

**Efforts of developing countries in assessing and meeting the costs of
adaptation: Lessons learned and good practices
Synthesis report by the Adaptation Committee in the context of the
recognition of adaptation efforts of developing country Parties**

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List abbreviations and acronyms

AC	Adaptation Committee
Adcom	Adaptation Communication
AF	Adaptation Fund
BUR	Biennial Update Report
BTR	Biennial Transparency Report
CBT	Climate Budget Tagging
CFF	Climate Fiscal Framework
COP	Conference of the Parties
CPEIR	Climate Public Expenditure and Institutional Review
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CSO	Civil-Society Organization
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
LT-LEDS	Low Greenhouse Gas Emission Development Strategy
LEG	Least Developed Countries Expert Group
MCA	Multi-Criteria Analysis
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NC	National Communication
NDC	Nationally Determined Contribution
NDR	Needs Determination Report
NGO	Non-Governmental Organization
OECD	Organisation for Economic Cooperation and Development
PPCR	Pilot Program for Climate Resilience

SCF	Standing Committee on Finance
SPCR	Strategic Program for Climate Resilience
TAP	Technology Action Plan
TNA	Technology Needs Assessment
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. Summary

1. The CMA, in its decision 11/CMA.1, requested the secretariat, under the guidance of the AC and the LEG, and in collaboration with relevant stakeholders, to prepare synthesis reports every two years. These reports focus on specific adaptation themes, providing relevant lessons learned and good practices in developing country Parties, in the context of the recognition of their adaptation efforts.

2. This synthesis report, the second in the series, is focused on “Efforts of developing countries in assessing and meeting the costs of adaptation.” The objective of the report is to synthesize relevant lessons, insights, and good practices in developing country Parties, with respect to i) assessing the costs of adaptation and ii) meeting the costs of adaptation. The synthesis is based on a review of national reports submitted to the UNFCCC secretariat, including NDCs, NAPs, Adcoms, TNAs, and TAPs, other relevant reports under the UNFCCC, reports from the operating entities of the UNFCCC financial mechanism and other relevant literature.

1.1. The costs of adaptation

3. The costs of adaptation can be defined as the costs of planning, preparing for, facilitating, and implementing adaptation measures to moderate harm or exploit beneficial opportunities arising from climate change effects. The analysis of the costs of adaptation has benefits, as it facilitates the allocation and prioritization of resources, and in identifying potential adaptation finance needs.

4. Estimating the costs of adaptation at national and local levels is challenging. It requires the analysis of the site and context specific nature of risks (hazard, vulnerability, and exposure), which may change over time, and with it the corresponding site and context specific analysis of an adaptation response. There is also high uncertainty over the size of future climate risks, and the level of adaptation needed. Furthermore, delivering adaptation is a process that needs to go beyond the identification and costing of technical options.

5. There are various methods that can be used for estimating the costs of adaptation, all of which have strengths and weaknesses in relation to the challenges above. The choice of method used influences the size of adaptation costs estimated. Estimates of adaptation costs also vary with the objectives, definitions and boundaries for adaptation that are set, and the sectors covered. This means there is no definitive cost of adaptation, i.e. estimates for a country vary depending on the framing and objectives set, the methods used, and the assumptions made.

6. There has been significant progress by developing countries in assessing their costs of adaptation in recent years, with many more developing country Parties reporting these in NDCs, NAPs and other reports and communications. At the time of analysis for this report (May 2022), 76 developing countries had reported adaptation costs in their NDCs or NAPs. This has increased significantly since the INDC submissions, when 44 developing countries reported adaptation costs. Many developing country Parties are also reporting adaptation costs in their Adcoms. While most of them submit their NDCs or NAPs as their Adaptation Communication or at least include the same adaptation cost estimates, a few countries have identified new adaptation costs in their Adcoms.

7. The synthesis demonstrates that the cost estimates in NDCs and NAPs vary in detail, as well as in terms of objectives, sectoral coverage, and assumptions. Many country estimates are now providing detailed and comprehensive estimates of adaptation costs, with 42 (of the 76) including sectoral breakdowns. However, in remaining country submissions, costs are reported at aggregate level, and/or without supporting evidence or breakdown. The synthesis also finds that there are wide variations in the boundaries and framing used by countries.

8. Where sectoral or thematic breakdowns are provided, developing countries have mostly estimated these using sector, programme, project, or activity-based costing methods. These methods typically take identified lists of adaptation options and assess the costs of implementing these (e.g., at national scale or in programmes or projects). A small number of developing countries have used other methods, and some countries have used outputs from more detailed analytic studies to identify priorities for subsequent costing. The latter are considered good practice examples as they provide valuable information to support adaptation investment planning and implementation.

9. The programme and project-based costing methods used by most countries have advantages, especially as they are relatively easy to complete. They provide indicative outputs on the costs of near-term actions (focusing on the period to 2030) and can directly be used to report adaptation finance needs. However, these methods also have some disadvantages. Most of them cost long lists of identified activities, rather than priorities, and they are not based on quantitative analysis of current and future impacts, the benefits of adaptation, or the consideration of alternative options or levels of adaptation. They rarely consider uncertainty. Furthermore, they use varying definitions of adaptation, often including the adaptation deficit (current climate variability) and sometimes wider development priorities.

10. Most submissions from Parties have focused their cost estimates on the short-term, noting this provides the most relevant information for early financing needs. However, adaptation cost estimates for the medium and longer-term (after 2030) are also important, especially as part of adaptive management pathways. Positively, a number of Parties now include longer-term estimates, and these provide useful examples. There are also submissions which include and also cost strategic priorities (in addition to sector or projects), and these provide the potential for more programmatic approaches and more transformative change.

11. The costs of adaptation vary depending on which sectors are included. The sectoral coverage of adaptation costs reported by developing countries is increasing. Several countries have undertaken very comprehensive multi-sectoral costing studies and good practice examples are highlighted. These provide valuable lessons, for example on the coverage of risks and the synergies between sectors.

12. However, the omission of important sectors and risks in many country NDCs and NAPs means that adaptation costs are often underestimated. Further, some key sectors are rarely covered, notably the costs of adaptation for biodiversity and ecosystem services, human health, and business (including tourism), though examples of good practice in these areas have been identified. While most NDCs and NAPs consider gender and inclusion as cross-cutting themes, these are rarely translated into estimates of the costs of adaptation, and further consideration on this issue would be useful.

13. A cross-comparison of country studies reveals some useful insights. The total costs of adaptation reported from different countries vary significantly (by orders of magnitude), though estimates are closer when adjusted per capita or per GDP.

14. Some submissions and initiatives have progressed their adaptation cost estimates further towards investment plans. These include prioritized interventions, which include programmatic modalities, detailed costings that include implementation and execution, financing arrangements, institutional responsibilities, and implementation plans. These are good practice examples which demonstrate how to move towards resource mobilization and implementation, though they require time, resources, and expertise.

15. Some submissions have also sought to mainstream (integrate) adaptation into development planning, and thus align costing more closely to medium-term developing planning and budgeting.

16. Overall, there are many positive examples of how developing countries are overcoming the challenges of estimating the costs of adaptation and advancing these estimates to provide new information. There are many lessons that developing countries can learn from their counterparts.

1.2. Meeting the cost of adaptation

1.2.1. Domestic expenditures towards meeting the costs of adaptation

17. The synthesis report presents an analysis on how developing countries are assessing domestic expenditures on adaptation. Several methods can be used for such domestic expenditure analysis, including climate public expenditure review and climate budget tagging. These provide relevant information on current domestic allocations.

18. The synthesis indicates that there has been considerable progress by developing countries in applying such methods and assessing domestic expenditures. A significant number of developing country Parties have undertaken and reported using climate finance tracking or climate budget tagging exercises. Over 20 individual countries have undertaken such expenditure studies, of which 14 include differentiated adaptation expenditures. These include numerous good practice studies and provide valuable lessons. A further 30 countries have been included in a regional adaptation public expenditure study.

19. The synthesis finds that based on these data, developing countries are already financing adaptation through domestic expenditures, and for some countries, the share of the national budget, and the expenditure levels relative to GDP, are significant.

20. These climate budget tagging exercises have positive benefits, improving inter-ministerial discussion and collaboration (notably with Ministries of Finance or equivalent) on climate adaptation, and helping to consolidate disperse information which allows for the identification and analysis of policy and budgetary trade-offs. A number of good practice examples of how these expenditure reviews have been used, and their benefits in progressing adaptation, are highlighted in this report.

21. However, these methods involve challenges, because they require deciding on what counts as adaptation, and countries have to allocate expenditure shares to adaptation in cases where adaptation is one of several objectives (in an activity or budget line). The methods and weighting approach strongly influence these estimates of domestic expenditure reported and there is a degree of subjectivity in such assessments. For these reasons, it is not recommended to directly compare the expenditures between countries without considering these differences.

22. It is not yet possible to assess if developing countries are increasing domestic expenditures to meet increasing climate change impacts and financing needs for adaptation, but this is identified as an important issue to investigate, for example by updating earlier CPEIR/CBT assessments, as well as tracking allocations over longer time periods.

1.2.2. Creating enabling conditions

23. The synthesis report has also looked at efforts by developing countries to create the enabling conditions to increase access to, and mobilize support, for adaptation, including from domestic and international funds. This is included recognizing the wider adaptation efforts being taken by developing country Parties.

24. These enabling activities include operational aspects such as capacity-building for facilitating access to public and private finance, new institutional and governance arrangements to build mechanisms or facilities to co-ordinate and scale up finance, and the enabling conditions to seek new sources of finance and implement new financial instruments. There are also cross-cutting enabling activities to build the capacity of development and finance ministries to integrate adaptation considerations into macroeconomic and fiscal policies and public financial management (and expenditures).

25. These enabling conditions can increase the flow of finance, from both domestic and international sources. A number of good practice examples are included. However, there are challenges to create these enabling conditions and further support is needed to increase their uptake.

1.2.3. Key findings, experiences, and insights

26. This synthesis recognizes that significant progress has been made by developing countries in assessing and reporting the costs of adaptation and domestic expenditures in recent years. It also identifies numerous examples of good practice among developing countries. These provide valuable lessons for improving the take-up and quality of such assessments for other countries.

27. Nevertheless, these assessments remain challenging, and based on this synthesis, several suggestions are made that could help developing countries in estimating adaptation costs and assessing domestic expenditures on adaptation. These would help increase the number of countries reporting costs in their NDCs and NAPs, and could improve the robustness of cost estimates, as well as supporting adaptation investment programs and plans (i.e. for financing and implementation).

- a) Improved guidance and material to support developing countries in estimating the costs of adaptation would be useful, to increase method harmonization and comprehensiveness. This could also include good practice examples in emerging areas (multi-sector coverage, analytical detail and use of appraisal, prioritization, longer-term analysis, adaptation investment plans);
- b) Greater provision of capacity-building and technical assistance support to developing countries would be useful for estimating the cost of adaptation and domestic expenditure, as well for scaling up the enabling conditions for resource mobilization;

- c) Finally, enhanced advice and support to help developing countries to prioritize adaptation and develop investment plans would be useful. This could include more upstream and strategic (programmatic) analysis and promote greater mainstreaming of adaptation in country development and financial planning.

2. Introduction and background

2.1. Background

28. The CMA requested the secretariat, in decision 11/CMA.1, under the guidance of the AC and the LEG, and in collaboration with relevant stakeholders, to prepare synthesis reports every two years starting in 2020. The synthesis reports cover specific adaptation themes and are focused on relevant lessons learned and good practices in developing country Parties in the context of the recognition of their adaptation efforts. This mandate was issued in the context of the CMA's consideration of recognizing adaptation efforts of developing countries.¹

29. The first one of these synthesis reports was issued at the end of 2020 on the theme of "*How developing countries are addressing hazards, focusing on relevant lessons learned and good practices*".²

30. The Adaptation Committee, at its 19th meeting, agreed to merge the suggested topics of assessing the costs of adaptation and meeting the costs of adaptation for its second synthesis report. It requested the secretariat to prepare a synthesis report on the theme of "*Efforts of developing countries in assessing and meeting the costs of adaptation*" for consideration at AC 20.

2.2. Scope of this report

31. This synthesis report describes efforts of developing country Parties in assessing and meeting the costs of adaptation as reported through a selection of national reports and communications (NDCs, NAPs, Adcoms, TNAs, and TAPs) and as documented in other relevant reports published under the UNFCCC, by the operating entities of the financial mechanism and by other relevant organizations, agencies and programmes.

32. It aims to provide a solid reference to the efforts of developing countries, despite the challenges, in assessing the costs of adaptation and investing their resources and efforts into it. It does not aim to produce new numbers on the costs of adaptation or produce a toolbox or guidance for undertaking such assessments. Instead, the aim is to provide a synthesis of studies and evidence and to draw out the insights that they provide.

2.3. Outline of this report

33. Following this introduction, the report includes the following sections. Chapter 2 introduces the core concepts of the costs of adaptation and provides a synthesis of efforts by developing countries to estimate these. It discusses methods and challenges and highlights good practice examples and lessons on how countries have addressed these. Chapter 3 focuses on developing countries' efforts to meet the costs of adaptation, including domestic expenditure on adaptation and the creation of enabling conditions to access and mobilize funding for adaptation. It highlights good practice examples and lessons. Chapter 4 brings together the key findings, experiences, and insights from the analysis, and identifies lessons and future needs.

Box 1

Definitions of key concepts

Adaptation. In human systems, as the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, adaptation is the process of adjustment to actual

¹ Decision 11/CMA.1, para. 13.

² <https://unfccc.int/documents/267818>.

climate and its effects; human intervention may facilitate adjustment to expected climate and its effects. (IPCC, 2022).

Costs of adaptation. The costs of planning, preparing for, facilitating and implementing adaptation measures (IPCC, 2007).

Resilience. The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. (IPCC, 2022).

3. Assessing the costs of adaptation

The costs of adaptation are defined in the contribution of Working Group II to the Fourth Assessment Report of the IPCC (IPCC, 2007) as the costs of planning, preparing for, facilitating, and implementing adaptation measures to moderate harm or to exploit beneficial opportunities. These cost estimates can help in the allocation and prioritization of resources, and also in identifying and clearly expressing potential adaptation finance needs. This chapter provides a synthesis of efforts by developing countries to estimate the costs of adaptation and highlights good practice examples and lessons.

34. There has been significant progress by developing countries in assessing the costs of adaptation in recent years. The number of countries assessing costs has increased significantly since previous studies (e.g. UNFCCC, 2009; UNEP, 2016). This section summarizes country experience from 2010 to current (2022).

3.1.1. National estimates in NDCs and NAPs

35. Developing country Parties communicate estimates of their adaptation costs mainly through NDCs, NAPs and Adcoms. Thereby, most of the countries that communicate cost estimates in Adcoms use the same data as in their NDCs or NAPs. Hence, this section focuses on the costs of adaptation as communicated in these two types of national documents. It is highlighted that the analysis here includes updates from the report of the first SCF report on the Determination of the Needs of Developing Country Parties (UNFCCC, 2021) due to the large number of updated NDCs and NAPs submitted before and after COP 26.

36. An analysis of the submissions to the UNFCCC NDC registry identifies 194 countries that have submitted first NDCs and more than 100 countries that have submitted revised NDCs. The analysis has been based on the first and updated NDCs received by the UNFCCC secretariat up to May 2022. While the NDCs are submitted by all countries, this synthesis focuses on developing countries only. These are defined here as countries that have ratified or acceded to the United Nations Framework Convention on Climate Change and that are not included in Annex I to the Convention.³

37. A significant number of developing country Parties is now assessing and reporting adaptation costs. At the time of publication, 76 developing countries have reported adaptation costs in their NDCs or their NAPs. This has increased since the INDC submissions when 44 countries reported adaptation costs. However, despite this positive trend, around half of developing countries (78 countries) have still not reported the costs of adaptation in their national submissions, although several countries have indicated their plans to conduct adaptation costs assessments in the future.

38. It is highlighted (see next section) that the cost estimates in NDCs and NAPs vary in detail, as well as in terms of objectives, sectoral coverage, and the assumptions made, including what counts as adaptation. Therefore, some caution is needed in directly comparing the costs of adaptation between countries and drawing strong conclusions, at least not without analysing differences in the methods and approaches used. It also means that a simple aggregation of country level estimates (e.g., from NDCs) into a single global estimate should be treated with caution.

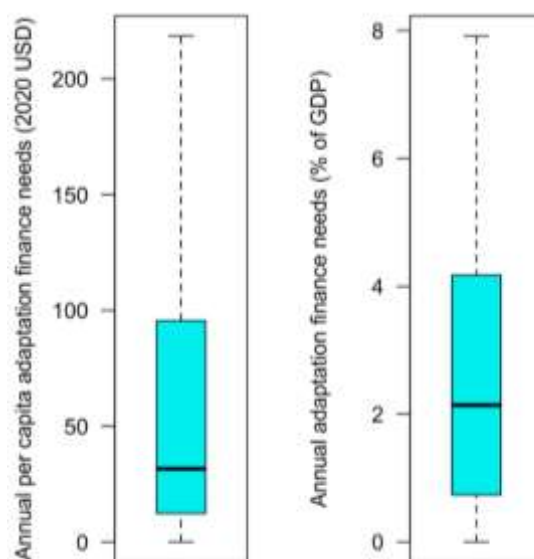
39. A review of NDC and NAP submissions for this report, updating the previous analysis by Chapagain et al, 2020, finds that the total annual costs of adaptation for those 76 countries that have reported adaptation costs in their NDCs or NAPs, are approximately USD 71 billion per year (expressed in consistent current [2020] prices), on average, for the period up to 2030. Most of the proposed adaptation costs are conditional on international financial assistance. These numbers can be compared to previous adaptation cost estimates for (all) developing countries in the UNEP Adaptation Gap report, which estimated total costs at between USD 140 billion and USD 300 billion per year by 2030 (UNEP, 2016) (updated to 160 billion to USD 340 billion annually by 2030, expressed in 2020 prices, UNEP, 2022).

40. The total costs of adaptation estimated and reported by various countries in these NDCs and NAPs are very different. Annual adaptation costs vary from USD 0.2 million to USD 13 billion per year for individual countries.

³ The list of Parties to the Convention is available at www.unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states.

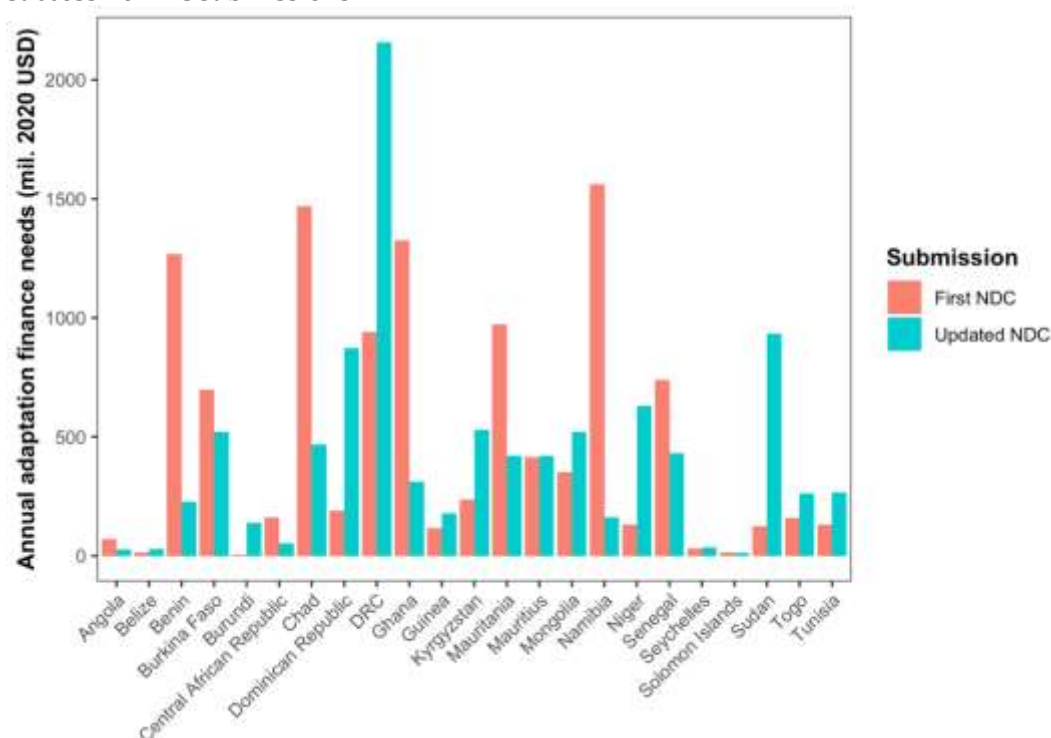
41. An analysis of the submitted NDCs and NAPs for this report finds that annual adaptation finance needs as a percentage of GDP range from 0.7 per cent to 4.2 per cent (interquartile range) with the median estimate of 2.3 per cent (see figure 1). When adjusted for population, the result shows that developing countries' estimated costs of adaptation range from USD 10 to 95 per capita (interquartile range) with the median estimate of USD 30 per capita for the 2021–2030 period, for those countries that have reported adaptation costs. These comparisons provide useful information for developing countries (for example, to benchmark against each other, and thus identify whether they are possibly under-estimating costs or omitting important activities).

Figure 1. For those developing countries reporting costs, costs per capita and as a percentage of GDP



42. The analysis for this report has found that countries have updated their costs of adaptation over time, demonstrating that developing countries are building on previous work and improving estimates. Twenty-three countries have updated their estimates of adaptation costs and adaptation finance needs in their updated NDC submissions. A comparison of original and updated NDCs indicates that adaptation finance needs are higher than the initial estimations for 13 countries, whereas it is lower for 10 countries. For example, the Dominican Republic, Democratic Republic of the Congo, Sudan, Guinea and Mongolia revised their NDCs, and reported significantly higher adaptation financing needs compared to their initial submission. One reason for this increase is the incorporation of more sectors in the adaptation plan (see later discussion).

Figure 2. Examples of developing country Parties' updates of annual adaptation costs in successive NDC submissions

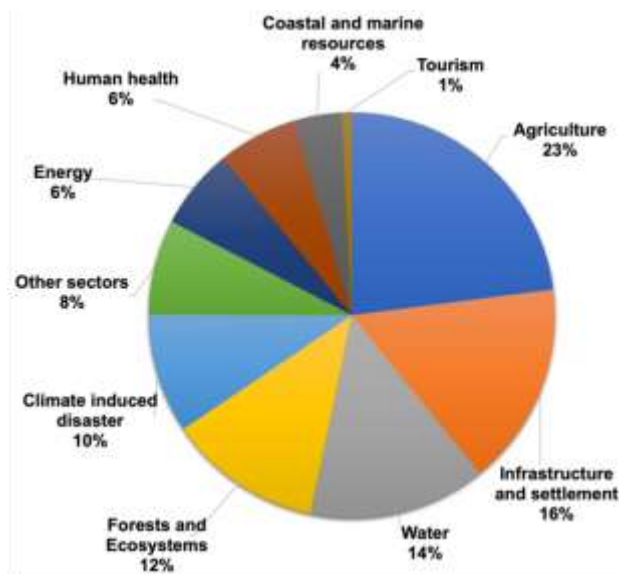


43. A number of developing countries have undertaken very comprehensive multi-sectoral costing studies and good practice examples are highlighted (see case studies below). However, for around half of the NDCs and NAPs, only headline economy-wide estimates are provided, with no details of how these are split across sectors.

44. The synthesis also finds that there is wide variation in the sectors and impacts covered by developing countries in their reported adaptation costs. This partly reflects patterns of hazards and vulnerability, but also the time and resources needed for multi-sector studies.

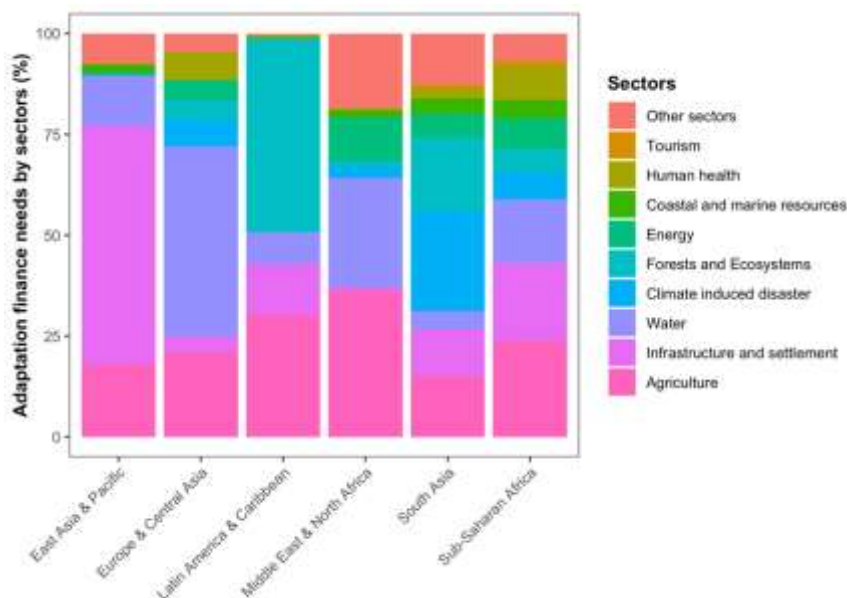
45. The synthesis has identified that 42 countries disaggregated their adaptation costs/needs by sector in their NDCs or NAPs. It has compiled evidence on the share of adaptation costs by ten sectors, shown in figure 3. Developing countries have indicated the highest adaptation finance needs in the agriculture sector (23%), followed by infrastructure and settlements (16%), water (14%), forests and ecosystems (12%), climate-induced disasters (10%), energy (6%), human health (6%), coastal and marine resources (4%), tourism (1%), and other sectors (8%). It is stressed that this split is influenced by the subset of countries that report sectoral estimates and may not be representative of costs or needs in all countries.

Figure 3. The adaptation costs as a percentage by sector, for developing countries that have submitted sectoral breakdown of costs



46. The sectoral split, however, is different for different world regions. Developing countries in East Asia and the Pacific have indicated the highest adaptation finance needs in the infrastructure and settlements sector (59%), followed by agriculture (18%) and water (13%). Adaptation finance needs in the water sector (47%) are highest in Europe and Central Asia followed by agriculture (21%) and climate-induced disaster (7%) and human health (7%). In Latin America and the Caribbean, forests and ecosystems (48%), agriculture (30%), and infrastructure and settlements (13%) are the three sectors with the highest adaptation finance needs. Agriculture (36%) and water (27%) are the sectors with the highest adaptation finance needs followed by energy (11%) in the Middle East and North Africa. In South Asia, adaptation finance needs are highest in climate-induced disasters (25%) followed by forests and ecosystems (18%), agriculture (15%), and infrastructure and settlements (13%). Agriculture (24%) is the top priority sector in Sub-Saharan Africa followed by infrastructure and settlements (19%), and water (16%).

Figure 4. Sectoral adaptation finance needs by world regions (for those countries that have reported adaptation costs)



47. The synthesis also finds that there are often sector omissions in many developing countries submissions, notably for the costs of adaptation for biodiversity and ecosystem services, health and business (including tourism). This omission is highlighted as a concern, for example given the links between

biodiversity/natural environment and climate change. However, estimates are possible for these sectors and there are good examples of the costs of adaptation in developing country submissions (see case study in box 2 below).

Box 2

Case Study. Peru's National Adaptation Plan - the costs of adaptation for biodiversity and health

The NAP of the Government of Peru (Gobierno del Perú, 2021) has costed a range of adaptation measures across sectors. The set of measures set out in the NAP were chosen on the basis of a risk analysis which considered priorities based on vulnerability, exposure and hazards. The analysis used a combination of literature reviews, stakeholder engagement, climate and sectoral models and climate scenario forecasts to determine where adaptation measures would be most needed. Activity-based costing was used to estimate the costs of achieving adaptation targets for 2021, 2025 and 2030, which included a range of costs. The NAP has included sectors which are often omitted in submissions, notably for ecosystems and for health.

Regarding ecosystems, the NAP includes measures relevant to biodiversity, including conserving watershed ecosystems (estimated to cost between USD 29.5 million and USD 290.3 million by the end of the decade (USD 3 million to USD 29 million per year). It also included relevant biodiversity measures including the sustainable use of ecosystem goods and services (traditional forestry practices) and the restoration of forest ecosystems.

It also includes measures for health. Estimated costs for the health sector are at USD 96 million to USD 178 million between 2021 and 2030. These costs include actions to strengthen epidemiological surveillance systems for diseases linked to climate change, and to promote healthy practice to address vector-, food- and water-borne diseases due to the effects of climate change, as well as extreme temperatures. It also includes enhancement of health service capacity to prepare and cope with climate change, and to improve the resilience of health infrastructure.

48. Adaptation cost estimates for the medium- and longer-term (after 2030) are also important, especially as costs are projected to increase significantly in this time. For example, the estimates in the UNEP adaptation gap reports (UNEP, 2016; 2021) estimate that the costs of adaptation for developing countries could rise to between USD 280 billion to USD 500 billion/year by 2050.

49. A number of countries have indicated medium- and longer-term adaptation costs in their submissions and these provide good practice examples (see case study in box 3 below). This longer-term perspective is useful, not least in communicating the high increase in costs of adaptation likely after 2030 and also the need for more transformative change. These longer-term assessments also offer greater potential for following adaptive management frameworks, and adaptation pathways that consider iterative programming over time, including a cycle of monitoring, learning, and review. There is a longer-term focus in the UNFCCC LT-LEDS initiative, though this is concentrated on mitigation. Nonetheless, a number of these submissions do include adaptation linkages or co-benefits of adaptation (UNFCCC, 2022). For example, Fiji's Low Emission Development Strategy 2018-2050 includes a separate chapter on climate change adaptation and resilience. The SCF NDR also reports that some adaptation costs are reported under LT-LEDS (UNFCCC, 2021).

Box 3

Case Study. Nepal's National Adaptation Plan 2021–2050 - medium - and longer-term cost estimates

Nepal set up its NAP formulation process in 2015 by establishing eight sectoral and four cross-cutting thematic groups coordinated by the respective thematic ministry. The thematic groups collected the sector-wide long list of adaptation options based on literature review and multi-stakeholder consultations in each province. The NAP (2021–2050) summary was published in 2021 (Government of Nepal, 2021).

The listed adaptation options were scored and ranked using a MCA technique to identify priority adaptation options. From this process, 64 strategic priority adaptation programmes were identified for the implementation in the short-term (until 2025), medium-term (until 2030), and long-term (until 2050). Nepal's NAP is subject to review and update in 2030.

The estimated cost of implementation was USD 2.1 billion per year for short- and mid-term adaptation measures (until 2030) and USD 1.32 billion per year for long-term adaptation measures (until 2050). Nepal plans to invest around 3 per cent of the total adaptation finance needed from domestic resources but almost 97 per cent of the financing is anticipated to require external support.

Gender equality and social inclusion and livelihoods and governance were included as a separate thematic sector in Nepal's NAP. Four priority adaptation programs are identified for this sector with the estimated costs of USD 700 million by 2050.

50. Finally, while most NDCs and NAPs consider gender and inclusion as cross-cutting themes, these issues are often not captured in the estimates of the costs of adaptation. However, a small number of countries have considered gender and inclusion in detail, and some provide associated costs, again serving as good practice examples (see case studies in boxes 4 and 5 below).

Box 4

Case Study. Republic of Moldova's Nationally Determined Contribution – prioritization through multi-stakeholder participation

The Republic of Moldova (Government of the Republic of Moldova, 2020) followed a step-by-step approach to identify and prioritize adaptation options and to estimate its associated implementation costs in its updated NDC.

A series of national and subnational level assessments, including vulnerability and risk assessment, sector and institutional capacity assessment and survey, and gender assessment, were conducted during the 2012–2019 period. These assessments helped to identify the climate change impacts, vulnerability, and potential adaptation options in the priority sectors of the country. The cross-sectorial adaptation priorities were also assessed during the process.

The climate change adaptation priorities were then identified through a MCA. This was conducted in extensive consultation and in a transparent process with the participation of multiple stakeholders. The adaptation prioritization criteria for the MCA included: (i) alignment with the country's climate change adaptation strategies and plans as well as with the country's legislation; (ii) contribution to vulnerability reduction at the national level and increase in climate-resilient sustainable development; (iii) total number of direct and indirect beneficiaries (women and men); (iv) contribution to transformational adaptation; (v) contribution to improved economic performance with high level of

environmental, social, and gender co-benefits; (vi) financing needs of vulnerable groups, target population, sectors, development regions, country; (vii) financial and economic feasibility based on which sectoral investment options have been prioritized.

The sector-specific adaptation priorities and costs for six priority sectors, and further cross-cutting capacity development needs, were estimated, and the costs were estimated for the period 2020–2025 at USD 1.7 billion.

Box 5

Case Study. Cambodia's National Adaptation Plan and Nationally Determined Contribution - gender and inclusion

Cambodia has adopted a strong gender dimension in its national climate policy, NDC and NAP. In 2016, it published a stand-alone Gender and Climate Change Action Plan to help plan and implement measures with a focus on gender aspects and specifically the role of women in coping with climate change.

The Cambodia Climate Change Strategic Plan 2014–2023, which has been submitted by the Kingdom of Cambodia as its NAP (Royal Government of Cambodia, 2013, submitted in 2021), also promotes the integration of gender, vulnerable groups, and indigenous peoples into climate change adaptation measures to ensure the climate change response is equitable, gender-sensitive, transparent, accountable and culturally appropriate.

Cambodia has also produced a National Adaptation Plan Financing Framework and Implementation Plan (2017), that is advancing 40 priority actions. Every priority action includes gender considerations, and there is a separate set of costed priority actions for the Ministry of Women's Affairs (MOWA). This includes priority actions to promote the integration of gender responsiveness in sector plans to increase resilience capacity of women to cope with climate change, and for developing and piloting gender-based climate change adaptation projects (as well as other actions).

3.1.2. Estimates and methods from other relevant reports under the UNFCCC, including by the SCF

51. A number of other studies and reports under the UNFCCC have compiled estimates of adaptation costs or finance needs.

52. In 2017, the COP requested the UNFCCC secretariat, in collaboration with the operating entities of the Financial Mechanism, United Nations agencies and bilateral, regional, or multilateral channels, to explore ways and means to assist developing country Parties in assessing their needs and priorities in a country-driven manner, including technological and capacity-building needs, and in translating the climate finance needs into action. In response, the UNFCCC secretariat launched the Needs-based Finance project with the objective of facilitating access to and mobilizing climate finance for the implementation of priority mitigation and adaptation projects. The assessments include analysis of current climate finance flows, as well as finance needs.

53. The project focuses on the regional level (UNFCCC, 2021) with assessments undertaken in Arab States, East Africa, Southern Africa, West Africa, Asian Least Developed Countries, Central Asia and South Caucasus, South-East Asia, Eastern Caribbean, Island States in the Indian Ocean and Melanesia. It also includes individual countries, among them Antigua and Barbuda, Belize, Cuba, Dominican Republic, Honduras, Iran and Pakistan.

54. A key component of the assessments is the identification of climate finance needs and priorities. These assessments review all communications submitted by the relevant countries as part of the UNFCCC process, and other documents, including national climate change plans and strategies, national development plans, BURs, NAPs, NAPAs, NCs, NDCs, TAPs, TNAs and GCF country programmes. The values from these sources are aggregated or collated, depending on whether or not they are additional, and then summarized by country, by sector and, in some cases, by timeframe. However, as these draw primarily on the existing NAPs and NDCs, they do not provide additional estimates of adaptation costs.

55. At COP 24, Parties requested the SCF to prepare a report on the determination of the needs of developing country Parties every four years (starting at COP 26), related to implementing the Convention and the Paris Agreement. The First Report on the Determination of the Needs of Developing Country Parties was published in 2021 (UNFCCC, 2021). This collated adaptation finance needs from BURs, NAPs, NAPAs, NCs, NDCs, TAPs, and TNAs. The SCF NDR reported on the costs of adaptation (on the difference between adaptation costs and adaptation finance needs see box 6 below) from NDCs and NAPs. This report (see previous section) has updated the SCF NDR findings, taking into account the large number of updated NDCs submitted before and after COP 26.

56. The SCF NDR includes additional finance needs for adaptation as reported in TNAs and TAPs. These costs relate to the implementation of technology-based adaptation measures in developing countries. The goal of TNAs is to help countries determine their climate technology priorities. TNAs can be used to support national sustainable development, build national capacity and facilitate the implementation of prioritized climate technologies. The preparation of a TAP is the final step of this process and supports the implementation of the prioritized technologies. A TAP specifies how to overcome barriers and implement technology measures, including responsibilities and financing. Costed adaptation actions are included in submitted TAPs. They include funding for research and development of new and innovative adaptation measures, institutional and organizational capacity-building, information and awareness raising and policy, legal and regulatory actions. The total submitted costs of the TAPs (phase 1 and phase 2) for adaptation from developing countries, as referenced in the SCF NDR, is USD 4.4 billion (cumulative). These primarily have prioritized the agriculture and water sectors.

Box 6

What are the differences between the costs of adaptation and adaptation finance needs?

The costs of adaptation and adaptation finance needs are similar, but there are key differences. Finance needs are determined by the existing levels of expenditures on adaptation, as well as incremental financing requirements (domestic and international). This means additional finance needs may be different to the total cost of adaptation, as the latter includes existing expenditures. Furthermore, adaptation finance needs may be reported for priorities only, or for certain sectors, rather than the total costs of adaptation. Furthermore, the approaches and methods that are used for estimating the costs of adaptation and for adaptation finance needs are often different (see Box 9), which affects the size of estimates. Many of the studies on the costs of adaptation (see next section) are estimated based on an analysis of future climate impacts, and then an analysis of the cost of adaptation to reduce these impacts. Such cost estimates can then provide the basis for adaptation finance needs. As highlighted above, however, most NDCs and NAPs use a different method for costing, based on programme and project costing of a long list of identified activities, which often include a wider definition of adaptation. This has a different framing for cost estimation, and thus estimates usually differ from literature studies (of the same sectors or countries).

57. Reports of other UN and international organizations, including from the operating entities of the UNFCCC financial mechanism (GCF and GEF), as well as the AF, also reveal insights into adaptation costs. The GCF, GEF and the AF require costed proposals when funding adaptation. The aggregate levels of

adaptation finance from these funds are part of current financial flows, and so captured in other reports (e.g., CPI, 2021). In terms of the methodology for estimating adaptation costs, all the UNFCCC funds require programme- or project-costing, i.e. activity-based assessment of costs (project budgets), which then correspond to funding levels provided, including additional implementation and execution costs. In terms of the methodologies recommended for funding submissions, there are some minor differences between the funds. Applications for the GCF are required to estimate the expected economic rate of return, based on a comparison of scenarios with and without the project (GCF, 2022) and implies an economic appraisal of the costs and benefits of adaptation. An economic return calculation is not required for AF projects, but the Fund does require analysis of the cost-effectiveness of proposed interventions. Country submissions to these funds provide good practice examples of project-level costing of adaptation.

58. The PPCR of the Climate Investment Funds has supported developing countries and regions in building their resilience to the impacts of climate change. The program assisted governments in integrating climate resilience into strategic development planning across sectors and stakeholder groups, including costed investment plans (SPCRs). The program then looked to fund these priorities with concessional and grant funding to put the plans into action and pilot solutions. The PPCR has worked with 28 countries and 2 regions.

59. A core component of the SPCR development process was a programmatic approach, including the detailed costing of prioritized adaptation measures and investments (see case study in box 7 below). All 28 SPCR adopt a broadly consistent approach, which is to first design a suite of policies/programmes and to subsequently cost these. The more focused nature of the SPCR leads to lower estimates than national studies because they focus on more concrete investments. The average national adaptation cost estimate for the countries assessed is just over USD 90 million per year. The SPCR are notable in that they tend to consider alternative ways of delivering adaptation, through a combination of direct government action and enabling conditions, and they provide prioritized and costed actions that are investment ready.

Box 7

Case study. Saint Vincent and the Grenadines Strategic Program for Climate Resilience

The Saint Vincent and the Grenadines SPCR (Government of Saint Vincent and the Grenadines, 2011) provides an example of good practice in that it is holistic, comprehensive and highly detailed. The country's strategy is divided into four components: climate vulnerability, risk assessments and risk reduction; data collection, analysis and information management; strengthening of existing policy, legal and institutional frameworks to address climate change; design and implementation of a public education and capacity-building programme. Through these four components it covers both the immediate need of assessing and addressing the areas and sectors which are currently at greatest risk and the longer-term requirement of improving local capacity (both technical and institutional).

The SPCR has a very detailed level of costing. Each of the four components houses a suite of projects and these projects then house suites of activities and so forth. By providing cost estimates at the activity level, the SPCR is able to provide a transparent explanation of how investment will be spent and consequently, how this investment will translate into results.

60. As highlighted above, UNEP has compiled estimates of adaptation costs, including of the aggregate adaptation costs for developing countries, as part of the Adaptation Gap Report series. A detailed review of top-down and bottom-up estimates was used to provide indicative adaptation costs as part of the adaptation finance gap analysis. The 2016 edition of the Adaptation Gap Report (UNEP, 2016) estimated that the annual costs of adaptation in developing countries could be between USD 140 billion and USD 300 billion by 2030 and estimated to increase to between USD 280 billion and USD 500 billion by 2050.

61. There has also been a series of initiatives on adaptation costs and finance needs from UNDP. This included earlier work (UNDP, 2011) on country level assessment of investment and financial flows for

adaptation, which included 15 country studies. This used a different method based on the incremental mark-up needed for adaptation (see next section).

62. The multilateral development banks have also estimated the costs of adaptation. The World Bank (2010) estimated the costs of adaptation globally and for a selection of countries in its *Economics of Adaptation to Climate Change* report. This used a modelling framework to develop adaptation costs, based on economic analysis (sector-based analysis and computable general equilibrium modelling). More recent World Bank examples include estimates of the policy options for early disaster resilience (policy action) in 117 countries (Hallegatte et al., 2017) and the costs (as well as benefits) of investing in resilience for new infrastructure in developing countries (Hallegatte et al., 2019). The World Bank has also undertaken a very large number of additional country and sector studies that include estimates of the costs of adaptation. The African Development Bank (2019) estimated the costs of adaptation as part of its Africa Adaptation Gap Analysis Report and estimated adaptation needs in the study on *Climate Change Impacts on Africa's Economic Growth*. Similarly, the Asian Development Bank has undertaken a series of regional studies (ADB, 2013, Westphal et al., 2013) on the economics of climate change that include analysis of the costs of adaptation, which include economic modelling as well as supporting country level adaptation cost assessments.

3.1.3. Other estimates of the costs of adaptation in the literature

63. The previous sections focused primarily on country reported analysis of adaptation costs. However, there is a much larger literature on the costs of adaptation and additional estimates from the academic and grey literature. This literature is important as it provides additional insights, as well as examples of good practice.

64. Much of this literature has been summarized in previous reports (UNFCCC, 2009; OECD, 2015; UNEP, 2015; UNEP, 2021) and it has also been synthesized in the recent contribution of Working Group II to the Sixth Assessment Report of the IPCC (IPCC, 2022). The number of studies makes it difficult to summarize, but two important points are noted. First, this literature applies a wider variety of methods (see Box 9 below) than used in national country submissions. This often includes more detailed analysis of the risks and impacts as well as of the benefits of adaptation, although many academic studies focus on the medium-term (the 2050s) rather than explicitly the period to 2030. Second, and related to this, the use of different approaches leads to alternative estimates of the costs of adaptation, as compared to country submissions. For example, there are numerous studies on the costs of coastal adaptation that provide global, regional and national estimates (e.g., Nicholls et al. 2019; Schinko et al. 2020; Tiggeloven et al. 2020; Brown et al. 2021; Tamura et al. 2019). Where such alternative country estimates exist from the literature, these provide useful information for potential input into national submissions, but also can provide useful benchmarks on adaptation cost estimates.

3.2. Methods for assessing the costs of adaptation

65. The previous section outlines the progress made in assessing the costs of adaptation by developing countries. This section focuses on the detailed methods and approaches used to identify relevant insights.

66. In theory, it is relatively simple to estimate the costs of adaptation as the sum of the costs of actions for planning, preparing for, facilitating and implementing adaptation measures to moderate harm or exploit beneficial opportunities. However, in practice, estimating these costs is extremely challenging. The challenges to estimating the costs of adaptation are set out in box 8. Adaptation requires analysis of the site and context specific nature of risks, noting that these change over time, and the corresponding site and context specific analysis of an adaptation response. There is also high uncertainty around the size of future climate risks, and thus the level of adaptation needed, as well as on the effectiveness of adaptation.

67. As a consequence, adaptation can be seen as a process of managing risk, i.e. a socio-institutional process that involves societal, behavioural and socio-economic dimensions, as well as organizational and institutional factors, that go beyond the identification and costing of technical options alone.

68. For proactive adaptation, a fundamental aspect of understanding and managing risk is dealing with uncertainty (see also box 9). This can include alternative decision-support methods, including a number of

methods that support decision making under uncertainty. Adaptation costs vary depending on whether a static approach is taken to risks, or whether decision making under uncertainty is included, because it influences the type and timing of investments, as well as the process of adaptation.

69. Estimates of adaptation costs also vary with the objectives set (including the trade-off with residual damages after adaptation), assumptions, and other factors, which include political as well as scientific perspectives. These factors influence what is counted as adaptation, as well as the size and nature of the costs assessed.

Box 8

Challenges in estimating the costs of adaptation

In simple terms (UNEP, 2015), the costs of adaptation can be assessed by estimating the current and future impacts of climate change, assessing how adaptation can reduce these impacts (benefits) and how much this action might cost (UNEP, 2015). However, there is a further trade-off with the impacts of climate change after adaptation, i.e. residual damage, because it is often costly to reduce impacts to zero. In practice, estimating the costs of adaptation is extremely challenging for the following reasons (UNFCCC, 2009; UNEP, 2015; UNEP, 2020):

- There is currently no single, agreed quantitative goal or objective for adaptation (the equivalent of the targets to limit future warming or reduce emissions for mitigation) at either the global or national levels. The costs of adaptation vary with the objective adopted, and whether this is defined by economic efficiency, levels of acceptable risks, or to maintain current levels of damages.
- Adaptation is location, time, and context specific, and must be assessed in terms of specific impacts, which vary by risk. This differs to mitigation, which is assessed in terms of a common unit of measurement (tCO₂). This also means it takes time and resources to estimate adaptation costs.
- Adaptation costs vary with the sectors and risks considered. The higher the number of sectors and risks, the higher the costs of adaptation will be. Most studies focus on a smaller number of risks and have a partial coverage of adaptation costs. In general, there has been less consideration of household and private adaptation, and these could increase the estimated costs of adaptation, potentially significantly.
- The costs of adaptation will vary with future emissions trajectories (scenarios) and levels of warming, i.e. whether the Paris Agreement goals are met. However, the costs of adaptation also vary for any individual scenario, because of the large uncertainty and wide envelope of projected change from climate and impact models.
- Adaptation levels and costs vary subject to whether a static baseline (current society and economy) or a future socio-economic baseline is applied, since changes in development, the economy and the population affect the stock at risk, including its exposure and vulnerability.
- Adaptation costs are higher if countries' existing adaptation deficits are included, this deficit being the existing adverse impacts of current climate variability and extremes, i.e. that have always occurred. These deficits exist because many developing countries lack sufficient levels of disaster risk reduction to current risks. While the existing adaptation deficit is not primarily caused by climate change, future adaptation will be less effective if it is not addressed first.
- Similarly, adaptation costs are much higher if development options that build general resilience are included. In contrast, if adaptation is only included based on a strong additionality, then a smaller set of actions will be costed.

- Adaptation is often described as a process, and involves capacity-building and governance change, ideally as part of an iterative risk management framework. It is much less a set of technical options (as is the case for mitigation). It is also non-linear and involves complex temporal aspects, this means the effectiveness of adaptation may change over time. However, most current cost estimates are based on technical (engineering) costs.
- Many adaptation studies omit opportunity, transaction and monitoring costs, and exclude design, management and technical assistance costs, thus real-world adaptation cost out-turns are likely to be higher in practice. However, countering this, non-technical options, learning and innovation all have the potential to reduce future adaptation costs compared to current estimates. Furthermore, soft options have potentially lower costs or offer wider co-benefits when compared to engineering-based options.
- Assessing costs within an economic framework affects estimates because taking time preference (discounting) into account affects the attractiveness and choice of options. A further issue relates to the indirect impacts of climate change, including cross-sectoral and economy wide effects. Including these effects can increase or decrease impacts and adaptation costs.
- Adaptation that considers distributional issues and equity may involve different interventions and different groups, which may alter costs. Similarly, mitigation and adaptation can involve positive synergies, but also potential trade-offs. If trade-offs are considered, this may limit least cost adaptation options and mean different actions with potentially different costs.
- There are barriers and constraints to adaptation (physical and ecological limits, technological limits, information and cognitive barriers, and social and cultural barriers). These have the potential to increase costs, and in some cases, there will be limits to adaptation.

70. Reflecting these challenges and the complexity involved, there is no universal method for assessing the costs of adaptation, and a range of methods can be used (see box 9). These various methods address the challenges of estimating the costs of adaptation differently, as they can adopt alternative perspectives or framing and different assumptions. This means there is not the same consensus on methods that exist for mitigation, where a standardized approach has been developed based on scenarios, marginal abatement costs and cost curves.

71. As a consequence, there is no single, definitive cost of adaptation for a country, i.e. it depends on the method used, the objectives set and the assumptions made, noting different actors may have different views on these issues. For example, costs vary depending on whether the objective of adaptation is to reduce risks efficiently, accepting a trade-off with higher residual risk, or whether the objective is to achieve low levels of residual damage accepting this is likely to have higher adaptation costs. The framing of adaptation, and the choice of methods and key assumptions, make a large difference to estimated adaptation costs (UNEP, 2015). This means comparisons between developing country estimates should be treated with caution unless harmonized methods and assumptions are employed.

Box 9

Potential/Selected methods for estimating the costs of adaptation

The potential methods that can be used to estimate the costs of adaptation include the following:

Sector, programme, project and activity-based costing: This approach dominates NDCs and NAPs and focuses on the costing of identified adaptation actions (be they sectoral, programmatic or project based). These can be high-level costing exercises, through to more detailed, bottom-up activity budgets for project implementation.

Sector integrated assessment/damage costs: This is the most commonly applied approach to estimating adaptation costs in the literature and involves the use of sector models (global, regional, national, local) to assess future climate change impacts, and then technical adaptation responses and associated costs and benefits. Such approaches have been used commonly for coastal and river protection, as well as agriculture. Examples include coastal adaptation costs estimated by the DIVA model (Brown et al. 2021).

Integrated assessment models (global): These models combine the scientific and economic aspects of climate change within a single, integrated analytical framework, and can quantify the economic impacts of climate change, and in some cases, the costs and benefits of adaptation, albeit in a stylized form. While primarily applied at the global level, these have also been used to downscale results to regions or countries. Examples include applications for Africa (De Bruin and Ayuba, 2020).

Computable general equilibrium (CGE) modelling: These are macro-economic models that allow analysis of how impacts cascade across sectors of the economy, as well as price effects. They often use sector impact assessments, and the analysis of costs of inaction, as well as adaptation costs and benefits, as inputs. Examples include the original World Bank (2010) Economics of Adaptation to Climate Change national studies, as well as more recent studies (COACCH, 2021).

Econometric modelling: There have been a number of studies that use econometric (statistical) analysis of current climate and economy linkages and use these relationships to look at future climate change impacts, and in some cases extend to consider potential costs of adaptation (African Development Bank, 2019).

Investment and financial flow analysis: These focus on the likely costs of planned adaptation, based on analysis of current financial flows, now and in the future, and apply an adaptation mark-up (e.g., a per cent uplift) to flows to estimate potential adaptation costs. An example is the UNDP Assessment of Investment and Financial Flows (IFF) to Address Climate Change (UNDP, 2011), which provided national /sector estimates in 15 countries.

A variation of the Investment and Financial Flows is to base the analysis of adaptation costs (and sometimes benefits) on climate budget tagging or CPEIR studies (see section 3), aligning to national development planning.

Decision support tools: There is also a suite of decision support methods that can be used for identifying adaptation priorities and which generate cost estimates. These include a suite of standard decision support tools, with the use of cost-benefit analysis or cost-effectiveness analysis, which are often suitable for no- or low-regret adaptation, but do not account for uncertainty (see next bullet). These are more commonly used for project appraisal, rather than producing national estimates.

Decision making under uncertainty: Recognizing that appraisal for proactive, planned adaptation involves (deep) uncertainty, a suite of alternative decision support tools have emerged, that allow decision making under uncertainty, e.g., by

focusing on flexibility, robustness or including portfolios (Watkiss et al., 2014). These are also primarily used in project appraisal, although there are some applications at aggregated levels.

All of these have strengths and weaknesses. The appropriate method to use will depend on the objectives of the exercise (the reason for estimating costs of adaptation), but also on the time, resources and expertise available.

72. The studies undertaken in developing countries by governments, other organizations and researchers are highly heterogeneous, in terms of the methods used, the objectives adopted, the coverage of risks and sectors, key assumptions, and the spatial and temporal contexts. This heterogeneity is also seen in NDCs and NAPs (Pauw et al., 2020; UNEP, 2021). As highlighted above, caution is therefore needed in directly comparing the costs of adaptation between countries.

73. This synthesis has considered the approaches and methods used for estimating the costs of adaptation (see boxes 8 and 9). Many NDCs do not specify which methods have been used, and as highlighted above, around half only report single economy wide numbers. The synthesis finds that when information on methods is available, and for the NDCs and NAPs that include sector or thematic breakdowns, most countries have used sector, programme, project and activity-based costing. These are usually based on an estimate of the costs of activities e.g., they estimate the costs to deliver a national programme of climate smart agriculture or a large coastal project, and are often built up from technical or units, rather than as the result of an analysis or appraisal.

74. These activity-based costing methods have many advantages, especially as they are relatively easy to complete and provide practical information on near-term actions to inform adaptation finance needs and early implementation. However, they also have some disadvantages. The costs produced are indicative, and rarely include management, programming and implementation costs (i.e. they are not investment costs). They do not fully capture many of the challenges with estimating adaptation costs (see box 8). Most typically they cost long lists of identified activities, rather than prioritized actions (and levels of action). They are not based on an analytical assessment of baseline risks and the benefits of adaptation (in reducing climate change impacts) or use an economic appraisal framework. They therefore do not consider adaptation effectiveness, the comparison of the costs and benefits of adaptation, and thus the estimated level or scale of adaptation. They rarely consider uncertainty, and do not apply decision making under uncertainty, although some do include elements of iterative risk management. This can mean that the adaptation identified and costed is unlikely to be the most economically efficient outcome, and thus they may not prioritize the greatest risks or deliver the greatest adaptation benefits for available resource levels.

75. They also tend to focus on short-term programme or project priorities, largely concentrating on direct government interventions, with less consideration of implementation costs or enabling conditions. Only a few take a more strategic approach or consider longer-term issues, including uncertainty. Finally, these costing approaches often tend to include activities associated with the existing adaptation deficit (current climate variability) as well as broader development, i.e. they have a very broad coverage of actions, many of which do not have the primary goal of adaptation. This reflects the challenges in separating climate adaptation from development more generally, but it does mean costs often include very broad categories of adaptation in their submissions.

76. In terms of identifying adaptation priorities for costing, some NDCs do include formalized decision support methods, with the most common approach seeming to be MCA. Several NDCs use MCA to identify priorities, which are then costed. These MCAs include criteria to assess and score options, and weight and prioritize these, against set criteria. These criteria can include the qualitative benefits and costs of different actions or options (see case studies in the previous section for Moldova and Nepal).

77. A smaller number of developing countries have used other methods. Cambodia's NDC included a cost-benefit analysis and reports financial (economic) benefits of individual adaptation priorities alongside costs. Liberia also undertook a NDC costing and cost-benefit analysis to inform its NDC. However, the use of more standardized economic appraisal is rare.

3.3. Experience and lessons with estimating adaptation costs

78. The synthesis has assessed the experience in developing countries of estimating adaptation costs. The synthesis has found a wide range in the level and detail of analysis of adaptation costs submitted in NDCs and NAPs. Only around half of countries are reporting adaptation costs in their NDCs and, of those reporting costs, only around half include sectoral breakdowns. This indicates that developing countries are finding the estimation of adaptation costs to be challenging, or do not have the time, resources, or expertise to undertake such assessments.

79. The synthesis also finds that where more detailed cost data are available in NDCs and NAPs, most developing countries have used sector, programme, project or activity-based costing methods. These methods typically take identified adaptation actions and assess the potential costs. As highlighted above, these costing methods have strengths and weaknesses. They have a greater focus on applied and short-term adaptation costs, but they do not have a strong emphasis on the analytical assessment of climate risks and adaptation effectiveness.

80. The synthesis identifies several important lessons from the review. The use of programme- and project-based costing methods provides an extremely positive starting point for adaptation costing, and it offers estimates of near-term adaptation finance needs. However, such estimates are indicative only. An important finding is that developing countries, in producing costs estimates for their NDCs and NAPs, have not used more detailed analytical approaches that assess baseline risks and adaptation effectiveness and benefits, and they have not undertaken economic appraisal and rarely prioritized actions or options. This is despite guidance for NAPs (LEG, 2012) highlighting such appraisal methods, including analysis of costs and benefits. The fact that these more analytical methods and additional steps have not been undertaken reflect that such analysis is more difficult, and requires additional time, resources and expertise to implement.

81. These findings can be compared to insights from the SCF NDR (UNFCCC, 2021), which identified some of the challenges it experienced in compiling the finance needs of developing countries. It identified data inconsistencies, data gaps and difficulties related to data interpretation. The SCF also reports that while most countries have used methodologies to identify and report their needs both qualitatively and quantitatively, costing these needs for adaptation has been a major challenge and therefore most of these needs do not have accompanying cost estimates.

82. Based on these findings and lessons, a number of suggestions are made that could help overcome the challenges to estimating adaptation costs and increase the uptake and robustness.

83. While there is no formal guidance for estimating the costs of adaptation, and it might not be advisable to be too prescriptive, some further support and advice on how to estimate the costs of adaptation would be beneficial to developing countries. This could encourage more detailed costing in terms of comprehensiveness and granularity. This could be supported by a suite of useful information, for example, 'how to' notes and good practice examples, as well as information to help compile cost estimates, such as sector specific information, look up tables or inventories (including costs, cost-effectiveness and cost-benefit ratios, and cost benchmarking information).

84. There are also various areas where country approaches to costing could be improved, building on good practice examples in existing developing countries, as highlighted in the case studies above. This includes more analysis and good practice examples on the quantitative impacts of climate change and adaptation benefits, including appraisal of costs and benefits. There is also the potential for greater consideration of cross-cutting issues, notably gender, including associated costed estimates.

85. A further priority is to encourage and support developing countries to start thinking more strategically about adaptation, including upstream (i.e. before projects or concepts are formulated). This would also help in integrating (mainstreaming) climate adaptation in the national development planning processes. This could be taken forward with a series of pilot studies. Linked to this, there would be benefits in encouraging more programmatic approaches to drive implementation. To support this, it would be beneficial to have additional guidance and support for developing countries on developing adaptation investment programs and plans. This would include the steps towards prioritization, programming and implementation, including more detailed costs and financing arrangements. Other initiatives, such as the SPCR, provide examples of such approaches, producing more concrete investment-ready plans.

86. To support developing countries in the tasks above, and to enhance adaptation costing, it would be beneficial if greater levels of capacity-building and technical assistance support could be provided.

87. Across all these areas, there are benefits from enhancing the monitoring, evaluation and learning on adaptation costs, and seeking to establish information and knowledge sharing initiatives across developing countries.

4. Meeting the costs of adaptation

4.1. Synthesis of developing countries' domestic expenditure on adaptation

88. The available evidence suggests that estimated adaptation costs, and likely adaptation financing needs in developing countries, are five to ten times greater than current international public adaptation finance flows (UNEP, 2021).

89. The synthesis review finds that many developing countries are already allocating domestic budgets to adaptation to help fill this gap. While this is positive there are important ethical issues around such domestic action, and it being a substitute for international funding. This is especially the case in relation to the least developed countries given their low contribution to GHG emissions. The potential for domestic finance for adaptation also needs to be seen in the context of other challenges facing developing countries, especially in the context of the COVID-19 pandemic and rising costs of living around the world.

90. Unlike international public financial flows, there is no tracking of domestic expenditures on adaptation. However, there have been several initiatives by developing countries that have investigated such flows, including national case studies. The number of such studies has increased significantly in recent years. This provides important additional information on the efforts of developing countries in addressing adaptation.

91. The synthesis review has identified 24 national studies that assess domestic climate expenditures. Adaptation-only expenditure was reported separately by 14 of the 24 countries.

92. It is possible to present the results of various adaptation expenditure reviews, but this report strongly recommends not to make direct cross-country comparisons because of the methodological differences between studies (see next section). Each country's findings should be considered as the result of that country's approach and methodology to climate budgeting, rather than in comparison to other countries. The data presented are those reported by governments.

93. This analysis focuses on those countries that provide separate adaptation budgetary analysis, which is available for 14 countries. The estimates are presented first for adaptation expenditure as a proportion of the national government budget. It is clear that adaptation represents a significant proportion of government budgets.

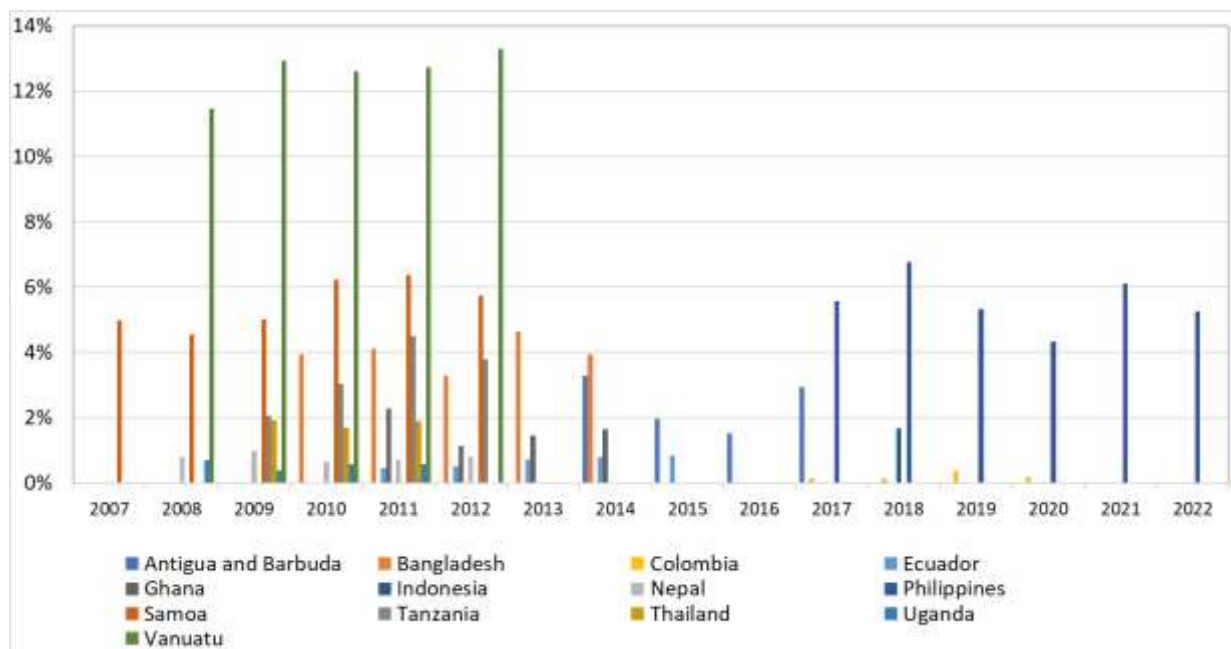
94. There has also been a regional study (Climate Scrutiny and Mokoro, 2018 for UNDP and UNECA) on *Africa's Public Expenditure on Adaptation* which compiled data from national budgets through a climate public expenditure and institutional review (CPEIR) for 34 countries, albeit not at the same level of detail as the country studies above. This study reports African countries are spending between 2 to 9 per cent of GDP on adaptation from their national budgets. UNDP is currently conducting an updated analysis.

These expenditures can also be presented in terms of the adaptation expenditures (from the budget) as a percentage of national GDP, though given different national circumstances and baselines, as well as different methods, countries should not be directly compared. This synthesis finds that many countries spent or allocated less than one per cent of GDP towards adaptation, though in a number of countries the levels were much higher than this.

95. While the difference in methods precludes an analysis of average spend, it is clear that developing countries are already financing adaptation through domestic expenditures, and for some countries, the share of the national budget, and of GDP more broadly, is already significant.

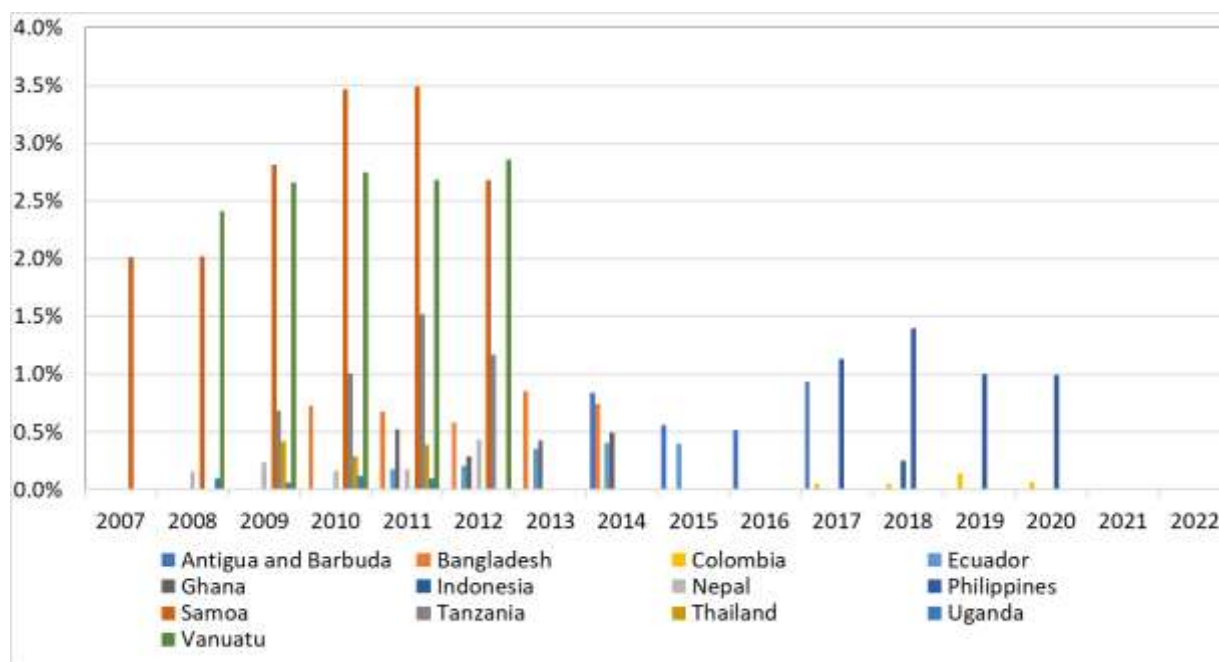
96. It is not yet possible to assess if developing countries are increasing domestic expenditures over time to meet rising current costs of adaptation, but this could be explored by updating earlier CPEIR/CBT exercises and looking at how allocations are changing over longer time periods.

Figure 5. Adaptation-relevant budgetary resources vs. total state budget, various countries, 2007–2022



Note: Values for individual countries are not directly comparable, because they are the result of each country's approach and method, and these strongly influence the numbers reported.

Figure 6. Adaptation-relevant budgetary resources vs. GDP, various countries, 2007–2022



Note: Values for individual countries are not directly comparable, because they are the result of each country's approach and method, and these strongly influence the numbers reported.

97. There are different methods that have been used to assess the domestic expenditures above, and these differences in methods are explored in more depth below. In theory, the analysis of domestic expenditures avoids some of the complexity with estimates of adaptation costs because it is focused on budgetary allocations or spend, and thus observable rather than estimated. However, in practice there are many challenges with such an assessment, and the exact methods and estimates vary significantly. These methods included budget analysis, public expenditure review and budget tagging (see box 10 below).

Box 10

Methods for assessing domestic expenditures on adaptation

There are several methods that can be used for climate tracking (Resch et al, 2017; World Bank, 2021). These include the following:

- On-budget expenditure analysis, which aims to identify climate change relevant budget lines, broken down by different components (e.g., capital and recurrent expenditures). This approach is relatively quick and low cost but requires disaggregated budget data.
- Expenditure reviews, which identify relevant expenditure codes across the government from accounts, complemented with interviews with relevant stakeholders. Since 2011, UNDP and the World Bank have supported countries to undertake such CPEIRs. UNDP has also developed a CPEIR Methodological Guidebook (Bain et al., 2019).
- Climate budget tagging, which flag budget codes in a government's electronic financial management system and allows for expenditure trend monitoring. It covers on-budget expenditures only.

A further set of methodological issues are involved in all these studies, which relate to the approach used for identifying and attributing (scoring) the relevance of adaptation. Several approaches can be used which include the following:

- Objective-based approaches. These look at the extent to which climate change mitigation or adaptation is part of the explicit or implicit objectives or intent of a programme or project. This can assign adaptation levels based on whether adaptation is a primary or significant objective (as with the Rio markers of the OECD, with associated scores, or can provide more disaggregated levels (e.g., ranking adaptation expenditures as percentage or into broad percentage categories). It is also possible to examine expenditures through a more bottom-up analysis of programme components and relevance to adaptation. The scoring methods used have a large influence on the level of adaptation expenditure assigned.
- Benefits-based approaches. This approach assesses the proportion of total benefits from the programmes associated with climate change mitigation or adaptation compared to other benefits (e.g., social, and environmental).
- Policy-based approaches. This approach limits climate relevant activities to those that are referenced in national climate change policy documents

98. The synthesis for this report (as well as other evidence) has found that countries adopt different approaches to tagging. The World Bank (2021) reports that expenditures are generally tagged during budget preparation, hence providing information on allocations rather than actual spend. Only a few countries apply tagging ex-post after the completion of the budget process (e.g., Cambodia, Colombia). Also, some countries combine objective- and policy-based definitions of climate relevance. Most countries delegate tagging responsibilities to line agencies. Since quality assurance is only done by a minority of countries (e.g., Indonesia, Philippines, Uganda), however, there is a risk of the methodology not being applied consistently across agencies.

99. Countries apply their own definitions and methods, and transparency around those is often low (Watson et al. 2020). Importantly, public budgetary resources may also increase emissions or increase vulnerability (Watson et al., 2020) – something which has often been overlooked by climate budgeting approaches. This can be addressed by tagging expenditures on activities that have an adverse impact on the environment.

100. A key methodological input to these methods concerns the identification and weighting of adaptation. A common problem that all these methods face is the need to decide and identify what counts as adaptation and then subsequently, what expenditure share of a specific action should be attributable to adaptation versus other areas. The exact allocation of adaptation, and rating climate change finance from other domestic development budget lines (development) is challenging. There is therefore a degree of ambiguity and subjectivity in any such assessments. There are different methods that can be used for these allocations, also presented in box 9. Even when common approaches are used, there is widespread variation in the exact methods used for identifying and weighting of adaptation.

101. Despite these challenges, developing country experience does show that these studies can be very valuable, and they can lead to a greater integration of climate adaptation in development planning. A good practice example from Bangladesh is presented in box 11 below.

Box 11

Case study. Bangladesh. From climate expenditure tracking to climate public financial management

Bangladesh is one of the most climate vulnerable countries in the world. In 2012, a CPEIR was conducted (O'Donnell et al., 2013), which analyzed the policy and institutional context and financial management arrangements of the agencies involved in climate adaptation and mitigation activity. The CPEIR was part of a broader effort by the Government of Bangladesh, supported by UNDP, to strengthen the capacity of national and local level institutions to manage the increasing flow of climate finance, while preparing the government to generate domestic sources of climate finance, and utilize the finances with highest transparency and accountability.

Building on the CPEIR recommendations, in 2014 the government formulated a Climate Fiscal Framework (CFF) (Government of the People's Republic of Bangladesh, 2014) aimed at (a) establishing greater national ownership of climate finance, (b) promoting government-NGO-private sector partnership, (c) enhancing results management, (d) increasing mutual accountability and (e) broadening the opportunity for resilient development and green growth in Bangladesh.

The CFF was an important milestone which laid the foundations of a climate inclusive public financial management system. Soon after the adoption of the CFF, in 2016, with the support of UNDP, the Government (Finance Division) started implementing a project titled Inclusive Budgeting and Financing for Climate Resilience which led to several important results: a review of existing fiscal policies (tax, value-added tax, subsidy and pricing); the embedding of climate in the Budget Circular, which provides strategic directions to the line ministries for preparation of a Ministry Budget Framework; the development of a climate tracking methodology (Government of the People's Republic of Bangladesh, 2018) in line with the thematic areas set out in the Bangladesh Climate Change Strategy and Action Plan; and the introduction of a new audit protocol for climate change related activities and climate investments.

Under the Inclusive Budgeting and Financing for Climate Resilience, the CFF was updated in 2020 mainly to broaden its remit to include the role of private sector, NGOs and CSOs, and to embed climate considerations into financial sector policies (lending policy and insurance policy). The framework covers innovative financing

options such as climate bonds, blended climate finance, budget support and crowdfunding. The CFF 2020 includes an implementation plan indicating a range of activities to be implemented in different time horizons along with the roles and responsibilities of key relevant institutions to take the task forward.

4.2. Developing countries' efforts to create enabling conditions to access and mobilize funding for adaptation

102. Several studies report that there are barriers and constraints to mobilizing finance for adaptation (UNEP, 2016b; Mortimer et al., 2020; Watkiss et al., 2022) (for the difference between finance and funding see box 12 below). These include information failures, market failures (including positive externalities), financial challenges, policy and governance barriers and behavioral and cultural barriers. Such studies also report that these barriers make it challenging to develop investment ready projects. This can include challenges in developing public adaptation projects that meet government economic and financial criteria, or private sector or blended projects that are bankable (investment ready and potentially financially viable). However, these barriers can often be overcome through the creation of enabling conditions.

Box 12

Finance versus funding

This report defines adaptation finance as all sources of funding and financing for adaptation from the public, private and third sector, and all financial instruments including grant, debt, equity and other. This follows the convention in the adaptation finance literature (see CPI, 2021), which uses 'finance' as a broad term to represent all investment in adaptation. However, it is noted that financing and funding are sometimes defined differently. Funding is sometimes defined as money, especially grants, that is provided by government/public sector. Finance is sometimes defined as capital raised from financial institutions or other lenders which requires repayment (debt). This report uses the generic term 'finance' for all investment in adaptation. This includes public (international and domestic, public financial institutions), private sector (companies, households, private financial institutions and intermediaries) and third sector (foundations, charities) sources, while noting there are important differences between these sources and related financial instruments.

103. This synthesis report has looked at efforts that developing countries are undertaking to create the enabling conditions that increase access to and mobilize finance for adaptation, including from international and bilateral funds, domestic budgets and the private sector, and therefore to overcome the barriers described above.

104. Many developing countries have developed resource mobilization strategies and plans, and nearly all have developed adaptation project concepts and proposals for potential funding. It is highlighted that having robust estimates of the costs of adaptation is key to the effective development of resource mobilization plans, and more detailed costings are a prerequisite for accessing external finance.

105. There are also examples of countries developing more strategic approaches to create the enabling conditions for resource mobilization. Several countries have set up domestic climate funds or facilities to provide the architecture and governance to prospect for and deliver finance at scale for adaptation across government. One example includes the climate investment facility in Rwanda as described in box 13 below. These initiatives have been nationally driven but supported by capacity-building and technical assistance. Once established, they can build capacity across government and support line ministries to access finance. They also enable more harmonized and strategic approaches to resource mobilization.

106. To date, almost all global adaptation finance to developing countries has been provided from the public sector (CPI, 2022), from multilateral finance institutes and bilateral development partners and has

been in the form of grants and debt (loans). Developing country Parties have therefore focused their efforts on the enabling conditions to increase finance from these sources.

107. However, there are emerging opportunities to raise finance from other sources for adaptation, including from the private sector and financial markets, and to develop new financial instruments, including bonds, guarantees, and equity, as well new arrangements such as public-private partnerships. Targeting these sources of finance and using these financial instruments requires different enabling conditions, as well as new capacity and skills. While at an earlier stage, there are examples of developing country Parties demonstrating good practice in these areas.

108. Creating the enabling conditions for these new sources of finance and new instruments often requires the use of blended finance. This is where public or philanthropic actors provide some form of concessionary finance or support to help encourage or de-risk private sector investment. This can, for example, include technical assistance funds (grants) to help strengthen financial viability or provide support on key areas, the use of concessionary finance to lower the cost of capital or provide additional protection to private investors, to provide guarantees or insurance (on below market terms), or to provide design or preparation grants (Convergence, 2021).

109. While these blended finance solutions have been primarily advanced through the operating entities of the UNFCCC financial mechanism and multilateral financial institutions, as well as a number of international adaptation accelerator initiatives, there are some early examples of good practice in developing countries that are seeking to create the enabling conditions for such blended finance. A good practice example is included in the case study in Rwanda below, where a dedicated facility has been set-up to promote blended finance through a project preparation facility to help develop private proposals, coupled with the potential offer of concessionary finance to help de-risk investment. Such initiatives highlight the need for additional knowledge, skills and expertise, for example associated with relevant financial and legal arrangements, due diligence, and other areas. This may require additional actors to be involved, e.g., Ministries of Finance (or equivalent) or national development banks, as well as complementary technical assistance and capacity-building.

Box 13

Case Study. Rwanda's Green Fund and Green Investment Facility

Rwanda set up its environment and climate change investment fund, now called the Rwanda Green Fund, in 2012. The fund was initially set up as a demand-led challenge fund, using competitive calls for proposals, inviting applications against specific thematic areas or funding priorities. Proposals are assessed against transparent and pre-determined criteria. To date, 10 calls for proposals have been successfully conducted and over 40 projects have been funded. It is recognized internationally and was awarded the UN Global Climate Action award in the "Financing for Climate Friendly Investment" category.

The Fund has strong and established institutional structures, with a Board, supporting Technical and Funding committees, and a Fund Management Team (secretariat) of 25 fully qualified and experienced professionals. It is fully nationally staffed by Rwandans.

Finance (capitalization) was provided from international grants, but it is also part-financed with domestic revenues provided from the Government of Rwanda. The Fund provides grants for public sector organizations, and innovation grants to support research and development, proof-of-concept and demonstration for the public and private sector. It also has offered a line of credit with concessional rates in partnership with the Development Bank of Rwanda for private sector applicants. The Fund is now focusing on NDC delivery, with a specific fund component (the NDC facility).

The Fund has been extremely successful in accessing climate finance, for the Fund itself, but also for across government in Rwanda and has mobilized USD 250 million to date.

The Fund continues to evolve. It has recently developed a hybrid function, so that it can deliver strategic programming, for example through sector mainstreaming, as well as the existing demand led approach.

Rwanda is also now looking to develop a new blended facility model to support new financial instruments and work with the private sector. The Rwanda Green Investment Facility has been developed, which is a partnership between the Green Fund and the Rwanda Development Bank. This involves a project preparation facility, led by the Green Fund, to support private sector mitigation and adaptation project development, coupled with a credit facility, led by the Rwanda Development Bank, to provide financing for private sector investment.

110. There are a number of other areas where enabling conditions can be developed to help mobilize finance. Many developing countries use public-private partnerships, where infrastructure or service provision is governed by a long-term contract between a private party and a government entity. There is the potential to integrate climate risks and adaptation into such contracts, as well as to use these models to develop new adaptation investment. There is emerging guidance on how to do this and examples in developing countries (Frisari et al., 2020). Similarly, new models for leveraging institutional capital towards infrastructure adaptation investments can also be explored. A related policy enabler here is the use of climate-resilient standards and regulations for national infrastructure development and procurement, to simplify and deliver adaptation as the new normal (ADB, 2020a). For example, Vietnam has introduced climate standards (codes) for the road sector (ADB, 2020b).

111. There are also other financial mechanisms that developing countries are piloting that could help finance adaptation, including debt restructuring, e.g., such as the debt swap examples from the Seychelles structured for ocean conservation and adaptation (2015), de-risking instruments, e.g., sovereign risk pooling insurance, and also contingency financing including disaster contingent financing. All of these involve new enabling conditions, but also require corresponding capacity-building and expertise.

112. A final key enabler is around adaptation mainstreaming, and especially the integration of climate adaptation in public financial management and development planning. This can help generate and programme domestic finance for adaptation by leveraging government development budgets and can also help to manage and integrate international finance in planning. Such initiatives can build on and integrate analysis of the costs of adaptation and climate expenditures/CTB. This includes, in particular, the integration of adaptation into national and sector medium term development planning, such as five-year plans and through to budgets (GCA, 2021). Such actions help improve the governance for adaptation programming at scale and build capacity for finance and planning ministries.

113. There is some analysis on the success factors for mainstreaming (LSE, 2017, WRI, 2018). These include the presence of a high-level champion, the involvement of strong Ministries, the availability of climate finance and technical assistance and capacity-building support, as well as policy frameworks (and commitments) that help push forward the process of mainstreaming, the presence of coordination mechanisms across government that support mainstreaming goals, and information and tools. A number of countries provide good practice examples of mainstreaming (see case study of Fiji in box 14 below).

Box 14

Case Study. Adaptation mainstreaming in public financial management and development planning in Fiji

Many developing countries are now integrating climate adaptation into their national and sectoral development plans, and into their investment and budget cycles. Fiji identified mainstreaming as a key priority in its 2012 Climate Change

Policy and included mainstreaming as part of a set of action on horizontal integration in its NAP (Government of the Republic of Fiji, 2018). This component aims to mainstream climate change issues into national level development planning processes. By doing so, this will strengthen coordination, increase robustness of planning processes and help to prevent maladaptive outcomes.

The government is now considering the integration of adaptation at the local level: in the town development planning and investment plans, mainstreaming the NAP at the local level through various actions including supporting local adaptation planning, investment mobilization and capacity-building.

4.3. Experience and lessons with meeting the costs of adaptation

114. A number of lessons can be drawn from the review undertaken for this report on how developing countries are meeting the costs of adaptation, and from the wider evidence base of other similar reviews (see Allan et al. 2019; World Bank, 2021; Postic, 2021; Bova, 2021). A key lesson is that the benefits associated with a comprehensive evaluation of adaptation domestic expenditures more than justify the effort involved (Postic, 2021). These benefits include improved inter-ministerial discussion and collaboration on climate issues, from the consolidation of scattered information, to the identification and analysis of policy and budgetary trade-offs. It is currently difficult to quantify these benefits, for example, World Bank (2021) highlight that although budget tagging has increased awareness of climate change issues across Ministries of Finance and line ministries, it is difficult to determine the impact on budget allocations and decision-making.

115. A further set of lessons identified that the success factors for undertaking such studies include a strong institutional leadership and climate change champions within governments, as well as developing a methodological approach which is sound and comprehensive, i.e. that covers all aspects of budget (including taxes), monitors outcomes (not only intentions), and includes measures unfavourable to climate adaptation (e.g., fuel subsidies).

116. While the number of countries undertaking such studies is increasing, there are still important barriers to overcome. The methods are quite complex to implement, and there are challenges in the weighting (attribution of adaptation), as this involves subjectivity as well as complexity (Postic, 2021). Countries currently apply their own definitions and methods, and transparency around those is often low (Watson et al. 2020). There is existing guidance on undertaking such assessments (e.g., the UNDP guidance on knowing what you spend, 2019), and while supplementary material to help implementation might be useful, uptake of such studies could be notably increased through enhanced advice and support to help developing countries to undertake such assessment.

117. With regard to experiences of countries in establishing enabling conditions to increase the access to and mobilization of finance for adaptation the report has identified good practice examples where countries have created the governance and institutional mechanisms to help enhance access to international and bilateral funds, including with dedicated facilities, and supporting capacity-building initiatives. These provide useful lessons for other countries. However, these have focused on public finance.

118. There is also some experience emerging in developing countries which are creating the enabling conditions for other sources of finance, including private finance, and piloting new financial instruments and models, including blended finance. Further development in these areas is likely to be critical in all countries, to help address the current adaptation finance gap.

119. To enhance the conditions for resource mobilization, it would be useful to provide further guidance and support to enable developing countries to scale-up and access public sources of finance, especially through facility models, and through capacity-building to enhance the governance and capacity on finance. These can draw on existing good practice examples.

120. There is also an opportunity to support more innovative approaches, building on experience in a number of developing countries, which widen sources of finance and broaden financial instruments and

approaches. It would be useful to support these initiatives and develop these into good practice examples, then use these to disseminate lessons on the enabling conditions for private and blended finance.

121. Finally, there is a broader set of enabling conditions that can help advance the analysis of the costs of adaptation and domestic expenditures, and their application in adaptation programming. This includes the mainstreaming of adaptation into public financial management and national development planning and budgeting. Such actions can help improve the governance around programming adaptation at scale and build capacity for finance and planning ministries. There are already developing countries that are piloting such action, and there are valuable lessons for other developing countries.

122. Cutting across all these areas (domestic budgets and enabling conditions), there would be benefits from enhancing the monitoring, evaluation and learning and seeking to establish information and knowledge sharing initiatives across developing countries.

5. Key findings, experiences, and insights

5.1. Key findings and insights

123. This synthesis finds that there has been significant progress by developing countries in assessing the costs of adaptation in recent years, with many more developing country Parties now assessing adaptation costs, and reporting these in NDCs, NAPs and other communications. Almost half of developing countries have now provided adaptation cost estimates in their latest NDC updates and recent NAPs. Many countries are now providing detailed and comprehensive estimates of adaptation costs, including sectoral or thematic breakdowns.

124. The synthesis also finds that most developing countries have used sector-, programme-, project- or activity-based costing as the primary method for estimating these costs, although the level of detail and granularity of these assessments varies across countries. These methods have many advantages, not least that they provide short-term and practical outputs. However, they also have some disadvantages, due to the lack of an analytical framing. A smaller number of developing countries have used more detailed analytical methods, and these provide good practice examples to support adaptation programming.

125. There is also now a growing number of developing countries that has assessed domestic expenditures on adaptation. This shows that developing countries are already financing adaptation through domestic expenditures, and for some countries, the share of the national budget, and the expenditure levels relative to GDP, are significant. Such assessments involve some challenges, but they have considerable benefits, improving inter-ministerial awareness and supporting integration.

5.2. Lessons and further needs

126. Significant progress is being made by developing countries in estimating the costs of adaptation, meeting the costs of adaptation (and assessing domestic expenditures), and creating the enabling conditions to access and mobilize funding for adaptation. This synthesis identifies numerous examples of good practice among developing countries that provide valuable exemplars in these areas. However, the review has also identified important lessons and further needs.

127. First and foremost, given that only around half of developing countries have provided estimates of the costs of adaptation in their NDCs and NAPs, and only around half of these involve more detailed estimates, this indicates important challenges to such assessments.

128. For the costs of adaptation, improved guidance and support material would be useful and would help increase the number of countries reporting costs in their NDCs and NAPs. This could include additional support material, such as information for compiling and benchmarking estimates, as well as good practice examples. This could also include advice in key areas where current practice is low.

129. Complementing this, countries that already have initial costs would benefit from more guidance and advice on developing adaptation investment programmes, as these can help drive resource mobilization and implementation. Such assessments include more detailed costs analysis, analysis of potential adaptation benefits, economic and financial analysis, and prioritization. They also include strategic (upstream) analysis as well as downstream costed investment plans.

130. Alongside this guidance there is a further need for greater provision of capacity-building and technical assistance support to developing countries to help them develop the expertise to undertake costs assessments.

131. Similarly, while the number of developing countries tracking domestic expenditures and creating the enabling conditions for finance is increasing, the numbers are still low. This indicates there are barriers to implementation. While there is existing guidance on tracking finance, further advice and capacity-building, with associated resources to support these activities, will be essential to increase uptake.

132. With respect to creating the enabling conditions to increase the access to and mobilization of funding for adaptation, many developing countries are demonstrating good practice with respect to public sources of finance. There are opportunities for peer-to-peer learning to transfer good practice to all countries, noting this will require resources and support. However, there is a wider gap on accessing other sources of finance (private, blended) and developing new financial instruments and models. Further support to develop good practice country examples, and disseminate lessons to other countries, would be beneficial.

133. Finally, there are a number of broader cross cutting issues that are highlighted that could help catalyze the uptake of adaptation costing and domestic expenditure analysis in more strategic and systemic adaptation programming. These include good practice examples of mainstreaming adaptation in national development planning and financial management. There are also further needs to enhance the monitoring, evaluation and learning on adaptation costs, expenditures, and enabling conditions and seek to establish information and knowledge sharing initiatives across developing countries.

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