecosystems; 4) early warning systems and disaster management; 5) education and capacity building; 6) energy; 7) health; 8) infrastructure; 9) insurance; 10) terrestrial ecosystems; 11) tourism; 12) water resources.

[10] UNFCCC 2001. Decision 28/CP.7

[11] The analysis included all LDCs except Haiti, Sudan and South Sudan. Haiti was excluded to focus the analysis on Africa and Asia. Sudan and South Sudan were also excluded from the analysis. South Sudan is one of the countries with less amount of international adaptation finance and it is not clear if this is related to the time that have passed from the development of the NAPA (2016) or to the countries' characteristics. Sudan submitted its NAPA in 2007 before the independence of South Sudan in 2011. The priorities in Sudan's NAPA included a region that is now in South Sudan, therefore, the country's priorities could have significantly changed after 2011.

[12] The last revision to the project database was done in March 2020.

To measure the countries' progress in accessing finance to address adaptation priorities, I plotted the amount of finance and percentage of adaptation priorities addressed by country and calculated the mean and standard deviation for each variable. With this information, I classified countries' progress according to three categories for each variable (low/medium/high). To identify the type of adaptation activities supported by international adaptation finance, I coded project outcomes and outputs following the adaptation categories developed by Biagini et al. (2014). I added codes or modified the existing codes where necessary to better reflect activities for all funds under analysis.

5. Results

In total, USD 1,969 Million have been allocated to LDCs through projects addressing adaptation priorities financed by the UNFCCC funds. The LDCF and GCF have provided 90% of the funds through 192 projects (table 2). LDCs have on average five approved projects per country, and received on average USD 44.7 million per country. The highest amount of resources has been accessed by Tanzania, Bangladesh, Ethiopia, Bhutan, Rwanda, Madagascar, Comoros, Nepal, Senegal, and Cambodia (figure 4). Tanzania, the country with the highest amount of finance, has received through one GCF project more resources than all LDCs through all the funds. Through this project, Tanzania was approved to receive USD 116.2 million from the GCF. This project constitutes 14% of the total amount of finance approved by the GCF for all LDCs. Bangladesh-the second country with the highest amount of finance, has been approved a total USD 106.2 million through eight projects.

Table 2. Adaptation finance accessed to address adaptation priorities

Fund	Projects	Amount (USD million)	% of the total
LDCF	164	$971.6	49%
GCF	28	$802.3	41%
AF	24	$177.4	9%
SPA	2	$10.6	0.5%
SCCF	3	$7.2	0.4%
Total	**221**	**$1,969.1**	

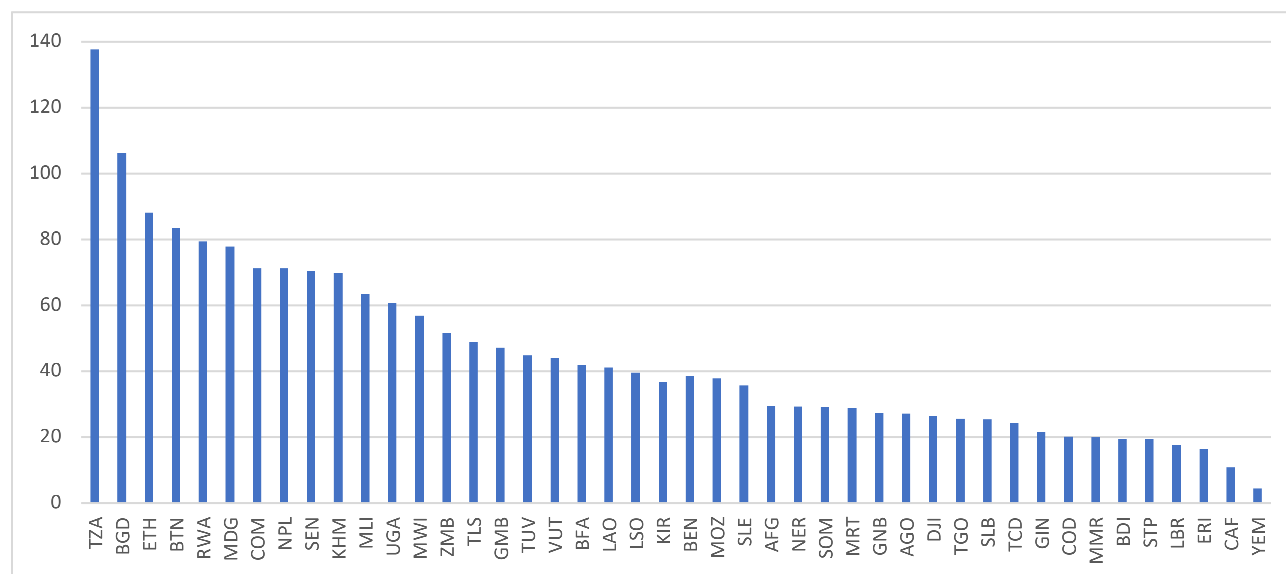

Figure 4. Amount of international adaptation finance accessed by LDCs

Priorities addressed by projects

More than half of the countries analysed (64%) are implementing projects that address or partially address 60% or more of their adaptation priorities. The countries with higher percentages of priorities addressed or partially addressed are Rwanda, Mozambique, Malawi, Guinea Bissau, Uganda, Nepal Bhutan, Djibouti, Tuvalu and Senegal (figure 5). UNFCCC's funds are mainly supporting priorities in the food security, terrestrial ecosystems and water resources sectors (figure 6). This is consistent with the sectors with the highest amount of priorities in the NAPAs. Adaptation priorities in the health and energy sectors have been seldomly addressed. However, priorities might be underestimated as the results do not reflect priorities being addressed by projects not included in the analysis. For example, some priorities in the energy sector have been addressed through mitigation projects, while in the health sector some priorities have been addressed through multi-country projects. In addition, 12 projects analysed did not specify the priorities addressed or partially addressed.

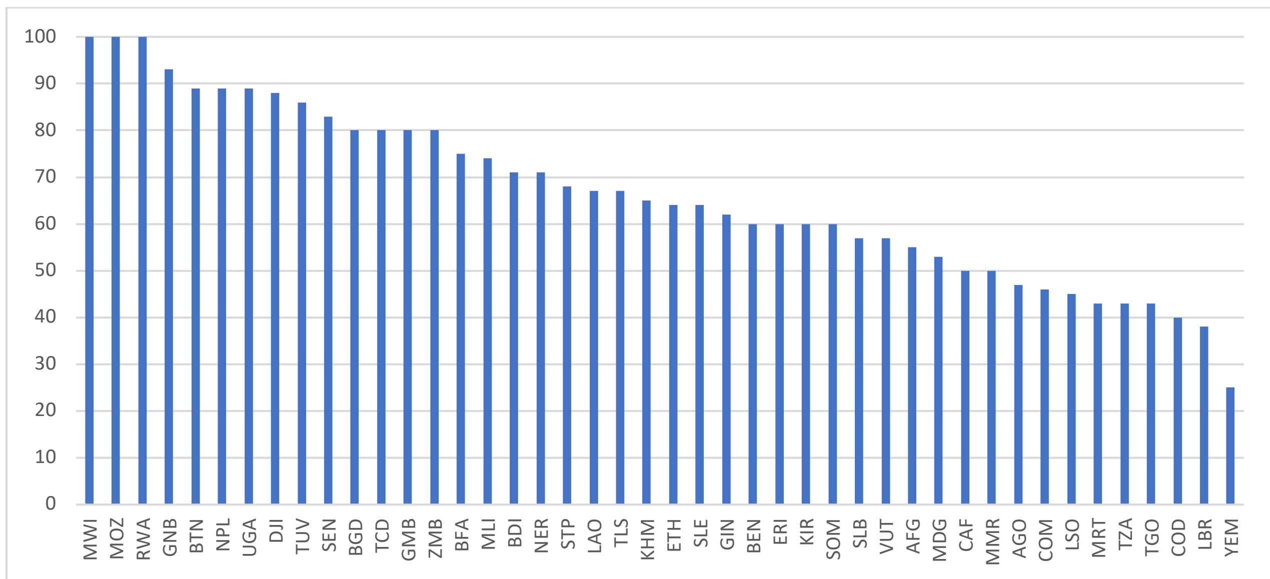

Figure 6. Percentage of priorities addressed or partially addressed.

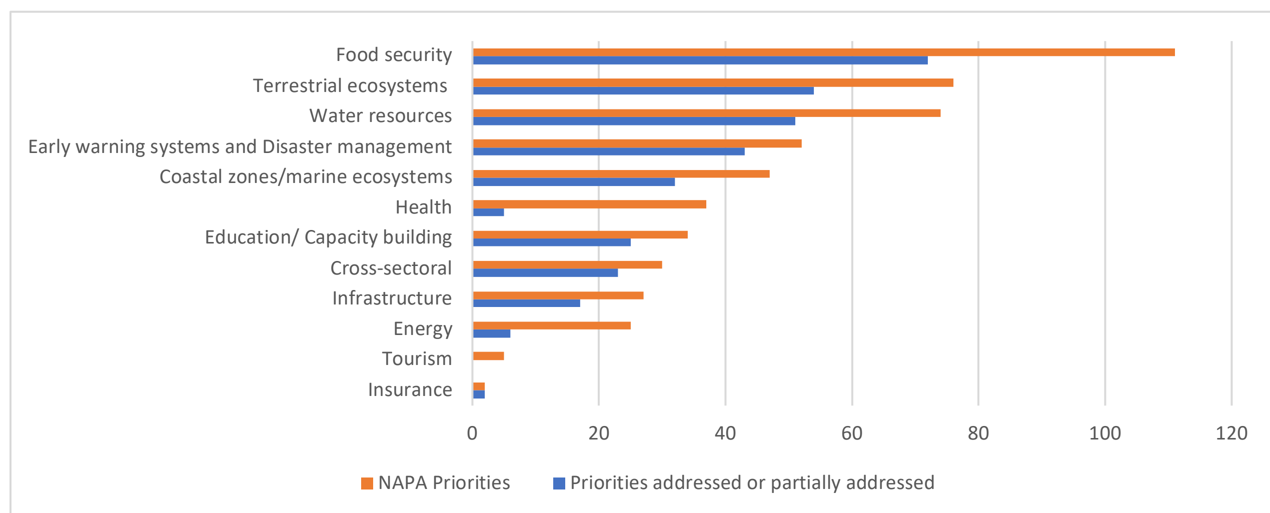

Figure 7. NAPA priorities addressed by sector

Progress in addressing planned adaptation priorities with international adaptation finance

Overall there is a positive tendency between the amount of finance received and the percentage of priorities addressed (see figure 8). Notable exceptions include Comoros and Tanzania (high finance but low priorities addressed) and Djibouti, Guinea Bissau, and Chad (low finance and high priorities addressed) (Table 3). The countries with the best progress in accessing finance to address adaptation priorities are Bangladesh, Bhutan and Senegal, who are lower middle income countries, and Nepal and Rwanda (low income countries). Bangladesh, Bhutan, Nepal and Rwanda are also countries where the highest amount of adaptation initiatives have been reported in the literature (De Souza et al. 2015).

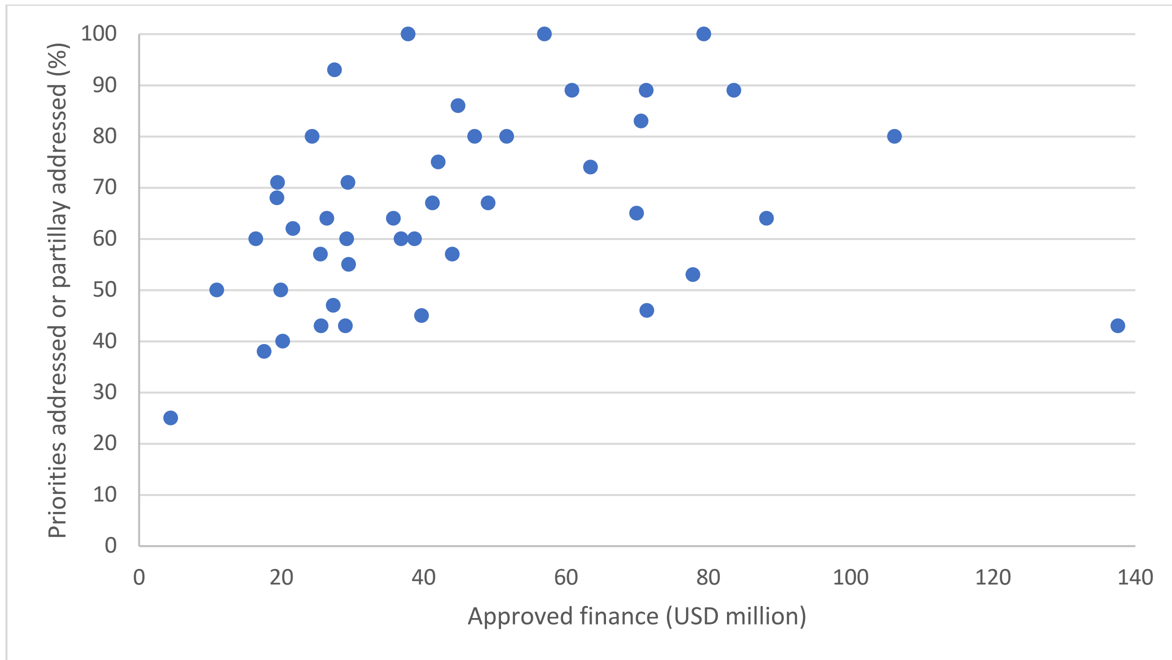

Figure 8. Progress in accessing international finance to address adaptation priorities

Studies on bilateral adaptation finance suggest that lower middle income countries benefit the most from adaptation finance as they are perceived to be more able to absorb finance flows (Betzold and Weiler 2017). However, this differs from multilateral finance in LDCs as shown in this study (figure 9).

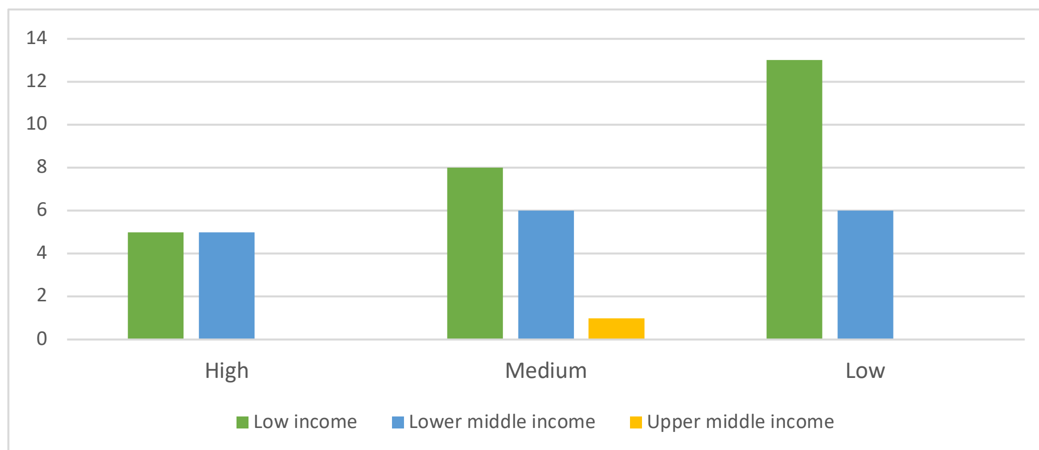

Figure 9. Number of LDCs according to the amount of international finance accessed and income group.

Table 3. LDCs' classification according to their progress in accessing international adaptation finance to address national priorities

Priorities	Finance		
	Low (<35 USD million)	**Medium (35-65 USD million)**	**High (>75 USD million)**
Low (0-50%)	**Countries:** AGO, CAF, COD, LBR, MMR, MRT, TGO, YEM **Total:** USD 154.80 million **% of total finance:** 8% **Projects:** 41	**Countries:** LSO **Total:** USD 39.68 million **% of total finance:** 2% **Projects:** 7	**Countries:** COM, TZA **Total:** USD 208.90 million **% of total finance:** 11% **Projects:** 7
Medium (>50-75%)	**Countries:** AFG, BDI, ERI, GIN, NER, SLB, SOM, STP **Total:** USD 190.30 million **% of total finance:** 10% **Projects:** 36	**Countries:** BEN, BFA, KIR, LAO, MLI, SLE, TLS, VUT **Total:** USD 350.94 million **% of total finance:** 18% **Projects:** 42	**Countries:** ETH, KHM, MDG **Total:** USD 235.86 million **% of total finance:** 12% **Projects:** 13
High (>75%)	**Countries:** DJI, GNB, TCD, **Total:** USD 78.20 million **% of total finance:** 4% **Projects:** 13	**Countries:** GMB, MOZ, MWI, TUV, UGA, ZMB **Total:** USD 299.15 million **% of total finance:** 15% **Projects:** 36	**Countries:** BGD, BTN, NPL, RWA, SEN **Total:** USD 410.88 million **% of total finance:** 21% **Projects:** 26

Countries with the least progress (low finance and low priorities addressed) have received 8% of the total amount of finance. From this group, Afghanistan, Central African Republic, Democratic Republic of Congo, and Yemen are countries with high and medium intensity of conflict, which might explain a low capacity to access adaptation finance and implement adaptation actions. Countries that have a high amount of finance but low percentage of priorities addressed could be explained by the type of approved projects and cross-sectoral focus, as well as the number of adaptation priorities in the NAPA. For example, both Comoros and Tanzania established a similar amount of adaptation priorities (13 Comoros, 14 Tanzania) and have five approved projects. In Comoros four projects are addressing the same top four NAPA priorities, targeting the agricultural, terrestrial ecosystems and water resources sectors. In Tanzania, 84% of the approved funds for the country were accessed through one cross-sectoral project funded by the GCF.

6. Conclusion

International adaptation finance channelled through the UNFCCC's funds is addressing planned adaptation priorities in LDCs. However, there are opportunities to strengthen the investment to address adaptation priorities in other key sectors, such as the health sector. LDCs' progress in accessing international finance to address their adaptation priorities varies, with Bangladesh, Bhutan Nepal, Rwanda and Senegal, being the leaders in accessing international finance to address national priorities. Djibouti, Guinea Bissau and Chad are among the countries with a higher percentage of adaptation priorities addressed but with limited finance. Angola, Central African Republic, Democratic Republic of Congo, Liberia, Mauritania, Togo and Yemen constitute the group with the least access to adaptation finance and limited adaptation action.

The different progress shows that there are opportunities to improve the distribution of adaptation finance to LDCs, and target capacity building and finance readiness support to the 19 LDCs with the lowest access to finance. Future research could explore the factors that explain why some LDCs have been more successful in accessing finance to address their adaptation priorities.

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