

**Efforts of developing countries in assessing and meeting the cost of adaptation:
Lessons learned and good practices
Draft synthesis report by the Adaptation Committee in the context of the
recognition of adaptation efforts of developing countries**

Recommended action by the Adaptation Committee

The AC will be invited to consider the draft synthesis report contained in document in this document for final comments and approval.

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1. Summary

1. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), in their decision 11/CMA.1., requested the secretariat 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 synthesis relevant lessons, insights, and good practices in developing country Parties, with respect to i) assessing the costs of adaptation and ii) assessing domestic expenditures towards meeting the costs of adaptation. The synthesis is based on a review of Countries self-reported documents, other relevant reports under the UNFCCC, and reports from operating entities of the UNFCCC financial mechanisms.

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. The analysis of the costs of adaptation has positive benefits, by helping the allocation and prioritisation of resources, and in identifying potential adaptation finance needs.

4. Estimating the costs of adaptation at national and local levels is challenging. This is because it requires analysis of the site and context specific nature of risks (hazard, vulnerability, and exposure), 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. Delivering adaptation is also widely seen as a socio-institutional process, that needs to go beyond the identification and costing of technical options.

5. There are alternative 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 nature of adaptation assessed as well as the magnitude of adaptation costs estimated. Estimates of adaptation costs also vary with objectives, future warming levels and scenarios considered, definitions and boundaries, and the sectors covered. This means there is no definitive cost of adaptation, i.e., estimates for a country vary depending on the method used, the objective set, and assumptions made.

6. 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 Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs) and other communications. At the time of this report, 76 developing countries have reported adaptation costs in their NDCs or NAPs. This has increased significantly since the INDC submissions, when 44 developing countries reported adaptation costs.

7. The synthesis finds that most developing countries have used sector, programme, project, or activity-based costing as the primary method for estimating costs in their NDCs and NAPs. Project-based costing methods typically take identified adaptation priorities and assess the costs of implementing these (e.g., at national scale or in a project). A small number of developing countries have used other methods, and some countries have used the outputs from more detailed studies to help identify priorities for subsequent costing. These good practice examples provide valuable information to support adaptation programming.

8. The synthesis also finds that the level of detail in country submissions on the costs of adaptation varies significantly. Some country estimates are extremely detailed and comprehensive, and 42 (of the 76) include sectoral breakdowns. However, in many country submissions, costs are reported at aggregate level, and/or without supporting evidence or breakdown. Further, there are wide variations in the framing used by countries, for example, with differing practice on the climate rationale and level of additionality, and thus what is considered as adaptation.

9. The programme and project-based costing methods used by most countries have advantages, especially as they are relatively easy to complete. They provide practical outputs on the costs of on 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 cost long lists of identified activities, and they

are not based on quantitative analysis of current and future impacts, the benefits of adaptation, or the appropriate level of adaptation. They rarely consider uncertainty. Furthermore, they tend to have wide definitions of adaptation, often including the adaptation deficit (current climate variability) and sometimes wider development priorities.

10. Most submissions 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 exemplars. There are also submissions which include and cost strategic (rather than sector or project) priorities, in addition to their sector estimates, and these provide the potential for more transformative change.

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

12. However, while sector coverage is expanding, it does vary by country. The omission of important sectors and risks 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). Examples of good practice in this area have been identified. While most NDCs and NAPs consider gender and inclusion as cross-cutting themes, these are rarely disaggregated in estimates of the costs of adaptation, and further consideration 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 GDP.

14. Some submissions and initiatives have progressed their adaptation cost estimates to investment plans. These include prioritised and costed interventions, which include programme modalities, implementation and execution costs. These act as good practice examples, as they help move forward cost estimate towards resource mobilisation and implementation, though they require time, resources, and expertise.

15. Some submissions have also developed governance issues around adaptation costs and programming, moving to mainstream (integrate) these in development planning, and thus aligning 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 capture new areas. There are many lessons that developing countries can learn from their counterparts.

17. Nonetheless, despite the positives, the majority of developing countries (around eighty countries, i.e., more than 50%) have still not reported the costs of adaptation in NDC or NAP submissions. There are several areas identified that could help overcome barriers and increase uptake and robustness of estimates of the costs of adaptation.

1.2. Meeting the cost of adaptation

1.2.1. Domestic expenditures towards meeting the costs of adaptation

18. The synthesis report has also investigated the progress on how developing countries are assessing domestic expenditures on adaptation.

19. 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.

20. These methods are challenging because they have to decide on what counts as adaptation, and because they 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 taking account of these differences.

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

22. 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.

23. 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.

24. 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 CPIER/CBT exercises, and seeking to track allocations over longer time periods.

1.2.2. Creating enabling conditions

25. 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 to recognise the wider adaptation efforts being taken by developing country Parties.

26. 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 use new financial instruments. There is also a cross cutting enable to build the capacity of development and finance ministries to integrate adaptation considerations into macroeconomic and fiscal policies and public financial management (and expenditures).

27. The synthesis finds these enabling conditions are increasing the flow of finance, both from domestic and international sources. A number of good practice examples are included.

1.2.3. Key findings, experiences, and insights

28. This synthesis recognises 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.

29. Based on this synthesis, a number of suggestions are made that could further overcome the challenges to estimating adaptation costs and assessing domestic expenditures on adaptation and could increase the level of uptake and robustness. These include:

- a) Improved guidance and support material for estimating the costs of adaptation, to increase method harmonisation and comprehensiveness. This could also include best practice examples in emerging areas (multi-sector coverage, analytical detail and use of appraisal, prioritisation, longer-term analysis, investment plans);
- b) Greater provision of capacity building and technical assistance support to developing countries for estimating the cost of adaptation and domestic expenditure, as well as support to create the enabling conditions for resource mobilisation, including new sources and financial instruments;

- c) Enhanced advice and support to help prioritise adaptation and develop investment plans. It would also be useful to promote more upstream and strategic analysis and promote greater mainstreaming of adaptation in country development and financial planning, perhaps through a series of pilot studies.

2. Introduction and background

2.1. Background and objectives

30. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) requested the secretariat, in decision 11/CMA.1. under the guidance of the Adaptation Committee (AC) and the Least Developed Countries Expert Group (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

31. 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

32. 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

33. The Adaptation Committee produced a background note/outline ([AC20/INFO/5D](#), version 01.0 from 30 August 2021) on 'Recognizing the adaptation efforts of developing country Parties: Assessing and meeting the costs of adaptation'. The scope for the synthesis report was defined as follows:

34. It will recognise efforts taken by developing countries in assessing and meeting the costs of adaptation, based on the review of the following as the main sources of input:

- a) Countries self-reported documents, including Nationally Determined Contributions (NDCs), National Communications (NCs), Adaptation Communications (ACs), National Adaptation Plans (NAPs), and National Adaptation Programmes of Action (NAPAs);
- b) Other relevant reports under the UNFCCC, including the SCF Needs-based Finance project, Determination of the needs of developing country Parties and Fourth Biennial Assessment and Overview of Climate Finance Flows;
- c) Reports from operating entities of the UNFCCC financial mechanism (e.g the Green Climate Fund, Global Environment Facility, and Adaptation Fund), UN organizations multilateral agencies, and multilateral development banks, including information from the Pilot Program for Climate Resilience (PPCR).

35. This synthesis report aims to provide a solid reference to the efforts of developing countries, despite the challenges, in appraising the costs of adaptation and investing their resources and efforts into it.

36. The synthesis study 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 new insights that they provide.

2.3. Outline of this report

37. Following this introduction, the report includes the following sections.

¹ Decision 11/CMA.1, para. 13.

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

38. Chapter 2 introduces the core concepts of the cost 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.

39. 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 provides a synthesis of information on efforts to estimate current adaptation spend and highlights good practice examples and lessons. It also reports on developing countries efforts to create enabling conditions to access and mobilize funding for adaptation.

40. Chapter 4 brings together the key findings, experiences, and insights from the analysis, and identifies lessons and future needs.

Box 1. Definitions of key concept

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 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 AR4, 2007).

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

3. Assessing the costs of adaptation

41. The cost of adaptation is not defined in the IPCC (2022), but is reported as the costs of planning, preparing for, facilitating, and implementing adaptation measures to moderate harm or exploit beneficial opportunities (UNFCCC, 2009). These cost estimates can help in the allocation and prioritisation of resources, and in identifying 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.

3.1. Synthesis of country experience

42. 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 stock-takes (UNFCCC, 2009; UNEP, 2016). This section summarises country experience.

3.1.1. National estimates in NDCs and NAPs

43. There are several self-reported documents from developing countries, submitted as part of relevant UNFCCC submissions, that include estimates of the costs of adaptation or adaptation finance needs. These include Nationally Determined Contributions (NDCs), National Communications (NCs), Adaptation Communications (ACs), National Adaptation Plans (NAPs), and National Adaptation Programmes of Action (NAPAs), as well Biennial Update Reports (BUR), Technology Needs Assessments (TNAs) and Technology Action Plans (TAPs).

44. This section focuses on the costs of adaptation as reported in countries Nationally Determined Contributions (Article 4, paragraph 2 of the Paris Agreement) and National Adaptation Plans (the Cancun Adaptation Framework agreed in the 16th Conference of the Parties (COP 16) established the National Adaptation Plan (NAP) process to enable Least Developed Countries (LDCs) and other developing countries to identify and implement medium and long-term adaptation needs). It is highlighted that the analysis here includes significant updates from the report of the first Standing Committee on Finance (SCF) on the

Determination of the Needs of Developing Country Parties (UNFCCC, 2021) due to the large number of updated NDCs submitted before and after COP26.

45. An analysis of the submission to the UNFCCC NDC registry identifies 194 countries that have submitted first NDCs and more than 100 countries have submitted revised NDCs. The analysis has been based on the first and updated NDCs up to May 2022. While this includes all countries, this synthesis focuses on developing countries only. This is defined here as countries that have ratified or acceded to the United Nations Framework Convention on Climate Change that are not included in Annex I to the Convention. The List of Parties to the Convention is available at www.unfccc.int/process/parties-non-party-stakeholders/parties-convention-and-observer-states.

46. A significant number of developing country Parties are now assessing adaptation costs, and reporting these in Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs). At the time of this report, 76 developing countries have reported adaptation costs in the 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.

47. Studies of the costs of adaptation have positive benefits, by helping the allocation and prioritisation of resources, and also by clearly expressing domestic and international adaptation finance needs.

48. It is highlighted (see next section) that these studies use different approaches and have different assumptions. 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 approach first. 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.

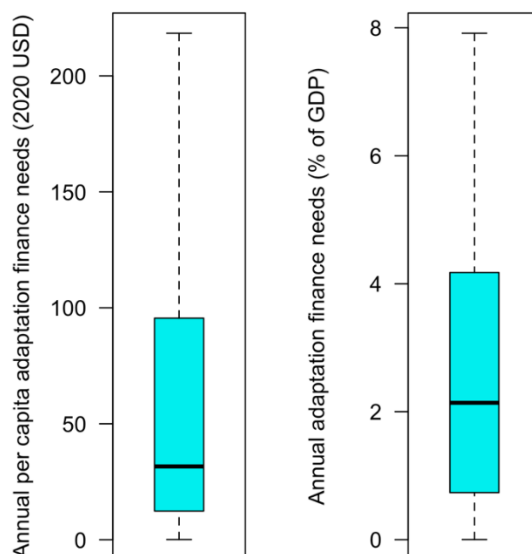
49. The total annual costs of adaptation for these 76 countries that have reported adaptation costs is approximately 71 billion USD per year (in current [2020] prices), on average, for the period up to 2030. Most of the proposed adaptation costs are conditional on international financial assistance. These numbers can be compared to adaptation cost estimates for (all) developing countries in the UNEP Adaptation Gap report, which are estimated at between USD 140 billion and USD 300 billion per year by 2030 (UNEP, 2016: 2021) (updated to 160 billion to USD 340 billion annually by 2030 in 2020 prices, UNDP, 2022).

50. The total costs of adaptation estimated by various countries are very different. Annual adaptation costs vary from USD 0.2 million to USD 13 billion per year for individual countries.

51. Annual adaptation finance needs as a percentage of GDP range from 0.7% to 4.2% (interquartile range) with the median estimate of 2.3% (see Figure 1). When adjusted for population, the result shows that developing countries' estimated costs of adaptation range from 10 to 95 USD per capita (interquartile range) with the median estimate of 30 USD 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).

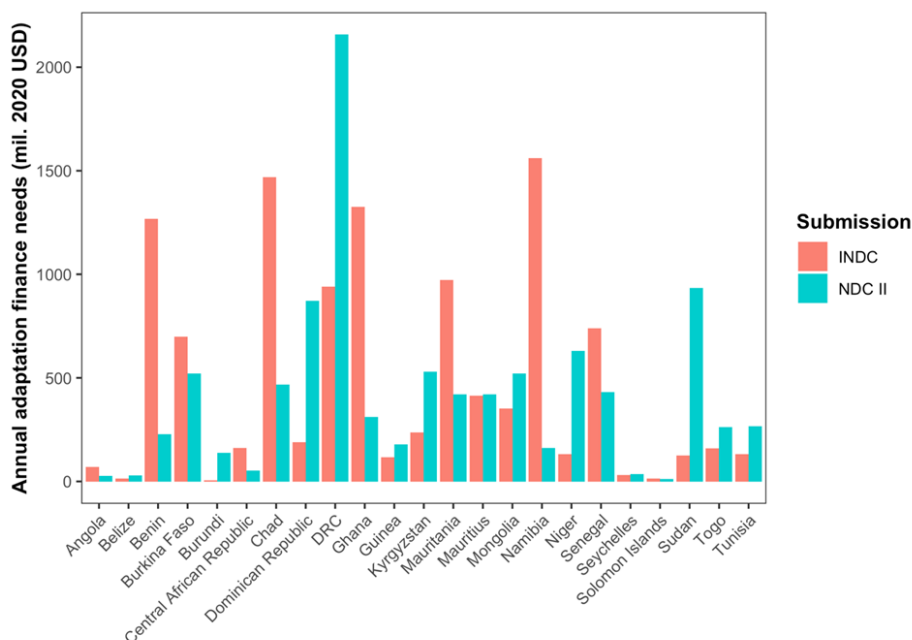
52. The adaptation costs/ finance needs in absolute dollar value are lowest in low-income countries (LICs). The median per capita annual adaptation costs are around 23 USD for LICs but it is 36 USD in lower middle-income countries (LMCs) and 63 USD in upper middle-income countries (UMCs). However, in relative terms, as a share of % GDP, adaptation costs in LICs are higher (reflecting that these economies are currently much smaller). The median estimate of annual adaptation finance needs in LIC and LMC is 3.5% and 1.9% of GDP respectively but it is only 1.1% in UMC. This shows that lower income countries have lower adaptation finance needs in absolute dollar values, but higher needs relative to their size of economy.

Figure 1. For those developing countries reporting costs, costs per capita and as a percentage of GDP. Source, Chapagain et al., 2021.



53. The synthesis 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. 23 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, DRC, Sudan, Guinea and Mongolia revised their NDCs, and report 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 updates on annual adaptation costs in initial and revised NDCs. Source, Chapagain et al., 2021



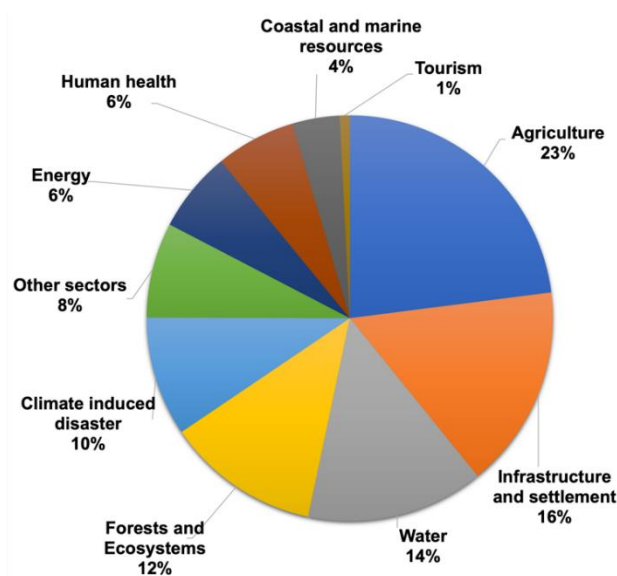
54. A number of developing countries have undertaken very comprehensive multi-sectoral costing studies and good practice examples are highlighted (see next section). However, for around half of the NDCs and

NAPs, only headline economy wide estimates are provided, with no details of how these are split across sectors.

55. The synthesis finds 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.

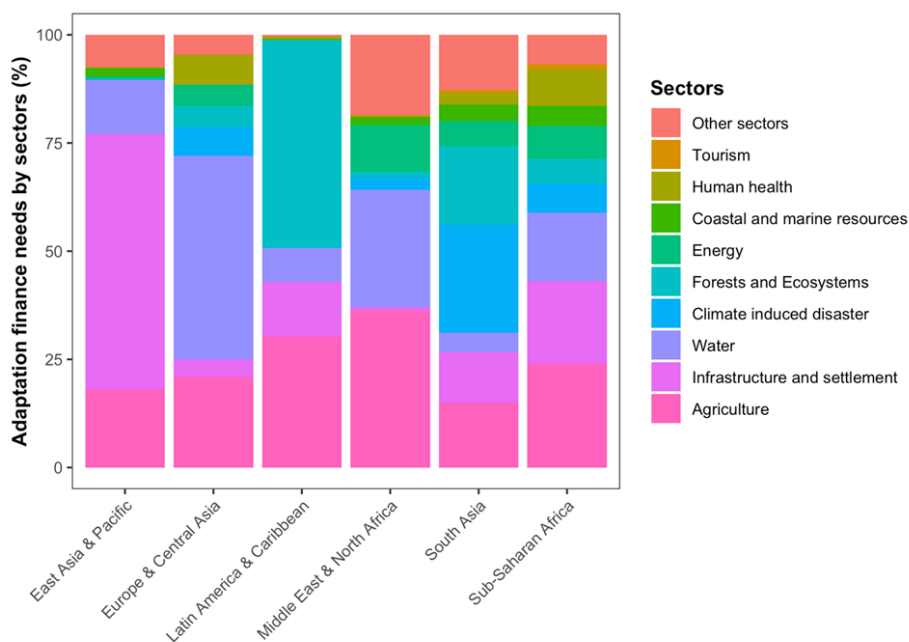
56. The synthesis has identified that 42 countries disaggregated their adaptation costs/needs by sector in their NDCs or NAPs. It has compiled evidence on the share of adaptation costs by ten sectors, shown in the figure. Developing countries have indicated the highest adaptation finance needs in the agriculture sector (23%) followed by infrastructure and settlement (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 by sector as a percentage, for developing countries that have submitted sectoral breakdown of costs. Source, Chapagain et al., 2021



57. 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 settlement sector (59%) followed by agriculture (18%) and water (13%). Adaptation finance needs in the water sector (47%) is 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 Settlement (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 settlement (13%). Agriculture (24%) is the top priority sector in Sub-Saharan Africa followed by infrastructure and settlement (19%), and Water (16%).

Figure 4. Sectoral adaptation finance needs by world regions (for those countries that report adaptation costs). Source, Chapagain et al., 2021



58. The synthesis also finds that there are often omissions in many developing countries submissions, for some sectors, notably for the costs of adaptation for biodiversity and ecosystem service adaptation, although also often for health and business (including tourism). This omission is highlighted as a concern, given the links between biodiversity/natural environment and climate change. However, such estimates are possible and there are good examples of the costs of adaptation in developing country submissions (see case studies below).

59. Adaptation cost estimates for the medium and longer-term (after 2030) are also important, especially as these are projected to increase significantly, however, these are very rarely considered in country submissions to date. For example, the estimates in the UNEP adaptation gap report (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.

60. A number of countries have indicated medium and longer-term adaptation costs in their submissions. (See case study below). A longer-term perspective is useful, not least in communicating the high increase in costs of adaptation likely after 2030 and thus the need for more transformative change. These longer-term assessments also offer greater potential for following adaptive management frameworks, and thus adaptation pathways that can look at iterative programming over time, including a cycle of monitoring, learning, and review, to improve adaptation planning. The focus of the UNFCCC LEDS initiative (low greenhouse gas emission development strategies) is on mitigation, although 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 Needs assessment report also reports some adaptation costs are reported under LEDS (UNFCCC, 2021).

61. While most NDCs and NAPs consider gender and inclusion as cross-cutting themes, these issues have not been captured in the estimates of the costs of adaptation. However, there are countries that have considered gender and inclusion in detail.

Box 2. Possible Case Study. Republic of Moldova's Nationally Determined Contribution

The Republic of Moldova followed a step-by-step approach to identify and prioritize adaptation options and estimate its 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 investment priorities were then identified through the Multi-Criteria Analysis. MCI was conducted in extensive consultation and transparent process with the participation of multiple stakeholders. The adaptation investment prioritization criteria during the MCI include: (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 sectorial investment options have been prioritized.

Finally, the sector-specific adaptation investment priorities and costs for six priority sector and a further cross-cutting capacity development needs, were estimated, and the costs of implementation were estimated for the period 2020-2025 at USD 1.7 billion

Box 3. Possible Case Study. Nepal's National Adaptation Plan (NAP) 2021-2050

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-wise long list of adaptation options based on literature review and multi-stakeholder consultations in each province.

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

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

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

Box 4. Possible Case Study. Malawi's NDC – long-term adaptation costs

Malawi has included estimates of the costs of mitigation and adaptation actions in its NDC. These include a breakdown of costs in the periods 2020-2025 and 2025-2030, but also extend to the costs in 2030 – 2040. These estimates show adaptation costs rise progressively over each time period,

highlighting that adaptation costs for developing countries are likely to be much higher in the decade of the 2030s.

This consideration of longer-term actions was part of the main assessment framework. The process identified a long list of possible adaptation actions (around 300). These were then assessed at workshops using multi-criteria analysis. Based on this process, the actions were clustered and prioritized, and then following further consultation and validation, the final list of actions was costed.

Box 5. Possible Case Study. The costs of adaptation for biodiversity: Peru

We are reviewing Peru which has a large component on forestry and ecosystems, but we are just waiting for the Spanish speaker on the team to come back from holiday.

Box 6. Case Study. Gender and inclusion in the Cambodia NAP and NDC

Cambodia has adopted a strong gender dimension in national climate policy and NDC and NAP documents. 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 (CCCSP), which has been submitted by the Kingdom of Cambodia as its NAP submission (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 (incl. SCF)

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

63. In 2017, the Conference of the Parties (COP23) 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 (NBF) 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.

64. The majority have been at the regional level (UNFCCC, 2021) with assessments 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, which include Antigua and Barbuda, Belize, Cuba, Dominican Republic, Honduras, Iran and Pakistan.

65. A key component of the technical 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 summarised 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.

66. At COP 24, the Conference of the Parties requested the Standing Committee on Finance (SCF) to prepare a report on the determination of the needs of developing country Parties every four years (starting at COP26), 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, TNAs. The SCF Needs report reported on the costs of adaptation (adaptation finance needs) from NDCs and NAPs: this report (See previous section) has updated these, due to the large number of updated NDCs submitted before and after COP26.

67. The SCF report does include additional finance needs for TNAs and TAPs have been reported. *Note, we need to cross check some of the SCF report. It has large adaptation finance needs from BUR and NCs, which seem much higher than the NDCs. Also, we need to check if there are any other elements, we can pull out from TNAs and TAPs that might be relevant for costs of adaptation technology transfer.*

Box 7. What are the differences between the costs of adaptation and adaptation finance needs?

The costs of adaptation and adaptation finance needs are often similar, but they can also involve differences. Finance needs are determined by the existing levels of expenditures on adaptation, as well as incremental financing requirements (again domestic and international). This means additional finance needs may be different to the estimated cost of adaptation. Furthermore, adaptation finance needs can be reported in terms of priorities, rather than the total costs of adaptation.

At a more detailed level, the methods used for estimating the costs of adaptation and adaptation finance needs are often different, which affects the size of estimates. Many of the literature 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 identified activities. This has a different framing for cost estimation, and thus estimates usually differ to literature studies (of the same sectors or countries).

3.1.3. Estimates and methods from other UN and international organizations including the relevant reports from the operating entities of the UNFCCC financial mechanism

68. The UNFCCC financial mechanisms, including the Green Climate Fund (GCF), Adaptation Fund (AF), and Global Environment Facility (GEF), 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 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, there are some minor differences between the funds, as applications for the GCF are also expected 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. The country submissions to the UNFCCC financial mechanisms provide good practice examples of project level costing of adaptation.

69. The Pilot Program for Climate Resilience (PPCR) of the Climate Investment Funds (CIF) has supported developing countries and regions in building their adaptation and 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. (Strategic Programs for

Climate Resilience, SPCRs). These 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.

A core component of the SPCR development process was the detailed costing of the proposed adaptation measures and investments. All 28 SPCRs 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 down on more concrete investments. The average national adaptation cost estimate for the countries assessed is just over \$90 million per year. The SPCR's 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 costed information that is more investment ready. *Note we have compiled costs by country for the SPCR – but if we don't include costs by country by NDC, we probably don't want to show SPCR costs.*

Box 8. St Vincent and the Grenadines's SPCR

The St Vincent and the Grenadines SPCR provides an example of good practice in that it is holistic, comprehensive and highly detailed. Their 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 they cover 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 is also exceptional in the level of detail of its costing. Each of the four components houses a suite of projects and these projects then house suites of activities and so, by providing cost estimates at the activity level, the SPCR is able to provide a fully transparent explanation of how investment will be spent and consequently, how this investment will translate into results.

70. As highlighted above, UNEP has compiled estimates of adaptation costs, including estimates 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 AGR2016 (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. It is planned that an updated review and new global estimate will be produced in 2023.

71. There has also been a series of initiatives on adaptation costs and finance needs from UNDP. This included the earlier work (UNDP, 2011) on country level assessment of investment and financial flows for adaptation, which included 15 country studies, and used a different method based on around the incremental mark-up needed for adaptation (see next section). They have also progress costing and climate budget tagging (see next section) through a series of initiatives. *Note, should we check with UNDP on other initiatives?*

72. The multi-lateral development banks have also estimated the costs of adaptation. The World Bank estimated the costs of adaptation globally and for a selection of countries in the earlier Economics of Adaptation to Climate Change (2010). This used a modelling framework to develop adaptation costs, based on economic analysis (sector-based analysis and computable general equilibrium modelling). More recent WB 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), noting that the WB has undertaken a very large number of additional country and sector studies that include estimates of the costs of adaptation. The African Development Bank 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 (AfDB, 2019). Similarly, the Asian Development Bank has undertaken a series of regional studies 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.

3.1.4. Other estimates from the literature

73. The previous sections focus 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.

74. Much of this literature has been summarised in previous reports (UNFCCC, 2009; OECD, 2015, UNEP, 2015, UNEP, 2021) and it has also been synthesized in the recent IPCC 6th Assessment Report (Working Group II) (IPCC, 2022). The number of studies makes it difficult to summarise, but two important points are noted. First, this wider literature applies a wider variety of methods (See Box 9, next section) than used in national country submissions. Second, and related to this, the use of different approaches leads to different estimates of the costs of adaptation, as compared to country submissions. Where 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

75. The previous section outlines the progress made in assessing the costs of adaptation by developing countries. This section dives down into the detailed methods and approaches used, to identify relevant insights.

76. In theory, it is relatively simple to estimate the costs of adaptation, as the sum of actions to address climate impacts or exploit opportunities. However, in practice, estimating these costs is extremely challenging (and much more so than estimating the costs of mitigation). This is because it 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. Delivering adaptation is also widely seen as a socio-institutional process, that needs to go beyond the identification and costing of technical options.

77. The challenges to estimating the costs of adaptation are set out in Box 9. It is highlighted that estimates of adaptation costs also vary with objective, assumptions, future warming levels, levels of residual impacts, and other factors, which include political as well as scientific perspectives. These issues influence what is counted as adaptation, as well as the size and nature of the costs assessed.

Box 9. 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. 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, because:

There is currently no single, agreed quantitative goal or objective for adaptation (the equivalent of the targets to limit future warming or emission reduction targets 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 common burdens (tCO₂). This also means it takes time and resources to estimate adaptation costs.

Adaptation costs vary with the sectors and risks considered. The broader 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 if a static baseline (current society and economy) or a future socio-economic baseline, including development, economic and population growth, are included (non-climate drivers), because the latter affects stock at risk, 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 have underinvested in 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 climate rationale, 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 costs 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 negative 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). These have the potential to increase costs, and in some cases, there will be limits to adaptation.

78. Reflecting this complexity, there are no common methods for assessing the costs of adaptation. A range of methods can be used (see box 10). These various methods address the challenges on 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.

79. 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 around key framing perspectives). The framing of adaptation, and the choice of methods and key assumptions, make a large difference to adaptation costs, altering estimates by at least an order of magnitude (UNEP, 2015). This means comparisons between developing country estimates should be treated with caution unless harmonised methods and assumptions are employed.

Box 10. 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 at the most detailed, bottom-up activity budgets for project implementation.

Sector integrated assessment/damage costs. These are the main source of cost of adaptation estimates in the literature and involve 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 stylised 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) and in Asia (ADB 2009, and later studies).

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 and adaptation studies as inputs, Examples include the original 2010 World Bank EACC national studies, as well as more recent studies (Ciscar et al., 2016: 2020).

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 impacts, and in some cases adaptation, AfDB (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 to these. 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 IFF is to base the analysis of adaptation costs (and sometimes benefits) on climate budget tagging or CPIER studies (see section 3), aligning to national development planning.

Decision support tools. There are also a suite of decision support methods that can be used for adaptation, to identify priorities, and which generate cost estimates. These include a suite of standard decision support tool, with the use of cost-benefit analysis, 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. Recognising 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. 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.

80. The studies undertaken in developing countries, by governments, other organisations, 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 (Pauw et al. 2020: UNEP, 2021). As highlighted above, caution is therefore needed in directly comparing the costs of adaptation between countries.

81. The synthesis has considered the approaches and methods used for estimating the costs of adaptation (see Box 7 and 9). Many NDCs do not specify which methods have been used. However, the synthesis finds that when information on methods is available, most countries have used sector, programme, project and activity-based costing in their NDC and NAPs.

82. Project-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.

83. However, these methods also have some disadvantages. They do not fully capture many of the challenges with estimating adaptation costs (see Box 9). Most typically cost long lists of identified activities. They are usually based on an estimate of the costs of activities (e.g., they estimate the cost to deliver a national programme of climate smart agriculture, or a large coastal project), rather than as the result of an analysis or appraisal. There is rarely any consideration of the benefits of adaptation (in reducing climate change impacts), adaptation effectiveness, or an analysis of the costs and benefits of adaptation or the appropriate level or scale of adaptation. They rarely consider uncertainty. This means that the adaptation assessed is unlikely to be the most economically efficient outcome, and may not prioritise the greatest risks or deliver the greatest adaptation benefits (for available resource levels).

84. 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).

85. Furthermore, 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 climate rationale. 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.

86. In terms of identifying adaptation priorities for costing, some NDCs do include formalised decision support methods, with the most common approach seeming to be multi-criteria analysis. Several NDCs use multi-criteria analysis (MCA) to identify priorities, which are then costed. These MCAs include criteria to assess and score options, and weight and prioritise these, against set criteria. These criteria can include the benefits (qualitative) and costs of different actions or options (see case studies in Moldova and Nepal, Box 2 and Box 3).

87. 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.

3.3. Experience and lessons with estimating adaptation costs

88. Estimating the costs of adaptation is challenging. There are alternative methods that can be used for estimating the costs of adaptation, all of which have strengths and weaknesses. The synthesis finds that most developing countries have used sector, programme, project, or activity-based costing as the primary method for estimating costs in their NDCs and NAPs. Project-based costing methods typically take identified adaptation priorities and assess the costs of implementing these.

89. 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 or its benefits.

90. It is difficult to know exactly why developing countries have followed similar programme and project-based costing methods, rather than using other approaches. The earlier guidance for NAPs (LDCEG, 2012) for example, recommended more detailed appraisal that includes methods such as analysis of costs and benefits, but this seems to have been rarely adopted. It could be that the focus on programme and project-

based costing is because it provides a more direct linkage to short-term adaptation finance needs, but it could also be because of the additional time, resources and expertise needed to implement analytical methods.

91. There is no formal guidance on estimating the costs of adaptation, and while it might not be advisable to be too prescriptive (given the range of methods), some further guidance, 'how to' notes, and good practice examples might be useful. There are also potential options to provide useful information for developing countries to help with adaptation cost estimates. These can include sector specific information, look up tables or inventories on adaptation options, costs, cost-benefit ratios, and cost benchmarking information.

92. The SCF Needs assessment report (UNFCCC, 2021) does identify some of the challenges that it found in compiling the needs of developing countries, which are also relevant. They identified data inconsistencies, data gaps and 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.

93. Based on this synthesis, a number of suggestions are made that could help overcome the challenges to estimating adaptation costs and increase the uptake and robustness.

94. First, the synthesis has found a wide range in the level and detail of analysis of adaptation costs submitted. Only around half of countries are reporting adaptation costs in their NDCs and of those, only just over 50% include sectoral breakdowns. There would be benefits from clearer guidance on how to estimate the costs of adaptation and promote best practice. Further, there are a number of areas where country approaches could be improved, building on good practice examples among developing countries as highlighted above. This includes more analysis on the quantitative impacts of climate change and adaptation benefits (including as part of appraisal of costs and benefits). It also includes the consideration of strategic analysis and longer-term estimates. There is also the potential for greater consideration of cross-cutting issues, notably gender. Based on these issues, the following are identified:

- a) To improve levels of detail (comprehensiveness, granularity) and consistency, it would be beneficial to have improved guidance on estimating the costs of adaptation;
- b) It might also be useful to develop useful cost information on common adaptation measures, whether through an inventory or guidance, to help countries when developing estimates;
- c) It would be useful to develop best practice examples in the more innovative areas highlighted above, e.g., for multi-sector coverage, analysis of costs and benefits, prioritisation, more strategic and longer-term analysis, investment plans.

95. The review finds that more than half of developing countries have still not provided costs of adaptation estimates in NDCs, and even for those countries that do, many estimates are only high-level and indicative. This indicates that developing countries are finding it challenging to provide cost estimates: this is not surprising given the complexity of analysis and the time and resources needed. To address this, the following is highlighted:

- a) To enhance the uptake of cost of adaptation estimates, it would be beneficial for greater provision of capacity building and technical assistance support to be provided to developing countries for estimating the cost of adaptation.

96. The estimates of the costs of adaptation provided by most developing countries are focused on sectors and projects. Many of these estimates have been found to be quite high level. Other initiatives, such as the SPCR, have advanced these estimates into more concrete investment ready plans. Alongside this, given climate challenges, it is useful for developing countries to start thinking more strategically about climate change risks adaptation, extending analysis of upstream. This would also help in integrating (mainstreaming) climate adaptation in national development planning processes.

- a) It would be useful to provide enhanced advice and support to help prioritise adaptation actions and develop investment plans. It would also be useful to promote more upstream and strategic analysis and promote greater integration in country development and financial planning, perhaps through a series of pilot studies.

97. Running 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

98. 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 (UNDP, 2021).

99. Domestic budgets are a potential source of adaptation finance that could help fill this gap, although there are important ethical and distributional issues around such action being undertaken by developing countries, and especially the least developed countries. The potential for domestic finance for adaptation needs to be seen in the context of other challenges facing developing countries, especially in the context of the COVID-19 pandemic and rising prices.

100. 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, undertaking 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.

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

102. It is possible to present the results of various adaptation expenditure reviews, but this report strongly recommends **not to make direct cross-country comparisons**. This is 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.

103. 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. The analysis found that adaptation represents less than 7 percent of government budget for most countries, though Vanuatu reports between 11.5 and 13.3 percent over its CPEIR reference period. Honduras (for which only 2019 data is available) reported the highest share (16 percent), though this includes expenditure which had adaptation as a least one of the objectives. The share of adaptation-only expenditure as a percentage of state budget was lower, at 5 percent.

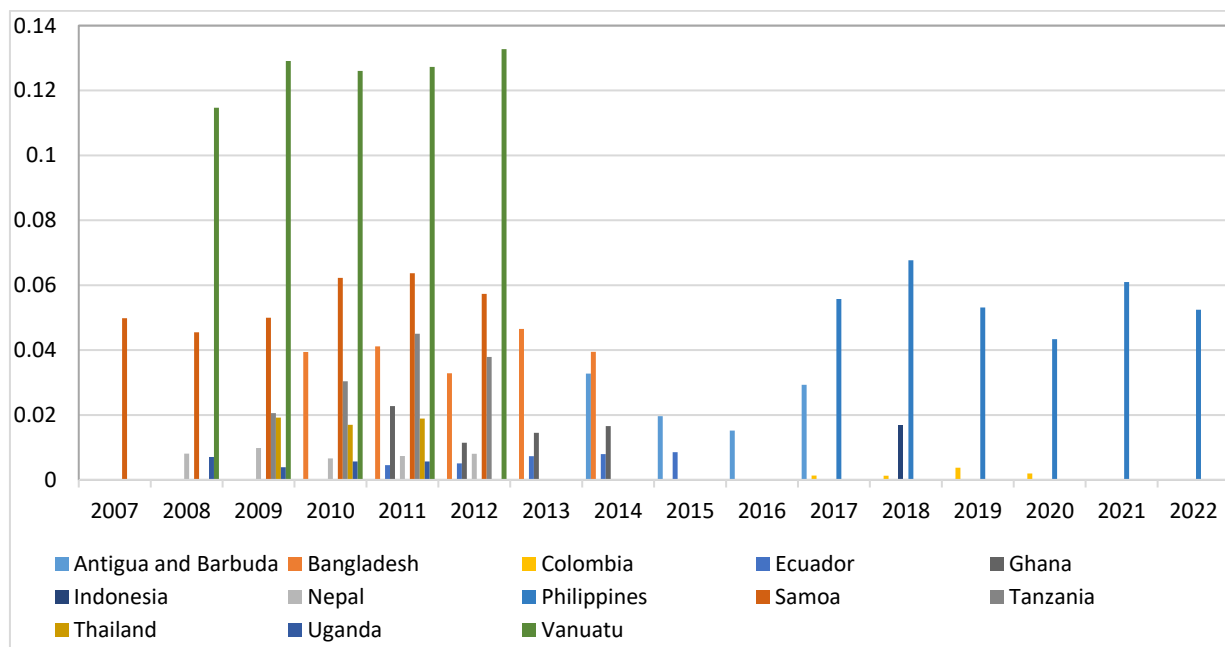
104. These expenditures can also be presented in terms of the adaptation expenditures as a percentage of overall GDP. This finds that most countries spend or allocated less than 1 percent of GDP towards adaptation; though the Philippines and Tanzania are higher at between 1 and 1.5 percent and Vanuatu and Samoa between 2 and 3 percent. Honduras reported 7 percent in 2019, however, adaptation-only expenditure accounted for 2 percent of GDP in 2019. *NB we also think there are studies in South Africa and Kenya, but we will not be able to review these and include until September*,

105. There has also been a regional study (Mokoro, 2017 for UNDP) on Africa's Public Expenditure on Adaptation (APEA) which compiled data from national budgets through a Climate Public Expenditure and Institutional Review for 34 countries, albeit not at the same level of detail as country studies. This reports African countries are spending between 2-9 percent of GDP on adaptation from their national budgets. UNDP is currently conducting an update analysis.

106. 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.

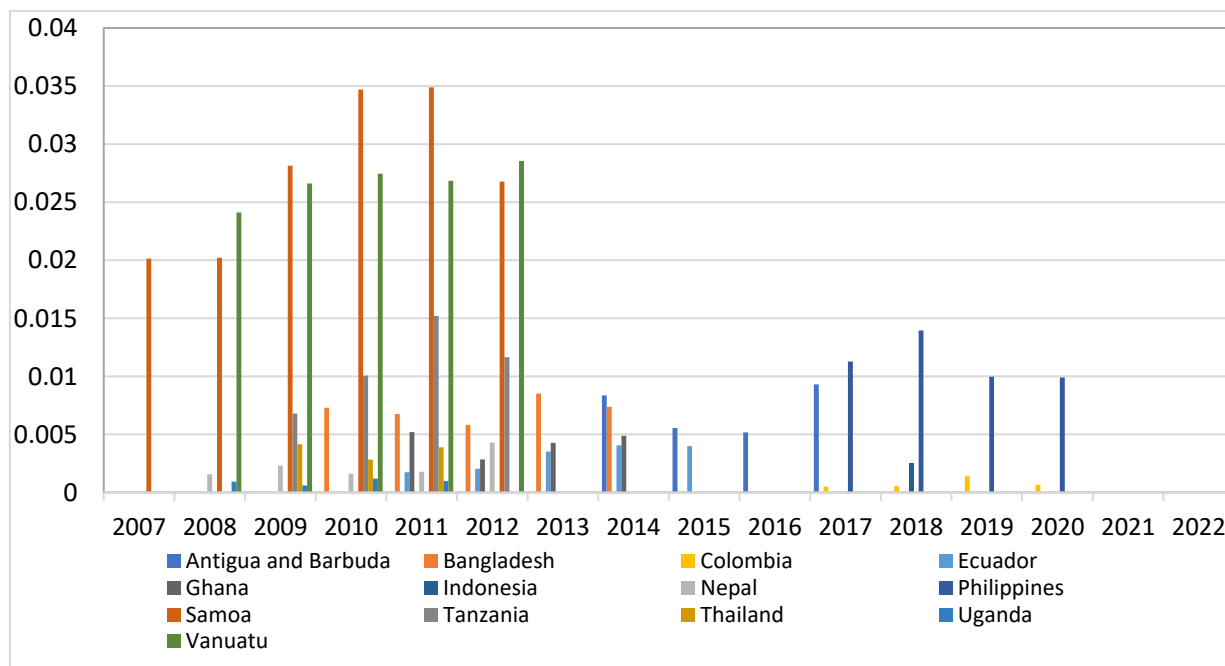
107. It is not yet possible to assess if developing countries are increasing domestic expenditures to meet rising current costs of adaptation, and what efforts are being taken to do this, but this would be an interesting issue to explore by updating earlier CPIER/CBT exercises and looking at how allocations 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.

108. There are different methods that can be used to assess domestic expenditures, 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 exact methods and estimates vary significantly. These methods included budget analysis, public expenditure review, and budget tagging (See Box 11 below).

Box 11. 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 Climate Public Expenditures and Institutional Reviews (CPEIRs). The UNDP has also developed a CPEIR Methodological Guidebook (Bain et al., 2019)
- Climate budget tagging. This is a tool which flags budget codes in a government's electronic financial management system, and expenditure trend monitoring. It covers on-budget expenditures only.

A further set of methods and approaches are involved in all these methods, which relate to the method or 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 Organisation for Economic Co-operation and Development (OECD), with associated scores, or can provide more disaggregated levels (e.g., ranking adaptation expenditures as % or into broad % 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.

109. The synthesis (as well as other evidence) identifies that countries adopt different approaches to tagging. The World Bank 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; yet, since quality assurance is only done by a minority of countries (e.g., Indonesia, Philippines, Uganda), there is a risk of methodology not being applied consistently across agencies.

110. 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.

111. 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. Here 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 10.

112. Even when common methods are used, there is widespread variation in the methods used for identifying and weighting of adaptation, and whether these use an objective based or other approach, as well as the exact approach to weighting.

113. However, 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 is presented below (see Box 12).

Box 12. Possible 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 Climate Public Expenditure and Institutional Review (CPEIR) was conducted, which analysed 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 GoB, 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) 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 (PFM) system. Soon after the adoption of the CFF, in 2016, with the support of UNDP, the GoB (Finance Division) started implementing a project titled Inclusive Budgeting and Financing for Climate Resilience (IBFCR) which led to several important results: a review of existing fiscal policies (tax, VAT, subsidy and pricing); the embedding of climate in the Budget Circular (BC), which provides strategic directions to the line ministries for preparation of Ministry Budget Framework (MTBF); the development of a climate tracking methodology 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 IBFCR (closed 2022), 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 bond, 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 foreword.

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

114. Several studies report that there are barriers and constraints to mobilizing finance for adaptation (UNEP, 2016b; Mortimer et al., 2020; Watkiss et al., 2022). These include information failures, market failures (including positive externalities), financial challenges, policy and governance barriers, and behavioural and cultural barriers. Such studies also report that these barriers make it challenging to develop bankable (investment ready) adaptation projects. However, these barriers can often be overcome through the creation of positive enabling conditions.

Box 13. Finance and funding

This report includes 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 sources (international and domestic, public financial institutions), private sector (companies, households, private financial institutions and intermediaries) and third sector (foundations, charities) while noting there are important differences between these sources and related financial instruments

115. The synthesis report has looked at efforts by developing countries to create the enabling conditions to increase access to, and mobilize support (funding and financing), of adaptation, including from international and bi-lateral funds, domestic budgets, and the private sector, and therefore to overcome the barriers above. This extends the sections above to recognise the wider aspects of adaptation efforts by developing country Parties.

116. Developing countries have initiated a number of activities that facilitate resource mobilisation and access to finance for adaptation. Many countries have developed resource mobilisation 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 are key to the effective development of resource mobilisation plans, and more detailed costings are a prerequisite for accessing external finance.

117. There are also examples of countries developing more strategic approaches to create the enabling conditions for resource mobilisation. 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 at the cross-government level. Examples include climate mechanisms and facilities in Rwanda and Ethiopia (see good practice example below). These initiatives have been nationally driven but supported by capacity building and technical assistance. Once established, they provide the potential to build capacity across government and support line ministries to access finance. They also enable more harmonised and strategic approaches to resource mobilisation.

118. To date, almost all global adaptation finance to developing countries has been provided from the public sector (CPI, 2022), from multi-lateral finance institutes and bi-lateral development partners and has been in the form of grants and debt (loans). Developing country Parties have therefore focused their efforts on the enabling actions to increase finance from these sources, as with the activities above.

119. However, there are new 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 initiatives. 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.

120. 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 (Convergence, 2021) 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.

121. While these blended finance solutions have been primarily advanced through the UNFCCC financial mechanisms and multi-lateral 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 below (in Rwanda, Box 14), 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, etc., 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 14. Case Study. Rwanda's Green Fund (FONERWA) and Green Investment Facility

Rwanda set up its environment and climate change investment fund (FONERWA, 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 (CFP), inviting applications against specific thematic areas or funding priorities. Proposals are assessed against transparent and pre-determined criteria. To date, 10 CFPs have been successfully conducted and over 40 projects have been funded. It is recognised internationally and was awarded the UN Global Climate Action award (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 owned and is fully staffed by Rwandans.

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

The Fund has been extremely successful in mobilising finance, for the Fund itself, but also for the wider climate finance landscape in Rwanda. [figures are available for climate finance mobilized]

The Fund continues to evolve. It has also 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 facility model, to support new financial instruments and work with the private sector. The Rwanda Green Investment Facility (RGIF) has been developed, which is a partnership between the Green Fund (FONERWA) and the Rwanda Development Bank (BRD). This involves a project preparation facility (led by FONERWA) to support private sector mitigation and adaptation project development, coupled with a credit facility (led by BRD) to provide financing for private sector investment.

122. There are a number of other areas where enabling conditions can be developed to help mobilise finance. Many developing countries use public-private partnerships (PPPs), where infrastructure 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 infrastructure. There is emerging guidance on how to do this and examples of developing countries that are developing such practices (Frisari et al., 2020). Similarly, new models for leveraging institutional capital towards infrastructure adaptation investments can also be explored. A related policy enabler here can be 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, Viet Nam has introduced climate standards (codes) for the road sector (ADB, 2020b).

123. There are also other financial mechanisms that developing countries are piloting, that can be seen in the wider financial landscape, including debt re-structuring, 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, and corresponding capacity building.

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

125. There is some analysis on the success factors for mainstreaming (LSE, 2017). 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 co-ordination mechanisms across government that support mainstreaming goals, and information and tools (WRI, 2018).

Box 15. Possible Case Study. Adaptation mainstreaming in Public financial management and development planning

We are reviewing potential case studies.

4.3. Experience and lessons with domestic expenditure

126. There are documented lessons on capturing domestic expenditures through climate budgeting that have been drawn from the evidence across country experience (see Allan et al. 2019; World Bank, 2021; Postic, 2021; Bova, 2021). These find the success factors for undertaking such studies include having a strong institutional leadership and climate change champions within governments, as well as developing a methodological approach which is sound and comprehensive, i.e., it covers all aspects of budget (including taxes), monitors outcomes (not only intentions), and includes measures unfavourable to climate adaptation (e.g., fuel subsidies).

127. Lessons from such assessment report that the benefits associated with a comprehensive evaluation more than justify the additional effort involved (Postic, 2021). These benefits include improved inter-ministerial discussion and collaboration on climate issues, from the consolidation of scattered information, and from the identification and analysis of policy and budgetary trade-offs. However, recent reviews (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.

128. It is worth noting that a relatively small number of developing countries have undertaken these assessments. This indicates barriers to implementation. These methods are also quite complex to implement, and there are particular challenges in the weighting (attribution of adaptation), as this involves subjectivity as well as complexity (Postic, 2021). Countries 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 so this might suggest that the following would be useful:

- a) To enhance uptake and application of expenditure analysis, and enhance consistency of approaches, it would be useful to provide enhanced advice and support to help developing countries to undertake such assessment, including longer-term.

129. The synthesis review has found that many developing countries are creating the enabling conditions to increase the access and mobilization of funding for adaptation. There are good practice examples where countries have created the governance and institutional mechanisms to help enhance access, including with dedicated facilities, and supporting capacity building initiatives. These provide useful lessons for other countries. However, most action to date has focused to date on public finance.

130. There are also some emerging examples where developing countries are creating the enabling conditions for other sources of finance and piloting new financial instruments. To further the conditions for resource mobilisation the following are highlighted.

- a) 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 capacity building that enhance the governance and capacity around finance in countries. These can draw on existing good practice examples;
- b) There is an opportunity to support more innovative approaches that are being undertaken by a smaller number of developing countries, which look to widen sources of finance and financial instruments, including the use of blended finance. It would be useful to support these initiatives and develop these into best practice examples, then use these to disseminate lessons on the enabling conditions for innovative finance.

131. There are a broader set of enabling conditions that can help advance the analysis of the costs of adaptation and domestic expenditures, and their application to adaptation programming. This includes the mainstreaming (integration) of these elements into public financial management and national development planning. Such actions can help improve the governance for 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 potential lessons for other developing countries:

- a) It would be useful to promote more upstream and strategic analysis and promote greater integration in country development and financial planning, perhaps through a series of pilot studies.

132. There would be benefits from enhancing the monitoring, evaluation and learning on domestic expenditures and enabling conditions for finance and seeking to establish information and knowledge sharing initiatives across developing countries.

5. Key findings, experiences, and insights

5.1. Key findings and insights

133. 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 Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs) and other communications. Almost half of developing countries have now provided adaptation cost estimates in their latest NDC updates and recent NAPs.

134. 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 significantly 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 small number of developing countries have used other methods, and these provide good practice examples to support adaptation programming.

135. There are also now a number of developing countries that have assessed domestic expenditures on adaptation, though this number is still relatively low. Such assessments are challenging to do but they have considerable benefits.

136. The synthesis review has also found that many developing countries are creating the enabling conditions to increase the access and mobilization of funding for adaptation, particularly for public sources. There are good practice examples where countries have created the governance and institutional mechanisms for this, including with dedicated facilities. There are also developing countries that are now also extending these enables to consider new sources of finance and new financial instruments and approaches. These require additional capacity and skills, but they offer the potential for widening access to finance.

5.2. Lessons and further needs

137. A number of lessons emerge from the review. These indicate areas of further needs for developing countries to advance the costing of adaptation and analysis of domestic expenditures as well as the creation of enabling conditions. Many of these build on the good practice already initiated by some countries. Some of these relate to technical issues and some are capacity gaps.

138. There are some areas where developing country analysis of the costs of adaptation could be improved. First and foremost, this includes more comprehensive, consistent and detailed assessment across all countries, i.e., what might be termed good practice. Complementing this, there could be improvements from including more analysis on the quantitative impacts of climate change and adaptation benefits (including as part of appraisal of costs and benefits). There would also be benefits from the addition of more strategic (upstream) analysis and longer-term estimates, as well as downstream costed investment plans. These indicate possible further needs could be:

- a) Improved guidance and support material (including information, best practice examples), to help developing countries provide more detailed and comprehensive estimates of the costs of adaptation. This would also help increase harmonisation and comprehensiveness, and thus also enhance adaptation finance needs assessment;
- b) To provide best practice examples in more innovative areas, where there has been less demonstration by most countries do date, for example, for strategic and longer-term analysis, gender inclusion, etc;
- c) To provide greater levels of capacity building and technical assistance support to developing countries for estimating the cost of adaptation.

139. There are also lessons on the analysis of domestic expenditures that indicate areas of future needs. The uptake of these assessments is lower than with the costs of adaptation, even though these studies are found to have considerable benefits. This indicates there are barriers to these implementation (e.g., complexity,

expertise needed, and resources) and there is also considerable variation in analysis methods. This indicates possible further needs as:

- a) Enhanced advice and support to help developing countries to undertake such assessment.

140. With respect to the enabling conditions to increase the access and mobilization of funding for adaptation, a key lesson is that developing countries are demonstrating good practice examples, with the governance arrangements and capacity building to facilitate resource mobilisation for public sources of finance. However, the progress on creating the conditions to scale up other sources of finance and new financial instruments and models is at an earlier stage. This indicates possible further needs could be:

- a) To provide further guidance and support to enable developing countries to increase activities to scale-up and access public sources of finance, especially through enabling conditions on governance and capacity, such as facility models. These can draw on existing good practice examples;
- b) To support more innovative approaches that are being undertaken by a smaller number of developing countries, which widen sources of finance and financial instruments to blended finance. These could be used to develop best practice examples, and to disseminate lessons to other countries.

141. Finally, there are a number of broader cross cutting issues that are highlighted that could help catalyse the use of adaptation costing and domestic expenditure analysis in more strategic and systemic adaptation programming. This indicates further needs could be

- a) To provide enhanced advice and support, including potential pilot studies, to mainstream adaptation costing, expenditure analysis and the establishment of enabling conditions into to country national development planning and financial management;
- b) To enhance the monitoring, evaluation and learning on adaptation costs, domestic expenditures, and enabling conditions and seek to establish information and knowledge sharing initiatives across developing countries.

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Documentation information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	30 August 2022	AC22 This draft synthesis report is for final comments and final approval by the AC.

Keywords: Resilience, developing country Parties, costs, Adaptation
