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Recognizing the adaptation efforts of developing country Parties: draft synthesis report on strengthening integrated knowledge, science, technology and data systems to advance adaptation action and reporting

Draft Synthesis report

Recommended action by the Adaptation Committee

The Adaptation Committee (AC), at its 30th meeting, will be invited to consider this zero-draft paper and provide further guidance to the secretariat on its further refinement, finalization and publication.

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I. Introduction

A. Mandate

1. In decision 11/CMA.1,[1] the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) requested the UNFCCC secretariat, under the guidance of the Adaptation Committee (AC) and the Least Developed Countries Expert Group (LEG) and in collaboration with relevant stakeholders, to prepare biennial synthesis reports starting in 2020. These reports are intended to recognize the adaptation efforts of developing country Parties, focusing on specific themes, lessons learned and good practices.

2. The CMA recalled that the global stocktake will review the overall progress made in achieving the global goal on adaptation, and acknowledged that adaptation efforts contribute to that objective.[2]

3. Three synthesis reports have been prepared to date:

(a) Addressing climate hazards;[3]

(b) Assessing and meeting the costs of adaptation;[4]

(c) Institutional arrangements and stakeholder engagement across the iterative adaptation cycle.[5]

B. Scope

4. The objective of the 2026 synthesis report is to recognize and synthesize lessons learned and good practices from developing country Parties in establishing and strengthening integrated knowledge, science, technology and data systems to advance adaptation action and reporting.

5. The report follows the four elements of the iterative adaptation cycle: risk, impact and vulnerability assessment; adaptive capacity assessment; adaptation planning; implementation; and monitoring, evaluation and learning and examines how developing countries have established and used knowledge, science, technology and data systems for the implementation of these elements and which gaps and challenges remain.

6. The report:

(a) Highlights country-driven efforts across the iterative adaptation cycle;

(b) Demonstrates how strengthened systems support assessments, planning, implementation and measurable progress;

[1] Decision 11/CMA.1 Available at https://unfccc.int/sites/default/files/resource/cma2018_03a01E.pdf.

[2] Paris Agreement, Article 7, paragraph 14. Available at https://unfccc.int/sites/default/files/resource/parisagreement_publication.pdf

[3] Available at https://unfccc.int/process-and-meetings/bodies/constituted-bodies/publications-bulletin/how-developing-countries-are-addressing-hazards-focusing-on-relevant-lessons-learned-and-good.

[4] Available at https://unfccc.int/node/632920.

[5] Available at http://unfccc.int/documents/647093.

(c) Provides relevant input to the AC's work under paragraphs 44 and 45 of decision 2/CMA.5;[6]

(d) Ensures balanced regional representation and context-sensitive analysis;

(e) Recognizes less visible yet critical areas of technological and systems support, beyond those already well-documented under other processes;

(f) Captures gaps, constraints and barriers alongside progress, to provide a complete picture of adaptation efforts.

7. Throughout, the analysis emphasizes lessons learned and good practices related to tangible adaptation outcomes; means of implementation; enabling institutional arrangements; inclusion of diverse knowledge systems, including local and traditional knowledge; cross-cutting considerations, including gender equality; and entry points for strengthening reporting coherence and effectiveness.

C. Sources of information

8. The report draws from country-submitted information, prioritizing information from the most recent available versions of national adaptation plans (NAPs), nationally determined contributions (NDCs), adaptation communications, biennial transparency reports (BTRs), and national communications, as well as the AC's interactive portal on the state of adaptation action by Parties[7] and related knowledge products; relevant work under other constituted bodies; publications and tools from constituted bodies and UN entities; peer-reviewed literature, academic and other technical materials; and direct inputs from selected case study countries, where appropriate.

9. It also contains case studies related to the topic, reflecting regional diversity, sectoral variety with flexibility to address previous coverage gaps, and alignment with the theme.

II. Enabling adaptation action through strengthened systems

A. Integrated knowledge, science, technology and data systems and why they matter for adaptation

10. This report considers **data systems** as the observation networks, statistical platforms and reporting architecture that generate and organize climate-relevant information; **science systems** as the research, assessment and advisory arrangements that turn that information into usable evidence, consistent with the Paris Agreement's call to strengthen scientific knowledge on climate through research, systematic observation and early warning systems;[8] **technology systems** as the tools, infrastructure and institutional arrangements, including the Technology Mechanism established at COP 16,[9] through which countries develop, deploy and access adaptation-relevant technologies; and **knowledge systems** as the arrangements, including local and traditional knowledge systems and in relation to the Nairobi work programme,[10] through which lessons and good practices are captured, exchanged and fed back into the iterative adaptation cycle. These four systems are described as integrated because, in practice, they operate as a single pipeline. Data generated through one system supports the science conducted through another; technology depends on both; and knowledge

[6] Decision 2/CMA.5, paras. 44–45. Available at https://unfccc.int/sites/default/files/resource/cma2023_16a01E.pdf.

[7] Available at https://unfccc.int/adaptation_country_portal

[8] Paris Agreement, Article 7, paragraph 7(c). Available at https://unfccc.int/sites/default/files/resource/parisagreement_publication.pdf.

[9] Decision 1/CP.16, establishing the Technology Mechanism, comprising the Technology Executive Committee and the Climate Technology Centre and Network. Available at https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf.

[10] Decision 2/CP.11. Available at https://unfccc.int/sites/default/files/decision_2cp11.pdf.

systems capture and circulate the resulting insights. Consequently, a weakness in any one system constrains what the others can deliver.

11. Adaptation action depends on the continuous functioning of these systems throughout the iterative adaptation cycle, from risk, impact and vulnerability assessment, through planning and implementation, to monitoring, evaluation and learning. Article 7, paragraph 14, of the Paris Agreement provides the basis for recognizing the adaptation efforts of developing country Parties, while the global stocktake reviews collective progress towards the global goal on adaptation. The quality of that review depends heavily on the systems that generate, organize and communicate the underlying evidence. The UAE Framework for Global Climate Resilience, adopted through decision 2/CMA.5, makes this connection explicit through its seven thematic targets (para. 9) and four dimensional targets aligned with the iterative adaptation cycle (para. 10). Progress towards these targets cannot be effectively tracked, reported or translated into action without the systems examined in this report. Strengthened knowledge, science, technology and data systems are therefore not peripheral enablers of adaptation; they are essential to making progress across the cycle visible and reportable.

12. The integration of these systems into adaptation planning and implementation has been progressively mandated and encouraged since the Convention, which commits Parties to promote research, systematic observation and the development of data archives related to the climate system, and to promote the full and open exchange of related scientific, technological and technical information.[11] The Nairobi work programme, established in 2005 to help Parties improve their understanding of impacts, vulnerability and adaptation, created an early knowledge-sharing structure that the UNFCCC now describes as its knowledge-to-action hub for adaptation and resilience. The Technology Mechanism, comprising the Technology Executive Committee and the Climate Technology Centre and Network, was established in 2010 to support the development and transfer of technologies, including adaptation.

13. The Paris Agreement set out, in Article 7, paragraph 7, dedicated cooperation provisions on strengthening scientific knowledge, institutional arrangements and information-sharing for adaptation, and decision 11/CMA.1, adopted in 2018, anchored the mandate to prepare the biennial synthesis reports recognizing developing country Parties' adaptation efforts, of which this is the fourth in the series.

14. The AC's 2020 data paper[12] then took stock of this evolving mandate, mapping the state of adaptation-relevant data and information systems across developing country Parties and establishing an early evidentiary baseline for further work. The adoption of the UAE Framework for Global Climate Resilience at CMA.5 then marked a turning point: for the first time, the Framework's thematic and dimensional targets gave Parties and constituted bodies a shared structure against which knowledge, science, technology and data efforts could be organized and assessed, instead of being treated as a diffuse cross-cutting concern.

15. Most directly relevant to this report's theme is the Belém Adaptation Indicators,[13] which provide a process for connecting national data and reporting systems to a common global framework. This report's focus on strengthening integrated systems responds directly to that work by recognizing what developing country Parties have already built, ahead of a period in which national systems will increasingly need to align with a common set of global indicators.

1. Data systems

16. Effective adaptation planning depends on a country's ability to generate, manage and translate climate observations into information and knowledge for effective policy and decision-making. It spans hydrometeorological services, national statistical offices'

[11] United Nations Framework Convention on Climate Change, Article 4, paragraph 1(g)–(h). Available at https://unfccc.int/resource/docs/convkp/conveng.pdf.

[12] Available at https://unfccc.int/sites/default/files/resource/AC%20adaptation%20data%20full.pdf.

[13] Decision 12/CMA.7, paras. 5–6. Available at https://unfccc.int/sites/default/files/resource/cma2025_19_a02.pdf.

integration of climate variables, and geospatial platforms that convert raw data into risk maps, early warning products and planning inputs.

17. Developing country Parties have taken varied paths to building this infrastructure, from establishing dedicated climate data units within national meteorological services to embedding climate indicators within existing statistical systems, often constrained by the technical and financial capacity needed to sustain observation networks over time. The strength of these underlying systems shapes the quality of the systems built on top of them, from vulnerability assessments to national reporting. Data compiled through the WMO Global Framework for Climate Services indicates that where such systems are institutionalized and adequately resourced, countries are better placed to convert climate information into usable products for adaptation decision-making, whereas donor-dependent or project-based systems tend to lapse once external funding ends.[14]

2. Science systems

18. Science–policy interfaces comprise institutional arrangements, technical advisory bodies, inter-ministerial working groups and national research partnerships that connect the generation of climate science with its use in policy, consistent with the Paris Agreement's call to strengthen scientific knowledge on climate adaptation. They draw on international assessments, including contributions from IPCC Working Group II,[15] as well as evidence generated by domestic academic and research institutions. Their effectiveness often depends less on the sophistication of science itself than on whether formal channels exist to introduce scientific and technical information into planning processes at the appropriate stage of the adaptation cycle, and on whether technical staff have sufficient authority and resources to translate findings into accessible, usable information for non-specialist policymakers.

19. Peer-reviewed research on science–policy interfaces for adaptation finds that the availability of scientific and technical information does not, by itself, ensure its use in decision-making. Whether evidence informs planning outcomes is often shaped by institutional and relational barriers, competing incentives and limited two-way communication between researchers and policymakers.[16] Complementary analysis of the science-policy-practice interface highlights the role of intermediary and boundary-spanning institutions in bridging this gap, pointing to knowledge-brokering functions that developing-country institutions could strengthen.[17]

20. Indicators translate adaptation action into information that can be tracked and reported. National indicator frameworks vary considerably in maturity: some Parties have adopted formal, sector-specific indicator sets embedded in their NAPs or NDCs, while others rely on narrative progress reporting without a defined indicator architecture. The recent adoption of the Belém Adaptation Indicators has increased attention on how countries define, collect and report indicator-based evidence of adaptation progress. Recent analysis suggests that translating these global indicators into usable national and subnational metrics, while avoiding an additional reporting burden on developing countries, will be a key determinant of whether they inform real decision-making instead of functioning as a stand-alone reporting exercise.[18]

[14] World Meteorological Organization, “The Global Framework for Climate Services – Innovation and Adaptation”. Available at https://wmo.int/media/magazine-article/global-framework-climate-services-innovation-and-adaptation.

[15] IPCC, Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2022. Available at https://www.ipcc.ch/report/ar6/wg2/.

[16] Sova, C. et al., “Strengthening the science-policy interface for climate adaptation: stakeholder perceptions in Cameroon”, Regional Environmental Change (2018). Available at https://link.springer.com/article/10.1007/s10113-018-1441-4.

[17] CGIAR/CCAFS, “Analyzing the science-policy-practice interface in climate change adaptation work”. Available at https://ccafs.cgiar.org/research/projects/analyzing-science-policy-practice-interface-climate-change-adaptation-work.

[18] Tanguy, A., Buffet, C. and Magnan, A.K., “Adaptation at COP 30: Indicators at the Heart of the Debate”, IDDRI, 27 November 2025. Available at https://www.iddri.org/en/print/pdf/node/27610.

21. The UAE–Belém work programme[19] concluded at CMA.7 with the adoption of 59 Belém Adaptation Indicators for the targets of the UAE Framework for Global Climate Resilience. These indicators are now creating a reference point against which national indicator efforts can align. This report considers how far developing country Parties' existing frameworks already anticipate that alignment, or where gaps remain. Reporting frameworks under the enhanced transparency framework add a further layer, requiring indicator systems that can feed both domestic MEL processes and international reporting obligations without duplicating effort.

3. Technology systems

22. Technology systems comprise the tools, infrastructure and institutional arrangements through which developing country Parties develop, deploy and access adaptation-relevant technologies, from early warning and monitoring equipment to geospatial and modelling platforms. The Technology Mechanism, comprising the Technology Executive Committee and the Climate Technology Centre and Network, provides the principal institutional channel under the Convention and the Paris Agreement for technology needs assessment, policy guidance and implementation support.

23. No developing country Party builds these systems in isolation. South-South cooperation, regional centers, United Nations entities and other constituted bodies under the Convention and the Paris Agreement provide technical support and peer-learning opportunities.

24. The report focuses on capacity-building efforts that develop durable national capabilities as opposed to one-off technical assistance and examines institutional partnerships that enable countries to sustain and update their systems over time. OECD analysis of capacity-building for climate action in developing countries highlights the value of sustained, demand-driven and nationally led capacity development over short-term, externally driven training. Similarly, partnerships between national institutions and universities or research bodies can strengthen national capacity to generate, interpret and apply climate information through co-produced research and long-term institutional twinning.[20]

4. Knowledge systems

25. Knowledge systems comprise the arrangements through which developing country Parties capture, validate and share lessons, good practices and traditional and local knowledge relevant to adaptation, and feed them back into planning and implementation. The Nairobi work programme performs part of this function at the multilateral level, while the Local Communities and Indigenous Peoples Platform provides a dedicated channel for integrating the knowledge, innovations and practices of indigenous peoples and local communities into adaptation action.[21]

26. National equivalents of these arrangements range from formal traditional-knowledge registers to informal networks of extension officers and community organizations that relay field-level lessons to national planning bodies. Where they exist, such arrangements determine whether lessons generated through implementation and monitoring, evaluation and learning are reflected in the next round of planning or only recorded in project-completion reports.

B. Contributions across the adaptation cycle

27. The case studies reviewed for this report are preliminary and more will be solicited to ensure coverage. The observations below therefore describe progress and gaps by system,

[19] Decision 2/CMA.5, paragraph 39.

[20] OECD, Strengthening Capacity for Climate Action in Developing Countries (2022). Available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/05/strengthening-capacity-for-climate-action-in-developing-countries_a8108519/0481c16a-en.pdf.

[21] Decision 1/CP.21, as elaborated by decision 2/CP.23. Available at https://unfccc.int/files/home/application/pdf/decision1cp21.pdf.

drawing on the case studies examined (Uruguay, Burkina Faso, Cambodia, Jordan, Egypt, Mexico, Vanuatu, Solomon Islands, Benin, the Philippines, Morocco and the Dominican Republic)[22] as illustrative examples, not as a representative sample.

Table II.1
Case studies at a glance[23]

Section	*Party*	*Key institution/instrument*
Risk/vulnerability	Uruguay	NAP-Cities multi-hazard assessment (4 cities)
Risk/vulnerability	Burkina Faso	ANAM observation network / University of Ouagadougou modelling
Planning	Cambodia	NDC 75-measure indicator matrix
Planning	Jordan	National Climate Change Policy (2022–2050)
Planning	Egypt	National Climate Change Strategy 2050 indicators
Implementation	Mexico	CONAGUA network / National Atlas of Vulnerability
Implementation	Vanuatu	VMGD network/sector indicator targets
Implementation	Solomon Islands	Meteorological Observation Systems project
MEL	Benin	Two-level MEL mechanism (MCDVV/DPP)
MEL	Philippines	RBMES / NCCAP M&E report
MEL	Morocco	SIREDD/OREDD regional MEL system
MEL	Dominican Republic	SNMyE integrated with ETF

2. Risk, impact and vulnerability assessment and adaptive capacity assessment

28. Across the case studies reviewed in this section, approaches to risk and vulnerability assessment range from dense national observation networks supplemented by international climate modelling to sectoral, city-level multi-hazard mapping that directly informs local planning. Both approaches illustrate how developing country Parties combine domestically generated data with external scientific inputs to build the evidence base for adaptation decision-making at national and subnational levels, respectively.

(a) Case study: Uruguay's multi-hazard climate risk assessment across four urban areas under the NAP-Cities process

29. Uruguay adopts a sectoral and regional approach to adaptation planning, with dedicated NAPs for agriculture, cities and infrastructure, and coastal areas. The formulation of each sectoral NAP begins with an assessment of vulnerability to multiple hazards in key vulnerable areas, integrating future climate scenarios and region-specific projections into the planning process.

30. Under the NAP-Cities process, Uruguay conducted a multi-hazard climate risk assessment in four urban areas: inland Canelones; the border city of Rivera; coastal Juan Lacaze; and the Pantanoso stream area of Montevideo, the capital. The locations were selected to reflect a range of climate-risk profiles. Municipal authorities and technical staff

[22] This list draws on the sample of Parties reviewed for this report (Uruguay, Burkina Faso, Cambodia, Jordan, Mexico, Vanuatu, Benin, the Philippines, Egypt, Morocco, Solomon Islands and the Dominican Republic), so they should be read as illustrative examples, not a representative or comprehensive sample.

[23] All case studies are drawn from the country review process (national reports and communications, cross-checked against the AC's country-profile portal).

contributed directly to the assessment and played a central role in translating its findings into local adaptation plans.

31. Agreements with national academic institutions, including the faculties of sciences; architecture, design and urbanism; engineering; and information and communication, helped generate the evidence needed to identify adaptation options for the key climate threats facing each city. The resulting multi-hazard risk maps inform social policy by clarifying the environmental conditions to which populations are exposed, and habitat policy by identifying areas with deficiencies in infrastructure, services or housing.

32. A dedicated communication strategy positioned training as a core component of the NAP-Cities project. Two annual capacity-building plans have been developed to date in response to identified needs, with gender considerations integrated throughout all training and education activities.

33. Lessons learned: Embedding the multi-hazard assessment within a cities-focused sectoral NAP, instead of conducting a single national assessment, enabled Uruguay to tailor risk information to each city's hazard profile while applying a shared methodology that supports national-level comparability. The direct participation of local technical staff further strengthened the link between risk information and local adaptation planning.[24]

(b) Case study: Burkina Faso's national observation network and university-partnered climate modelling

34. Burkina Faso's approach to risk, impact and vulnerability assessment is underpinned by a multi-instrument observation network managed by the National Meteorological Agency (ANAM). The network comprises 10 synoptic stations, 14 agrometeorological stations, 9 climate stations, 104 rainfall stations and 262 automatic weather stations. This infrastructure enables the country to generate the localized climate data required for risk and vulnerability assessments, reducing reliance on global and regional datasets alone.

35. Burkina Faso complements its national observations with both international projections and domestically generated climate modelling. Its adaptation communication cites a 2021 study by the Potsdam Institute for Climate Impact Research, based on the SSP1-RCP2.6 and SSP1-RCP6.0 scenarios, and a 2022 study using the SSP3-RCP7.0 and SSP1-RCP2.6 scenarios. During the NAP process, the University of Ouagadougou's Mathematical Equation Analysis Laboratory also analysed national climate trends for 1980–2010. Together, these inputs combine international projection science with historical trend analysis produced by a national academic institution.

36. Lessons learned: Burkina Faso's experience shows how a dense domestic observation network and a national academic partnership can complement, not replace, international climate science. By combining Potsdam Institute projections with modelling by the University of Ouagadougou, the NAP process strengthens the credibility and local specificity of the resulting risk assessment. However, the time gap between the university's 1980–2010 trend analysis and the 2021–2022 projection studies points to the value of updating historical trend analysis in future NAP cycles.[25][26]

37. Common to both cases is the pairing of a national or sub-national data-generation function with academic or international modelling partnerships. Uruguay's university faculties and Burkina Faso's University of Ouagadougou laboratory each anchor domestically

[24] Ministry of Housing and Land Planning (MVOT) and the Ministry of Environment (MA), "National Adaptation Plan to Climate Change and Variability for Cities and Infrastructures in Uruguay (NAP-Cities)". 2021. Available at https://unfccc.int/sites/default/files/resource/NAP_Cities_and_Infrastructure__Uruguay_Executive_Summary_ENG.pdf

[25] Government of Burkina Faso, National Climate Change Adaptation Plan (NAP), 2015. Available at https://unfccc.int/sites/default/files/resource/NAP_Burkina_Faso_2015_EN.pdf.

[26] Government of Burkina Faso and NAP Global Network, Evaluation of Burkina Faso's National Climate Change Adaptation Plan (NAP) 2015–2020: Final Report, 2021. Available at https://napglobalnetwork.org/wp-content/uploads/2021/10/napgn-en-2021-evaluation-burkina-faso-nap-2015-2020.pdf.

led scientific input alongside international projection studies. This suggests that risk and vulnerability assessment capacity depends as much on the design of institutional partnerships as on the volume of observational data collected.

Table II.2
National observation infrastructure referenced across case study countries

Party	*Network*	*Station count/type*
Burkina Faso	ANAM	10 synoptic, 14 agromet, 9 climate, 104 rainfall, 262 AWS
Cambodia	—	200 rainfall, 50 manual + 12 automated hydrological
Jordan	JMD / Ministry of Water and Irrigation	28 + 147 stations
Philippines	PAGASA / NAMRIA-CGSD	79 weather, 28 stream gauges, 102 rain gauges, 4 Dopplers
Mexico	CONAGUA	3,815 total (809 hydrometric, 3,006 climatological)
Vanuatu	VMGD	8 synoptic, 1 climate, 10 AWS, 52 manual + 4 automatic rain gauges

3. Adaptation planning

38. The three cases below show varied planning architectures: one embeds verification mechanisms directly into a quantified measures matrix, the other establishes an overarching policy framework designed to coordinate, rather than replace, a country's other planning instruments.

(a) Case study: Cambodia's measure-level indicator matrix linking planning to verification

39. Cambodia’s adaptation planning is anchored in a detailed matrix in its third NDC. The matrix covers 75 adaptation measures, each linked to baseline indicators, targets and sources of verification. This structure connects planning decisions directly to mechanisms for assessing whether measures have subsequently been implemented. It is complemented by an institutional readiness indicator that is already in use, while a broader framework is being developed to track the delivery of the Climate Change Adaptation Policy through results, output and impact indicators, as described in Cambodia’s first Biennial Transparency Report.

40. Cambodia’s observation infrastructure comprises 200 rainfall stations, still below the density required for full national coverage, and 50 manual and 12 automated hydrological stations, including seven located along the Mekong, Bassac and Tonle Sap rivers. Its monitoring framework combines upstream indicators covering institutions, policy integration, financing, capacity, equity and stakeholder engagement with downstream indicators covering development outcomes, emissions, vulnerability, climate trends and extreme events. These are complemented by the institutional readiness indicator, the public data portal and the 75-measure NDC matrix.

41. Cambodia has also established a public data portal,[27] which includes the institutional readiness indicators and makes planning-stage indicator data available beyond formal reporting cycles. Gender considerations are reflected in climate finance data: in 2023, weighted gender spending accounted for 5.5 per cent of overall external climate programmes, while 66 per cent of climate-related official development assistance was gender-relevant. This support was concentrated in disaster management, rural infrastructure, rural electrification, fisheries, social protection reform and water resources management.

42. Lessons learned: Integrating sources of verification directly into the planning instrument, instead of treating monitoring and evaluation as a separate downstream exercise, gives Cambodia’s NDC a built-in accountability structure from the outset. The combination

[27] Available at https://ncsd.moe.gov.kh/dcc/data-portal.

of institutional readiness indicators, which assess whether the systems required for delivery are in place, with output and impact indicators that track results, offers a useful model for countries whose planning and monitoring, evaluation and learning capacities are developing at different rates.[28][29]

43. Whereas Cambodia's planning instrument adopts a bottom-up approach based on measure-level indicators, Jordan uses a top-down coordinating framework that organizes sectoral action under a single overarching policy.

(b) Case study: Jordan's National Climate Change Policy as a cross-sectoral planning framework

44. Jordan's 2022–2050 National Climate Change Policy (CCP) is designed as an overarching, non-prescriptive framework for mainstreaming climate change into every sectoral policy, strategy and action plan, rather than a standalone adaptation plan. It sets out adaptation policies and actions across eight sectors: water, agriculture, ecosystems and biodiversity, health, urban development, coastal zones, cultural heritage and adaptive capacity, with each sector's interventions mapped out in tabular form. This is an update to Jordan's earlier 2013–2020 policy that explicitly incorporated lessons learned from that first cycle.

45. The Jordan Meteorological Department runs 28 meteorological stations; the Ministry of Water and Irrigation runs a further 147, together providing daily station-level data on precipitation, minimum/maximum temperature, mean wind speed and relative humidity.[30][31]

46. The two cases in this subsection show distinct entry points for strengthening evidence-based planning. Cambodia embeds quantified measures and verification mechanisms directly within its planning instrument, while Jordan uses a cross-sectoral coordinating framework to align multiple planning instruments. Neither approach is inherently stronger; the choice generally reflects the country's existing institutional landscape and the number of sectoral strategies already in place when the framework is introduced.

(c) Case study: Egypt's goal-linked indicators under the National Climate Change Strategy 2050

47. Egypt's National Climate Change Strategy 2050 establishes four adaptation goals, each supported by corresponding performance indicators. These include the percentage of health-sector teams trained to address climate-related health risks; the area of agricultural land; the volume of water consumed per feddan of agricultural land; the amount of water collected from flash floods; and the length of road networks equipped to withstand climate impacts.

48. The indicator set also integrates gender-responsive measures directly into the planning framework. These include the number of research outputs that collect and use sex-disaggregated data; the percentage of policies that provide for women's active participation in establishing financing criteria and allocating resources for climate change initiatives; and the percentage of national policies and action plans that incorporate measures specifically addressing women.

49. Lessons learned: Egypt's model differs from Cambodia's measure-level matrix and Jordan's cross-sectoral coordinating framework by linking indicators to a limited number of strategic goals and not to individual measures or sectors. Integrating gender-responsive

[28] Cambodia, First Biennial Transparency Report (BTR1), 2024. Available at https://unfccc.int/documents/645175.

[29] Cambodia, Nationally Determined Contribution (NDC 3.0), 2025. Available at https://unfccc.int/sites/default/files/2025-08/Cambodia-NDC%203.0_0.pdf.

[30] Jordan, Second Biennial Update Report (BUR2), 2021. Available at https://unfccc.int/sites/default/files/resource/Jordan%E2%80%99s%20Second%20Biennial%20Update%20Report%20for%20web%2010-5.pdf.

[31] Jordan, Fourth National Communication (NC4), 2022. Available at https://unfccc.int/sites/default/files/resource/Hashemite%20Kingdom%20of%20Jordan%204th%20National%20Communication.pdf.

indicators as standard performance measures within the same framework, instead of placing them in a separate cross-cutting annex, provides an additional model for structurally embedding gender considerations in adaptation planning. This approach is distinct from the standalone treatment applied elsewhere in this report to means of implementation.[32][33]

Table II.3
Overview of adaptation planning architectures profiled above (Cambodia, Jordan, Egypt)

Party	*Structuring logic*	*Verification / monitoring mechanism*	*Gender integration*
Cambodia	Measure-level matrix: 75 adaptation measures in the third NDC, each linked to baseline, target and source of verification (bottom-up).	Verification built directly into the planning instrument; complemented by an institutional-readiness indicator and a public data portal.	Not addressed as a distinct planning indicator; reflected instead in climate-finance tracking (gender-weighted ODA data).
Jordan	Overarching cross-sectoral coordinating policy (2022–2050 National Climate Change Policy) mainstreaming adaptation across eight sectors (top-down).	Coordinated through existing sectoral planning and reporting instruments; no dedicated measure-level verification matrix described.	Not addressed as a distinct feature in the case study.
Egypt	Goal-linked indicators: four strategic adaptation goals under the National Climate Change Strategy 2050, each with supporting performance indicators (goal-based).	Performance indicators are tied directly to strategic goals and not to individual measures or sectors.	Gender-responsive indicators embedded as standard performance measures within the same framework (e.g. sex-disaggregated research outputs, women's participation in resource allocation).

4. Implementation of adaptation actions

50. The three cases show how dedicated data and indicator systems support implementation alongside adaptation actions, reflecting that implementation and MEL are often more closely integrated in practice.

(a) Case study: Mexico's national monitoring infrastructure and indicator-based M&E system

51. The National Water Commission (CONAGUA) operates 3,815 climatic and hydrological monitoring stations across Mexico, comprising 809 hydrometric stations and 3,006 climatological stations. Impact studies covering species distribution, ecosystems, islands, coastal regions, urban areas, soil, agriculture and water informed the National Atlas of Vulnerability to Climate Change. Using historical data and future scenarios analysed at the municipal level, and incorporating gender variables, the Atlas supports adaptation decision-making.

52. Mexico’s M&E framework for adaptation comprises 77 indicators: context indicators that guide adaptation processes, management indicators, and impact indicators used to monitor and evaluate climate change adaptation across the country. From 2017 to 2020, the project “Construction of monitoring and evaluation schemes for adaptation in Mexico for evidence-based public policy formulation” strengthened national adaptation M&E. Its conceptual approach first monitors changes in vulnerability, then evaluates adaptation measures from design through implementation, and finally assesses outcomes at completion,

[32] Egypt, First Updated Nationally Determined Contribution, 2022. Available at https://unfccc.int/sites/default/files/NDC/2022-07/Egypt%20Updated%20NDC.pdf.pdf

[33] Egypt, First Biennial Update Report (BUR1), 2019. Available at https://unfccc.int/sites/default/files/resource/BUR%20Egypt%20EN.pdf.

feeding the findings back into the next cycle. Mexico is also working to establish and consolidate M&E mechanisms within the Information System on Progress in Transversality (SIAT-NDC) to report progress and results in reducing vulnerability.

53. Lessons learned: Mexico has also implemented the Transparency Agenda Information System of the Special Climate Change Programme (SIATPECC), through which compliance with actions committed under the 2021–2024 Special Climate Change Programme is reported. It is also developing SIAT-Subnational, which will enable all 32 federal entities to monitor and report their mitigation and adaptation actions. Together, these systems reflect a layered approach to building M&E infrastructure: CONAGUA's dense observation network generates the underlying data; the 77-indicator framework structures tracked; and the nested SIATPECC, SIAT-NDC and SIAT-Subnational platforms extend M&E capacity from the national to the subnational level.[34][35]

54. Vanuatu's implementation-stage systems follow a similar logic at a different scale.

(b) Case study: Vanuatu's meteorological network and sector-level indicator framework

55. The Vanuatu Meteorology and Geo-Hazards Department (VMGD) operates a national observation network comprising 8 synoptic stations, 1 climate station, 10 operational automated weather stations, 52 manual rain gauges and 4 automatic rain gauges. The synoptic and climate stations follow the World Meteorological Organization's Guide to Climatological Practices. The network is supplemented by Himawari satellite imagery available at intervals of 3–10 minutes. One upper-air observation station is currently non-operational, and Vanuatu does not yet conduct ambient air-quality or ocean observations.

56. Vanuatu's indicator framework establishes sector-specific targets. In agriculture, Target Ag1 aimed for 80 per cent of agricultural small and medium-sized enterprises and private-sector operators to generate sufficient income to meet essential household needs by 2022, under both normal and climate- or disaster-stressed conditions. In the water sector, Target Wa1 calls for all climate-vulnerable rural communities across the six provinces to develop drinking-water safety and security plans by 2030, while Target Wa2 calls for the declaration of six climate-resilient water protection zones by 2030. Progress is tracked through three categories: process indicators, outcome indicators and indicators linked to Vanuatu's National Sustainable Development Plan.

57. Lessons learned: The Government of Vanuatu has published an M&E framework specifying how progress against each indicator will be measured, including its baseline value and intended 2030 target. By pairing a small but well-documented observation network with sector-specific, time-bound targets, Vanuatu can track and report adaptation progress despite comparatively limited observational capacity. This approach may provide a useful reference for other small island developing States.[36][37]

58. Both Mexico's SIAT-NDC, SIATPECC and SIAT-Subnational systems and Vanuatu's sectoral indicator framework, covering Targets Ag1, Wa1 and Wa2, confirm that implementation-tracking infrastructure is often developed alongside the adaptation actions it monitors. This carries a direct implication for the monitoring, evaluation and learning subsection below: several of the MEL capabilities discussed there originate during implementation instead of being introduced later as a separate component.

[34] Mexico, First Biennial Transparency Report (BTR1), 2024. Available at https://unfccc.int/sites/default/files/resource/IBT1_libro_29ENE2025.pdf.

[35] Mexico, Nationally Determined Contribution (NDC 3.0) [Spanish], 2025. Available at https://unfccc.int/sites/default/files/2025-11/NDC%203.0%20M%C3%A9xico_spanish.pdf.

[36] Vanuatu, Revised and Enhanced First Nationally Determined Contribution 2021–2030, 2022. Available at https://unfccc.int/sites/default/files/NDC/2022-08/Vanuatu%20NDC%20Revised%20and%20Enhanced.pdf.

[37] Vanuatu, Third National Communication (NC3), 2021. Available at https://unfccc.int/sites/default/files/resource/Vanuatu%20Third%20National%20Communication%20Report.pdf.

(c) Case study: Solomon Islands' phased upgrade of climate observation infrastructure

59. The Solomon Islands Meteorological Service operates seven staffed weather stations, six automatic weather stations and 12 automatic rain gauges. Its observation infrastructure also includes the Honiara Sea Level Station, hosted under the Australian Aid-funded Pacific Sea Level and Geodetic Monitoring project as part of the Climate and Oceans Support Program in the Pacific, as well as two additional sea-level stations belonging to the Pacific Tsunami Warning System network. The country's own reporting identifies this network as inadequate, owing to budgetary constraints.

60. In response, Solomon Islands began implementing the Meteorological Observation Systems for Resilient Development project in 2025. The project will establish three new upper-air stations and rehabilitate eight existing surface stations, with the aim of improving the quality and reliability of meteorological data.

61. Lessons learned: Unlike the Mexico and Vanuatu cases, which describe established systems, the Solomon Islands example captures a country that has identified gaps in its infrastructure and initiated a phased response: rehabilitating existing stations while expanding into new areas of observation. This complements the other cases in this subsection by demonstrating that recognition of adaptation efforts should encompass countries that are still building foundational capacity, not only those with mature systems already in place.[38][39]

5. Monitoring, evaluation and learning

62. The four cases in this subsection show distinct institutional approaches to sustaining MEL over time: Benin's permanent two-tier governance structure; the Philippines' scheduled review cycle and differentiated indicator framework; Morocco's regionally integrated information system; and the Dominican Republic's integration of M&E into transparency reporting.

(a) Case study: Benin's two-level MEL mechanism

63. Benin's monitoring, evaluation and learning system for adaptation operates through a two-tier mechanism. At the strategic level, the Ministry of Living Environment and Sustainable Development (MCDVV), through its Directorate of Planning and Programming (DPP), holds primary responsibility for adaptation M&E. At the operational level, the planning and programming departments of sectoral ministries work through Gender and Environment clusters and their respective planning and M&E services. The two tiers are integrated into the institutional framework of the National Policy for Climate Change Management and the National Climate Change Committee.[40]

64. Whereas Benin's model is structural, defining responsibilities at the strategic and operational levels, the Philippines' model is procedural, built around a fixed review cycle.

(b) Case study: The Philippines' NCCAP M&E report lessons

65. The Philippines launched a major research programme in 2008 to assess the potential effects of future climate scenarios on the country's ecosystems and population. This included the Nationwide Operational Assessment of Hazards programme, which brought together government agencies, the private sector, academia and development partners to apply modern technologies to disaster science research. The NCCAP M&E report identified six key lessons. First, modelled scenarios with appropriate baselines and time horizons should inform long-term adaptation planning. Second, resource mobilization should combine public investment, including the People's Survival Fund, with private-sector input and innovative financing approaches. Third, Climate Change Expenditure Tagging, applied across many national

[38] Solomon Islands, First Biennial Transparency Report (BTR1), 2025. Available at https://unfccc.int/sites/default/files/resource/Solomon%20Islands%20Biennial%20Transparency%20Report%201.pdf.

[39] Solomon Islands, Nationally Determined Contribution 3.0 (NDC3), 2025. Available at https://unfccc.int/sites/default/files/2025-09/Solomon%20Islands%20NDC%203.0.pdf.

[40] Government of Benin, National Adaptation Plan (NAP) [French], 2022. Available at https://unfccc.int/sites/default/files/resource/PNA_BENIN_2022_0.pdf.

agencies and some local government units, can help align agency budgets with projected risks. Fourth, mitigation co-benefits should be integrated into adaptation assessments. Fifth, delivery of the means of implementation under the Paris Agreement should be tracked and evaluated against needs-based, evidence-supported priorities. Finally, a reliable system should track physical, financial and social progress, supported by an inventory of policy levers and opportunities for scaling up; establishing such a system will require a reconfigured M&E structure and process.[41][42]

66. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) maintains 79 weather stations, 28 stream gauges, 102 rain gauges and 4 Doppler radars nationwide. The Oceanography Division of the Coast and Geodetic Survey Department within the National Mapping and Resource Information Authority (NAMRIA) also collects physical oceanographic data on tides, currents, temperature, salinity and depth. Under the 2023–2050 NAP, reviews take place at several levels and intervals: local and sectoral reviews are conducted annually; national reviews also take place annually; a detailed midterm assessment is carried out every three years; and the NAP is updated every five years. The framework distinguishes between immediate indicators, which assess plan effectiveness and enable early adjustment, and long-term impact indicators, which measure adaptive capacity, resilience and development progress. Sustainable Development Goal indicators are adapted where relevant, and each indicator has a defined measurement method and designated owner.

67. Taken together, the Benin and Philippines cases suggest that sustaining MEL depends on two complementary features: clear institutional ownership, seen in Benin's division of responsibilities between the strategic and operational levels; and a predictable review cycle that enables indicators to be reassessed periodically, reflected in the Philippines' annual, three-year and five-year reviews. The Philippine framework was refined after its first M&E report identified challenges related to attribution and baselines.

(c) Case study: Morocco's regionally integrated MEL system under SIREDD

68. With support from the Green Climate Fund and implementation by UNDP, Morocco established an M&E system overseen by the National Commission for Climate Change and Biological Diversity (CNCCDB). The system tracks implementation progress and coordinates the collection and processing of required data. Quarterly reporting has been proposed to support effective delivery of the workplan.

69. Instead of creating a standalone national MEL platform, Morocco's National Adaptation Plan (2020–2030) integrates adaptation monitoring into the Regional Information Systems for the Environment and Sustainable Development (SIREDD). Each region operates a SIREDD managed by a Regional Observatory for Environment and Sustainable Development (OREDD), with a climate change module containing adaptation indicators. These systems provide decision-support dashboards and spatio-temporal monitoring of key climate indicators for regional decision-makers. Morocco has also proposed formalizing the role of the Vulnerability and Adaptation Working Group (VA-WG) in coordinating NAP planning, monitoring and evaluation, together with a capacity-strengthening plan developed in partnership with the Climate Change Competence Centre (4C Morocco).

70. Lessons learned: Morocco's model differs from the other MEL cases in two respects: system development is externally supported through the GCF and UNDP, and its architecture is regional, not centralized, with each region operating its own SIREDD and OREDD instead of reporting solely to a single national body. Combined with the pending formalization of the VA-WG's coordinating role, this indicates that Morocco's data architecture is more advanced

[41] Philippines, Nationally Determined Contribution, 2021. Available at https://unfccc.int/sites/default/files/NDC/2022-06/Philippines%20-%20NDC.pdf.

[42] Philippines, National Adaptation Plan, 2024. Available at https://unfccc.int/sites/default/files/resource/NAP_Philippines_2024.pdf.

than its institutional governance. The case therefore shows that these two dimensions of MEL maturity do not necessarily progress at the same pace.[43][44][45]

(d) Case study: the Dominican Republic's M&E framework integrated into transparency reporting

71. The Dominican Republic has designed its M&E framework as an integral part of the enhanced transparency framework for tracking NDC progress, rather than as a parallel or standalone process. The National Monitoring and Evaluation System (SNMyE), which supports the framework, is being strengthened to integrate technical and social information. A dedicated system for identifying and classifying public expenditure on climate change and disaster risk management provides an additional layer of information. Qualitative and quantitative indicators have also been validated in consultation with sectoral stakeholders.

72. Lessons learned: Integrating M&E directly into the enhanced transparency framework helps the Dominican Republic avoid creating parallel systems that would later need to be reconciled. Combining indicator monitoring with a dedicated public-expenditure classification system also enables the Dominican Republic to track not only whether adaptation actions are being implemented, but also how much is being spent and where. This financial dimension is not explicit in the other MEL cases examined in this section.[46][47]

Table II.4
Overview of monitoring, evaluation and learning institutional models profiled above (Benin, Philippines, Morocco, Dominican Republic)

Party	*Institutional model*	*Oversight/coordination*	*Distinguishing feature*
Benin	Two-tier structural model: strategic level (Ministry of Living Environment and Sustainable Development, via its Directorate of Planning and Programming) and operational level (sectoral ministries' Gender and Environment clusters).	National Climate Change Committee, within the institutional framework of the National Policy for Climate Change Management.	Clear division of institutional responsibility between strategic and operational levels.
Philippines	Procedural model built around a fixed, multi-tiered review cycle (annual local/sectoral and national reviews, a three-year midterm assessment, and a five-year NAP update).	PAGASA and the NAMRIA oceanography division supply monitoring data; immediate and long-term impact indicators are distinguished, each with a defined measurement method and designated owner.	Predictable, calendarized review cycle, refined after the 2008 NCCAP M&E report identified challenges related to attribution and baselines.
Morocco	Regional integration: adaptation monitoring embedded within the	National Commission for Climate Change and Biological Diversity	Externally supported (GCF/UNDP) and regionally architected;

[43] Morocco, Fifth National Communication and First Biennial Transparency Report (combined submission) [French], 2024/2025. Available at https://unfccc.int/sites/default/files/resource/Morocco%20-%20Combined%20report%20-%205NC_BTR1.pdf.

[44] Morocco, Third Biennial Update Report (BUR3) [French], 2022. Available at https://unfccc.int/sites/default/files/resource/Morocco%20BUR3_Fr.pdf.

[45] Morocco, Adaptation Communication (National Adaptation Plan) [French], 2024. Available at https://unfccc.int/sites/default/files/resource/PNSA_Morocco_Fr.pdf.

[46] Dominican Republic, Nationally Determined Contribution (first NDC, updated submission) [Spanish], 2020. Available at https://unfccc.int/sites/default/files/NDC/2022-06/Dominican%20Republic%20First%20NDC%20(Updated%20Submission).pdf.

[47] Dominican Republic, First Biennial Transparency Report (BTR1) [Spanish], 2025. Available at https://unfccc.int/documents/655312.

	Regional Information Systems for the Environment and Sustainable Development (SIREDD) instead of running as a standalone national platform.	(CNCCDB); regional Observatories (OREDD); coordinating role of the Vulnerability and Adaptation Working Group proposed for formalization.	data systems are more advanced than institutional governance, illustrating that the two dimensions of MEL maturity need not progress at the same pace.
Dominican Republic	M&E fully integrated into the enhanced transparency framework rather than run as a parallel process, supported by the National Monitoring and Evaluation System (SNMyE).	Indicators validated in consultation with sectoral stakeholders; complemented by a dedicated system for classifying public expenditure on climate change and disaster risk management.	Explicit financial-tracking dimension (what is spent, and where) not present in the other MEL cases examined.

6. Cross-cutting dimensions: gender and means of implementation

73. Two dimensions cut across all four systems without constituting a system in their own right: gender-responsiveness and means of implementation.

74. Consistent with the cross-cutting considerations of the UAE Framework for Global Climate Resilience, this report considers the extent to which national systems collect and report sex-disaggregated data, and whether the processes used to design and operate those systems are themselves participatory and gender-responsive. Analysis of gender-responsive national adaptation plan processes indicates that this remains uneven across Parties, representing an area where good practice examples could usefully be recognized,[48] consistent with broader evidence that gender data gaps constrain the ability of climate information systems to reflect differentiated vulnerabilities, needs and adaptive capacities.[49] Gender is treated as a property of the systems examined throughout the report, how data is gathered, who is consulted, what is disaggregated, and not a standalone theme confined to one section.

75. Means of implementation, finance, technology development and transfer, and capacity-building are treated in this report as a distinct, standalone component instead of being subsumed under gender or other cross-cutting considerations. Throughout the case studies in section II, the report explicitly links the financial, technological and capacity-related support received by a country to the adaptation actions and systems that this support enables. As a result, recognition of a developing country's efforts ensures a clear account of the enabling conditions. Recent work on indicators for the enabling factors of adaptation implementation, including means of implementation, underscores the value of tracking such support as a distinct strand instead of a residual category, making the factors that enabled an adaptation outcome as visible as the outcome itself.[50]

[48] IISD/NAP Global Network, "Learning From Gender-Responsive National Adaptation Plan Processes: Insights from countries to inform the review of the UNFCCC Gender Action Plan". Available at https://www.iisd.org/articles/insight/gender-responsive-national-adaptation-plan-processes-unfccc.

[49] UN Women, Gender Data Strengthens Climate Change Preparedness and Response (policy brief, 2023). Available at https://wrd.unwomen.org/sites/default/files/2023-03/GenderDataPB.pdf.

[50] OECD/IEA Climate Change Expert Group, Insights for the Global Goal on Adaptation: Indicators for Enabling Factors for Implementation, Including Means of Implementation, CCXG Paper No. 2025(4) (October 2025). Available at https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/10/insights-for-global-goal-on-adaptation-indicators-for-enabling-factors-for-implementation-including-means-of-implementation_553e86d4/855b6231-en.pdf.

III. Barriers and challenges faced by developing countries

76. The case studies identify five recurring constraints that developing country Parties continue to face:

(a) **Insufficient observation coverage:** national observation networks may remain inadequate for full coverage, often because of explicit budgetary constraints (Solomon Islands and Cambodia).

(b) **Implementation gaps:** formal monitoring, evaluation and reporting frameworks may be adopted before the institutional capacity and resources needed to make them operational are in place (Egypt and Morocco).

(c) **Fragmented reporting:** overlapping instruments, NAPs, NDCs, BTRs and adaptation communications can create coordination and reporting burdens without a dedicated framework to align them. Jordan's cross-sectoral policy and the Dominican Republic's integration of M&E with the enhanced transparency framework reflect different responses to this challenge.

(d) **Uneven system maturity:** Components of a country's MEL system may develop at different rates, with data architecture advancing faster than institutional governance, or vice versa (Morocco).

(e) **Methodological challenges:** Once M&E systems become operational, they may reveal difficulties related to shifting baselines, attribution and the time lag between interventions and observable outcomes (the Philippines).

IV. Lessons learned and good practices

77. This section synthesizes cross-cutting findings from the case studies in section II in order to, firstly, recognize what developing country Parties have achieved in establishing and strengthening knowledge, science, technology and data systems, including where the support received has been limited; and secondly, to draw lessons on how those systems have contributed both to adaptation outcomes on the ground and to a country's ability to report on them under the enhanced transparency framework. It covers the common enabling factors observed across the case studies.

78. Knowledge systems are the least consistently documented of the four systems in the national reports reviewed: few Parties describe formal mechanisms for capturing traditional or local knowledge or feeding implementation lessons back into planning, a gap that persists even where potentially relevant coordination structures exist, such as Jordan's National Climate Change Policy process, and that reflects the broader pattern identified in section II: the available case studies focus primarily on data, monitoring and indicators, with comparatively limited coverage of knowledge systems.

79. Across the case studies examined in this report, five recurring factors emerge as enabling the effective strengthening of knowledge, science, technology and data systems for adaptation

A. Institutional partnerships

80. Institutional partnerships: combining domestic technical capacity with international or academic expertise enables countries to integrate locally generated data with external scientific inputs, instead of relying exclusively on either source (Uruguay and Burkina Faso). This pattern recurs across systems: in data systems, Burkina Faso's national observation network and university-led modelling partnership, together with the Dominican Republic's national geographic institute, demonstrate comparatively strong upstream data-generation capacity built through such partnerships; in science systems, formal channels connecting scientific research to policy are documented unevenly across the case studies reviewed: Uruguay's collaboration with national universities and the Philippines' dedicated national research programme for adaptation-relevant climate projections reflect similar academic

partnerships, though sustained institutional access to international assessments, including from the IPCC, is less consistently described; and in technology systems, monitoring and early warning equipment such as Vanuatu's meteorological and geohazards network, and geospatial and modelling platforms more broadly, are often built with international technical partners, with the capacity to sustain and update this technology largely depending on sustained external partnership and training, consistent with the OECD finding, noted in section II.2, that donor-dependent capacity tends to expire once external support ends.

B. Integrated verification and monitoring

81. Integrated verification and monitoring: embedding verification and monitoring mechanisms in planning instruments from the outset avoids treating monitoring and evaluation as a separate, downstream exercise (Cambodia and Egypt).

C. Multi-level institutional integration

82. Multi-level institutional integration: linking national policy frameworks with subnational or sectoral delivery mechanisms strengthens coordination. Examples include regional information systems in Morocco, Benin's two-tier governance structure and Jordan's cross-sectoral coordinating framework.

83. Among the data systems examined, national observation and geospatial infrastructure are generally more developed than the frameworks needed to translate the resulting data into decision-relevant products. This integration extends to how data flows between levels: institutionalized monitoring, evaluation and learning arrangements that systematically feed data back into planning, such as Benin's two-level mechanism, remain the exception rather than the rule among the Parties reviewed.

D. Alignment with existing systems

84. Alignment with existing reporting systems: anchoring adaptation-specific M&E within national transparency or reporting architectures reduces the risk of creating parallel systems that must later be reconciled (Dominican Republic).

E. Gender responsive design

85. Gender-responsive data collection is reported unevenly across the Parties reviewed, ranging from explicit integration in planning processes to no mention at all, consistent with the broader gender-data gaps identified in the literature.

86. Reporting on means of implementation is more consistently present across the case studies but varies in how clearly it links the support a country received to the adaptation outcome that support enabled.

87. As such, one of the best practices observed in this report was gender-responsive design: integrating gender-responsive approaches into core indicator sets and training strategies ensures that gender is treated as a standard feature of system design rather than as a separate cross-cutting annex (Egypt, Uruguay and Cambodia).

V. Conclusion

88. The information consolidated from the different case studies examined in this report points to four key messages, summarized below:

(a) Recognizing country-driven effort: the case studies show developing country Parties across every region actively building the knowledge, science, technology and data systems that underpin adaptation action, frequently under conditions of limited financial and

technical support and with capacities that are still developing. This effort merits recognition, independent of whether every system has yet reached full maturity;

(b) Integrated systems support resilience: resilience gains are most evident when data, science, technology and knowledge systems inform decision-making together, rather than when any one system operates effectively in isolation. Cambodia's connection of its public data portal with planning indicators and Egypt's integration of gender-responsive indicators into its core strategy illustrate this finding;

(c) Aligning implementation and reporting can reduce reporting burdens: the case studies suggest that duplication can be minimized by integrating monitoring and evaluation into existing reporting frameworks, as the Dominican Republic has done under the enhanced transparency framework, and by embedding verification mechanisms in planning instruments from the outset, as Cambodia has done through its measure-level NDC matrix;

(d) Recognizing less visible contributions: sub-national platforms such as Morocco's regional SIREDD network, institutional-readiness indicators such as Cambodia's, and gender-responsive system design such as Egypt's each make a demonstrable difference to adaptation outcomes and merit the same recognition as headline national-level systems.

89. The case studies examined in this report also point to the following observations relevant to adaptation reporting under decision 2/CMA.5, paragraph 45,[51] without seeking to pre-empt the Adaptation Committee's own consideration of that paragraph:

(a) Reporting guidance could accommodate varying stages of system maturity, recognizing early-stage capacity-building efforts alongside more established systems, instead of assuming a uniform baseline across developing country Parties;

(b) Embedding verification sources directly into planning instruments, as shown by Cambodia's measure-level matrix, offers a transferable model that other Parties could consider when revising or developing NAPs and NDCs;

(c) Anchoring adaptation monitoring and evaluation within a country's existing transparency architecture, as demonstrated by the Dominican Republic;

(d) Regional or sub-national information systems, such as Morocco's SIREDD network, may merit recognition as contributors to national-level adaptation reporting, rather than necessarily requiring consolidation into a single centralized platform.

[51] See footnote 6 above.