

November 2022

# ENHANCING LONG-TERM LOW-EMISSION DEVELOPMENT STRATEGIES

Guidance document:  
**Adaptation  
and Resilience**

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# EXECUTIVE SUMMARY

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Adaptation is a critical theme for Long Term low greenhouse gas emission development Strategies (LTS) that is currently under-developed. Signatories to the Paris Agreement are committed to set out an LTS, framing national pathways for decarbonization and climate-resilient development up to 2050.<sup>1</sup> Despite the Paris Agreement's emphasis on adaptation, and mounting evidence of its importance to low- and middle-income countries, this aspect is largely absent from LTS published to date.

By integrating adaptation in LTS, countries can build on existing adaptation policies and develop a longer-term planning horizon to address physical risks. Increasing climate risks will have large and pervasive impacts on development trajectories in low- and middle-income countries. The LTS is an opportunity to understand long-term physical climate risks, integrate adaptation interventions into climate policy and develop the enabling environment for successful action on building resilience. Stakeholders can build on the progress made in adaptation policy documents such as National Adaptation Plans (NAPs) and Nationally Determined Contribution (NDCs), developing a longer-term planning horizon and considering adaptation, mitigation and other development objectives in a more holistic manner. Practically this involves aligning with existing documents on points such as monitoring an evaluation (M&E) framework, stakeholder engagement or undertaking assessments of existing adaptation interventions and financing opportunities.<sup>2</sup>

This guide provides an overview of how policymakers can more systematically account for adaptation in LTS. The appropriate level of detail will vary depending on countries' resources, but all can cover:

- **Information:** assessing physical climate risks to inform target-setting and prioritisation. This includes identifying key physical hazards and understanding their impact on the economy and society.
- **Interventions:** Identification and appraisal of adaptation options. This includes identifying and prioritising options for risk reduction, retention and transfer, accounting for synergies between adaptation, mitigation and other co-benefits.
- **Implementation:** Putting in place a supportive enabling environment to ensure the plans in the LTS are credible. This includes assigning institutional roles, formulating financing strategies, developing inclusive processes and updating the strategy over time, and building capacity.

In three priority areas, the note provides more detailed step-by-step guidance. These priority areas can unlock the transformative potential of the LTS:

- **Assess long-term physical risks and uncertainties:** accounting for these long-term physical risks – and the uncertainty around them -- can help avoid decisions that lock in higher risks and allow flexible responses to changing risk profiles.
- **Balance mitigation and adaptation objectives:** many interventions, for example in nature-based solutions or infrastructure development, can have significant impacts on both mitigation and adaptation. LTS can serve as an entry point for integrated decision making that maximises synergies and balances trade-offs between mitigation and adaptation planning.
- **Mobilise finance for adaptation:** by more systematically appraising investment needs, the impacts of planned interventions and potential financial models, the LTS can provide a credible evidential basis to attract capital at scale for adaptation.

**The guidance set out in this note provides practical steps to more fully integrate adaptation into LTS,** supported by public datasets and resources. Further work can deepen this in country-specific contexts, developing institutional frameworks and processes of capacity building and monitoring, reporting and verification (MRV) to support and sustain these efforts.

This report was prepared with analytical support from Vivid Economics.



# INTRODUCTION

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**Long-term strategies (LTS) frame national pathways for decarbonization, adaptation and economic development up to 2050.** Signatories to the Paris Agreement are committed to set out an LTS, with the scope and coverage dependent on the country's resources and capacity. As of September 2022, 53 countries have submitted Long Term Strategies to the United Nations Framework Convention on Climate Change (UNFCCC), of which eight are from lower-middle-income economies and 11 are from upper-middle-income countries.<sup>3,4</sup>

**This note provides practical guidance for integrating adaptation issues into LTS, based on the experience of middle and lower-income countries.** It highlights the importance of taking adaptation issues into account when preparing the LTS and sets out actionable steps countries can take to further integrate these issues into the LTS, drawing on evidence of best practice from existing LTS and wider literature. The objective is to provide user-friendly, practical guidance for the integration of adaptation issues into the LTS, making realistic allowances for differences in country-specific capabilities such as technological and financial resources.

## **BOX 1 | THE GUIDANCE HAS BEEN DEVELOPED IN PARTNERSHIP WITH STAKEHOLDERS INVOLVED IN THE PREPARATION OF LTS**

- A review of low- and middle-income countries' LTS identified the current coverage of adaptation issues as well as the type and depth of analysis. It identified case studies where these issues have been incorporated
- A literature review complemented the review of LTS, highlighting best practices and existing planning guidance that can be translated into LTS
- Engagement with stakeholders involved in the LTS preparation process in low- and middle-income countries informed an assessment of key gaps in current planning. This informed the focus areas for this note.
- The guidance was prepared in conjunction with experts on the specific areas and validated in stakeholder workshops

**Current and future climate risks will have large and pervasive impacts on development trajectories.** In today's climate, 3.3 billion people are exposed to heat, drought, urban water stress and flooding, with temperatures 1.0 °C above preindustrial levels, and this will increase to 5 billion by 2050 in a 2.0°C world.<sup>5</sup> Key issues to account for in adaptation planning include:

- **Increased economic losses:** demographic and economic trends combined with climate change in low- and middle-income countries increase physical risk. Land conversion, urbanization (especially in coastal cities), population growth, economic growth, increasing inequalities and the concentration of supply chains have all increased the people, assets and economic activity exposed to hazards.<sup>6</sup> For example, the impact of a 100-year flood in Ho Chi Minh City is expected to increase by six times between today and 2050, with real estate damage and destruction costs amounting to USD 8.4 billion.<sup>7</sup>
- **Impacts on sustainable development goals:** shifting physical risks have impacts on essential goods and services – for example affecting access to infrastructure, food, healthcare and education – that disproportionately affect the poor.
- **Shortfalls in adaptation finance:** there is a sizeable 'adaptation investment gap' where spending undershoots projected needs:<sup>8</sup> Annual costs of adaptation in developing countries could be between USD 280-500bn by 2050.<sup>9</sup> Adaptation accounts for only 7% (USD 46bn) of total climate finance flows (USD 632bn), with the public sector providing nearly all adaptation finance.<sup>10</sup>

**Countries can leverage the LTS to mainstream adaptation and meet adaptation needs.**

Most LTS disproportionately focus on mitigation, missing opportunities to integrate climate-resilient development. Building on the experience of National Adaptation Plan (NAPs) preparation, integrating adaptation and resilience into LTS development can help countries to: develop a long-term approach for responding to climate risk, link mitigation and adaptation planning, and link adaptation planning with broader sustainable development objectives. Practically, this involves aligning LTS with NAPs, Disaster Risk Management (DRM), sectoral plans and domestic budgets to build resilience into project design. Many countries such as Kenya and Fiji are building on their NAPs when designing LTS.<sup>11,12</sup> For example, projects in collaboration with the FAO and UN, look at aligning NAPs, NDC and LTS across the agricultural sector.<sup>13</sup> The LTS can also mobilise international climate finance to meet adaptation needs.

The guidance outlines an overarching approach to integrate adaptation and resilience into LTS, with detailed focus in three priority areas:

- **Assess long-term physical risks and uncertainties:** an assessment of climate risk, that accounts for both uncertainty and socioeconomic development scenarios, will help countries define flexible, adaptive pathways to effectively manage long-term climate risks.
- **Synergies between mitigation and adaptation:** LTS can serve as an entry point for integrated decision making that maximises synergies between mitigation and adaptation planning.
- **Climate finance for adaptation:** LTS can more fully appraise investment needs, articulate financing plans, and leverage climate finance in order to deliver adaptation investments in the near term.

The step-by-step guidance is complemented with case studies and a selection of resources, such as toolboxes, datasets and useful further reading.



# OVERARCHING GUIDANCE

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This section outlines actions to integrate adaptation issues in LTS. It answers the following questions:

- What does the guidance cover, and how can it be interpreted?
- What is the guidance for integrating adaptation and resilience issues within the LTS?
- How can the guidance be put into practice?

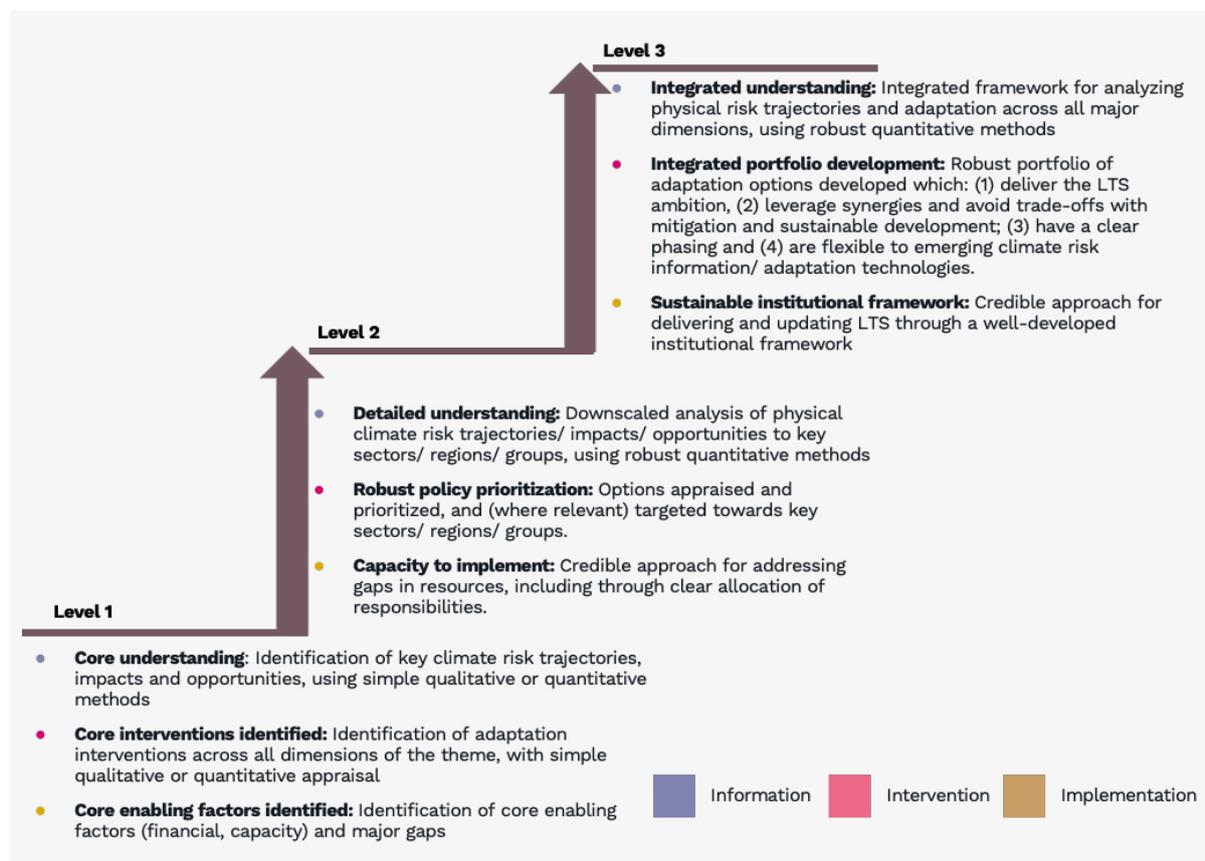
## What does this guidance cover, and how can it be interpreted?

**This guidance is aimed at policymakers in low-and-middle-income countries who are responsible for designing LTS.** While some countries are in the process of developing a LTS or are yet to start, some countries have already submitted LTS to the United Nations Framework Convention on Climate Change (UNFCCC). This guide is intended for use by countries at different stages of the LTS development process, enabling policymakers to enhance LTS over time. This guidance outlines actions that countries can take across three components:

- **Information:** analysis to inform target-setting and prioritization
- **Intervention:** identification and appraisal of key policies and actions
- **Implementation:** developing a supportive and sustainable enabling environment

To allow for different country starting points, this guidance is structured around three different archetypes, representing levels of development of the LTS. Countries can take different approaches to LTS development to meet local priorities and needs, as outlined in Figure 1. The appropriate level will vary according to country-specific features such as technical, financial and human resources. A level 1 LTS sets out key issues, interventions and enabling factors in a systematic but relatively informal way, with little quantitative analysis. A level 2 LTS builds on this with quantitative evidence to support initial priority interventions and a plan to put enabling conditions in place. A level 3 LTS is the most advanced, with long-term trajectories of intervention supported by integrated modelling of impacts on society and the economy, supported by a sustainable institutional framework. Countries can aim for the highest feasible level based on their context and enhance the LTS over time.

**Figure 1:** Three archetypes of LTS development to cover different country contexts



## What is the guidance for integrating adaptation issues within the LTS?

**Three actions** are identified as priority areas and will be discussed further in the next section.

Figure 2 outlines a set of actions for integrating adaptation issues into the LTS, disaggregated into the information, intervention and implementation categories. Three actions are identified as priority areas and will be discussed further in the next section.

**Figure 2:** Actions for the integration of adaptation and resilience and priority areas

<b>Information</b> Qualitative and quantitative analysis to inform target-setting and prioritisation	<b>Interventions</b> Identification and appraisal of key policies and actions	<b>Implementation</b> Supportive enabling environment to ensure credible implementation
<p><b>Assess:</b></p> <p><b>1</b> long-term climate risks, uncertainties and impacts on sustainable economic development, taking into account changing exposure and vulnerabilities</p>	<p><b>Prioritise:</b></p> <p><b>2</b> adaptation and mitigation synergies to avoid trade-offs</p> <ul style="list-style-type: none"> <li>• effective balance between risk reduction, retention and transfer to manage climate risk</li> </ul>	<p><b>Enhance capacity for:</b></p> <p><b>3</b> mobilising adaptation finance to meet investment needs</p> <ul style="list-style-type: none"> <li>• a dynamic, flexible adaptation strategy which allows re-appraising adaptation interventions</li> <li>• realise just transition opportunities in adaptation interventions</li> </ul>

## Information

**Robust assessment of long-term climate hazards in LTS can enable governments to effectively manage these risks.** The majority of LTS lack a comprehensive assessment of long-term risks and assessments are largely qualitative. A more quantitative approach can be based on climate modelling, covering all key hazards, with clear uncertainty bounds and accounting for different global emission trajectories. This can be supplemented by future scenarios of both socioeconomic exposure and vulnerabilities. Risk assessments can then be decomposed for vulnerable groups, sectors or geographic regions, thus identifying which groups and sectors will be disproportionately affected. An example is Indonesia's LTS which develops vulnerability-focused regional and sectoral pathways. Indonesia's LTS supports decision making by: (i) quantifying regional vulnerability along a vulnerability index, (ii) calculating the cost of the adaptation pathways and (iii) outlining an institutional framework where LTS 2050 targets inform interim targets in the NDC, which then feed into Climate Action Plans and National and Sectoral Development Plans. Based on this assessment, Indonesia has set the target of limiting annual average losses from acute physical hazards to no more than 3.45% of GDP by 2050.<sup>14</sup>

## Intervention

**Given identified long-term risks, countries can prioritise adaptation options which most enhance resilience to climate risks.** Strategic approaches to adaptation can consider a broad set of intervention options – including risk reduction, transfer and retention options – and appraise their performance against a full set of costs and benefits, including:<sup>15</sup>

- **Avoided damages:** implementing adaptation options can save lives, reduce damages to infrastructure and economic losses
- **Avoided risks:** decisions today can create 'lock ins' to future climate risks that may be irreversible or costly to revert later. Longer-term adaptation planning can avoid maladaptation<sup>16,17,18</sup>
- **Support economic activity:** risk reduction activities promote investment, household and agricultural activity and fiscal stability
- **Co-benefits:** adaptation interventions can generate co-benefits, such as investments in technologies or protection of ecosystem services
- **Integrated decision-making:** realising mitigation and adaptation linkages can help appraise options and inform policy design to maximise synergies as well as minimise trade-offs

**By following an integrated approach to mitigation and adaptation, the LTS can identify win-wins and manage trade-offs.** Mitigation and adaptation have been difficult to integrate because they are typically managed by separate policy-making entities and affect sectors differently.<sup>19,20</sup> However, by appraising mitigation and adaptation impacts alongside each other, it is often possible to identify trade-offs and synergies, which can inform prioritisation. As an example, Cambodia's LTS includes a table which outlines the co-benefits (including adaptation) of each mitigation action: it values these at USD 6.97 bn in 2050, creating 164,000 new jobs.<sup>21</sup>

## Implementation

**LTS can include commitments to develop capacity that sustains action.** A dynamic adaptation strategy, with clear processes for regularly assessing risk and re-appraising adaptation interventions can make the LTS more robust. For example, existing adaptation indicators used for monitoring and evaluation of NDCs can be leveraged for LTS implementation. This is seen in countries such as Kenya, where resilience indicators developed in the NDC process (e.g. % of finance allocated to adaptation) are also being leveraged in the NAPs.

**LTS can mobilise international adaptation finance and make adaptation interventions actionable.** LTS can articulate long-term adaptation investment needs, and supplement investment plans which more fully appraise financing needs, identify existing finance sources (e.g. international finance or sectoral budgets) and set out an approach to financing interventions. In doing so the LTS and longer-term policymaking can signal a commitment to invest that can reduce the costs of doing so and incentivise the private sector. For example, Cambodia estimates that the public financing need for the LTS will amount to almost USD 9 bn for the 2025-2050 period.<sup>22</sup> Some countries, such as the Gambia aim to set-up a multi-sectoral task-force to mobilise climate finance.<sup>23</sup> The LTS could also help address questions such as:

- How can adaptation finance be incorporated in wider national investment plans?
- How can current and future adaptation finance needs be differentiated?
- Can earlier investment in adaptation lead to lower long-term costs?
- What are the synergies and trade-offs between mitigation and adaptation finance?

**Finally, countries can recognise synergies between development and adaptation objectives in LTS by identifying impacts on vulnerable groups and small-medium sized enterprises.** Some LTS acknowledge the need for stakeholder engagement around a just transition (Indonesia, South Africa, Fiji).<sup>24</sup> Making the LTS process and outcomes more inclusive can ensure distributional impacts of long-term climate risks are appropriately addressed.

**The checklist below outlines a set of steps needed to deliver the actions listed above, across levels 1 to 3.** A selection of resources, such as toolboxes, datasets or useful further reading can be found in the Annex. The next chapter goes into three of these action areas in detail, providing step-by-step guidance for identified priorities.

**Table 1: Adaptation and resilience actions checklist**

		Level 1	Level 2	Level 3
Information	<b>Assess long-term physical risks</b> <ul style="list-style-type: none"> <li>What are the key long-term physical risks and uncertainties?</li> <li>What impacts do they have on direct economic losses and attainment of wider development objectives?</li> <li>How can decision-makers account for these risks?</li> </ul>	<b>Identify key physical hazards</b> <ul style="list-style-type: none"> <li>Identify priority climate hazards</li> </ul>	<ul style="list-style-type: none"> <li>Analyse hazard frequency and severity under climate change scenarios</li> </ul>	<ul style="list-style-type: none"> <li>Analyse hazard frequency and severity under climate change scenarios, including tail events</li> </ul>
		<b>Conduct risk assessments</b> <ul style="list-style-type: none"> <li>Assess drivers of exposure and vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>Conduct quantified climate risk assessment</li> </ul>	<ul style="list-style-type: none"> <li>Conduct quantified climate risk assessment, including systemic and macro risks</li> </ul>
		<b>Synthesize risks and identify priority sectors</b> <ul style="list-style-type: none"> <li>Identify vulnerable groups, sectors and geographic regions based on assessment</li> </ul>	<ul style="list-style-type: none"> <li>Synthesise analyses to allow for decision-making</li> </ul>	<ul style="list-style-type: none"> <li>Design dynamic adaptive pathways</li> </ul>
Intervention	<b>Realise synergies between mitigation and adaptation</b> <ul style="list-style-type: none"> <li>What are the synergies between mitigation and adaptation policies?</li> <li>How can governments appropriately prioritise and implement joint interventions?</li> <li>How can adaptation be mainstreamed in key sectors?</li> </ul>	<b>Identify synergies between mitigation and adaptation</b> <ul style="list-style-type: none"> <li>Map synergies and trade-offs across adaptation and mitigation interventions</li> </ul>	<ul style="list-style-type: none"> <li>Develop joint appraisal framework for intervention prioritisation</li> </ul>	<ul style="list-style-type: none"> <li>Develop joint appraisal framework for intervention prioritisation</li> </ul>
		<b>Build institutional capacity to mainstream adaptation</b> <ul style="list-style-type: none"> <li>Identify how coordination across actors and policies can deliver synergies</li> </ul>	<ul style="list-style-type: none"> <li>Build institutional capacity to mainstream adaptation in long-term sectoral planning</li> </ul>	<ul style="list-style-type: none"> <li>Build institutional capacity to mainstream adaptation in long-term sectoral planning</li> </ul>
	<b>Establish effective balance between risk reduction, retention and transfer to manage climate risk</b> <ul style="list-style-type: none"> <li>What is the most effective balance between risk reduction, retention and transfer options?</li> <li>How can governments appropriately prioritise interventions?</li> </ul>	<b>Appraise risk reduction interventions</b> <ul style="list-style-type: none"> <li>Identify cost-effective risk reduction interventions</li> </ul>	<ul style="list-style-type: none"> <li>Prioritise cost-effective risk reduction interventions</li> </ul>	<ul style="list-style-type: none"> <li>Prioritise cost-effective risk reduction interventions</li> <li>Analyse expected residual climate risks</li> </ul>
		<b>Appraise disaster risk financing instruments</b> <ul style="list-style-type: none"> <li>Identify cost-effective risk reduction interventions</li> </ul>	<ul style="list-style-type: none"> <li>Identify disaster risk financing instruments for risk retention and risk transfer</li> </ul>	<ul style="list-style-type: none"> <li>Appraise different risk financing instruments for risk transfer and retention to develop optimal strategy for risk management</li> </ul>
Implementation	<b>Enhancing capacity for accessing international climate finance</b> <ul style="list-style-type: none"> <li>What are the estimated adaptation investment needs?</li> <li>Are there gaps and barriers in ongoing finance for risk reduction and transfer?</li> <li>How can these be addressed?</li> <li>How can the LTS mobilise adaptation finance to meet long-term investment needs?</li> </ul>	<b>Appraise adaptation investment needs</b> <ul style="list-style-type: none"> <li>Assess adaptation investment needs</li> </ul>	<ul style="list-style-type: none"> <li>Estimate adaptation financing needs</li> </ul>	<ul style="list-style-type: none"> <li>Develop quantified scenarios of adaptation investment needs</li> </ul>
		<b>Identify gaps and barriers</b> <ul style="list-style-type: none"> <li>Identify existing and expected sources of finance</li> </ul>	<ul style="list-style-type: none"> <li>Quantify gaps in adaptation finance</li> <li>Identify barriers and solutions</li> </ul>	<ul style="list-style-type: none"> <li>Quantify gaps in adaptation finance</li> <li>Identify barriers and solutions</li> </ul>
		<b>Outline approach to mobilise finance</b> <ul style="list-style-type: none"> <li>Identify existing and expected sources of finance</li> </ul>	<ul style="list-style-type: none"> <li>Outline strategy to meet short-term adaptation investment needs</li> </ul>	<ul style="list-style-type: none"> <li>Develop a flexible long-term plan for adaptation investment</li> </ul>
Implementation	<b>Develop a dynamic, flexible adaptation strategy which allows re-appraising adaptation interventions</b> <ul style="list-style-type: none"> <li>How can decision-makers plan for long-term uncertainties?</li> <li>How can climate risks and interventions be appraised over time?</li> </ul>	<b>Outline a portfolio of adaptation interventions</b> <ul style="list-style-type: none"> <li>Identify priority adaptation interventions for the short term</li> </ul>	<ul style="list-style-type: none"> <li>Outline the timeline of adaptation interventions</li> </ul>	<ul style="list-style-type: none"> <li>Use dynamic adaptation pathway to identify timing of adaptation interventions</li> </ul>
		<b>Develop framework for monitoring and updating</b> <ul style="list-style-type: none"> <li>Develop indicators for monitoring and evaluation</li> </ul>	<ul style="list-style-type: none"> <li>Develop indicators for monitoring and evaluation</li> <li>Develop clear and transparent processes for updating adaptation components of LTS</li> </ul>	<ul style="list-style-type: none"> <li>Develop indicators for monitoring and evaluation</li> <li>Develop clear and transparent processes for updating adaptation components of LTS</li> </ul>
	<b>Mainstream inclusivity throughout policy design and target-setting</b> <ul style="list-style-type: none"> <li>What are the distributional impacts of climate risks and adaptation interventions?</li> <li>How can adaptation interventions support other development and environmental objectives?</li> </ul>	<b>Analyse physical climate risk</b> <ul style="list-style-type: none"> <li>Identify drivers of physical climate risk to marginalised communities</li> </ul>	<ul style="list-style-type: none"> <li>Quantitatively analyse exposure and vulnerability to climate hazards for marginalised communities</li> </ul>	<ul style="list-style-type: none"> <li>Quantitatively analyse exposure and vulnerability to climate hazards for marginalised communities</li> </ul>
<b>Assess climate policy risk and opportunities</b> <ul style="list-style-type: none"> <li>Identify adaptation policy risks and opportunities for marginalised communities</li> </ul>		<ul style="list-style-type: none"> <li>Assess adaptation policy risks and opportunities for marginalised communities</li> </ul>	<ul style="list-style-type: none"> <li>Assess adaptation policy risks and opportunities for marginalised communities</li> </ul>	
<b>Synthesis and policy response</b> <ul style="list-style-type: none"> <li>Identify policy priority interventions to empower communities</li> </ul>		<ul style="list-style-type: none"> <li>Appraise policy interventions to empower communities</li> </ul>	<ul style="list-style-type: none"> <li>Appraise policy interventions to empower communities</li> <li>Develop an inclusive institutional framework to empower communities</li> </ul>	

## BOX 2 | ENABLING FACTORS FOR LTS FORMULATION AND IMPLEMENTATION

A set of enabling factors can support the adoption of the guidance set out in this note. Three key areas are on commitment, engagement and capacity.

- **Commitment to climate action is an obvious pre-condition for a credible LTS.** This can either take the form of a specific mandate or the embedding of climate targets in broader national development strategies. Some countries are building LTS on existing adaptation policies such as the NAPs, NDC, vulnerability assessments (e.g. Uganda) and other national climate plans, adaptation communications or 2050 Visions (e.g. Tonga, Fiji).<sup>25</sup> It is critical that responsibility is allocated to relevant decision makers to mainstream adaptation. Improved coordination across ministries is essential to realise mitigation and adaptation synergies (e.g. Tonga) and mobilise adaptation finance (e.g. Morocco, Gambia).
- **Inclusive engagement can ensure there is sustainable support for the LTS.** This can include dialogue with a range of stakeholders, so that their priorities and constraints are understood, and awareness raising so that the population at large is informed on the objectives and content of the LTS. In the development of adaptation plans, engagement with communities and sectors that face potential losses is of particular importance as majority countries will experience the largest relative climate impacts before 2050.<sup>26</sup> For example, Tonga's LTS process involved participatory approaches to understand climate risks to vulnerable groups.
- **Many of the steps in the guidance require the use of advanced data analysis, which in turn may require investment in local capacity.** To make this more efficient, policymakers can establish institutions with the mandate to maintain these capacities over time and leverage expertise from the private sector or international partners. These enabling factors support the steps outlined in the guidance below, ranging from information gathering, target-setting, policy prioritization and implementation of the LTS. For example, Kenya's latest NDC has adaptation indicators which can be leveraged for LTS related monitoring, reporting and verification (MRV).

# PRIORITY AREAS

**This guidance notes provides a step-by-step guide for three priority areas.** These three areas were identified through a review of LTS and stakeholder workshops as being domains in which improved practice could have transformational impacts. Table 2 outlines the importance of each priority area, as well as how each priority area could be integrated within a LTS at levels 1, 2 and 3.

**The step-by-step guide for each priority area is presented in the charts on the subsequent pages.** The guide outlines a series of steps and sub-steps needed to deliver outputs for each LTS level. The chart is designed so that policymakers can trace the colour-coded arrows to identify the relevant sub-steps for their context.

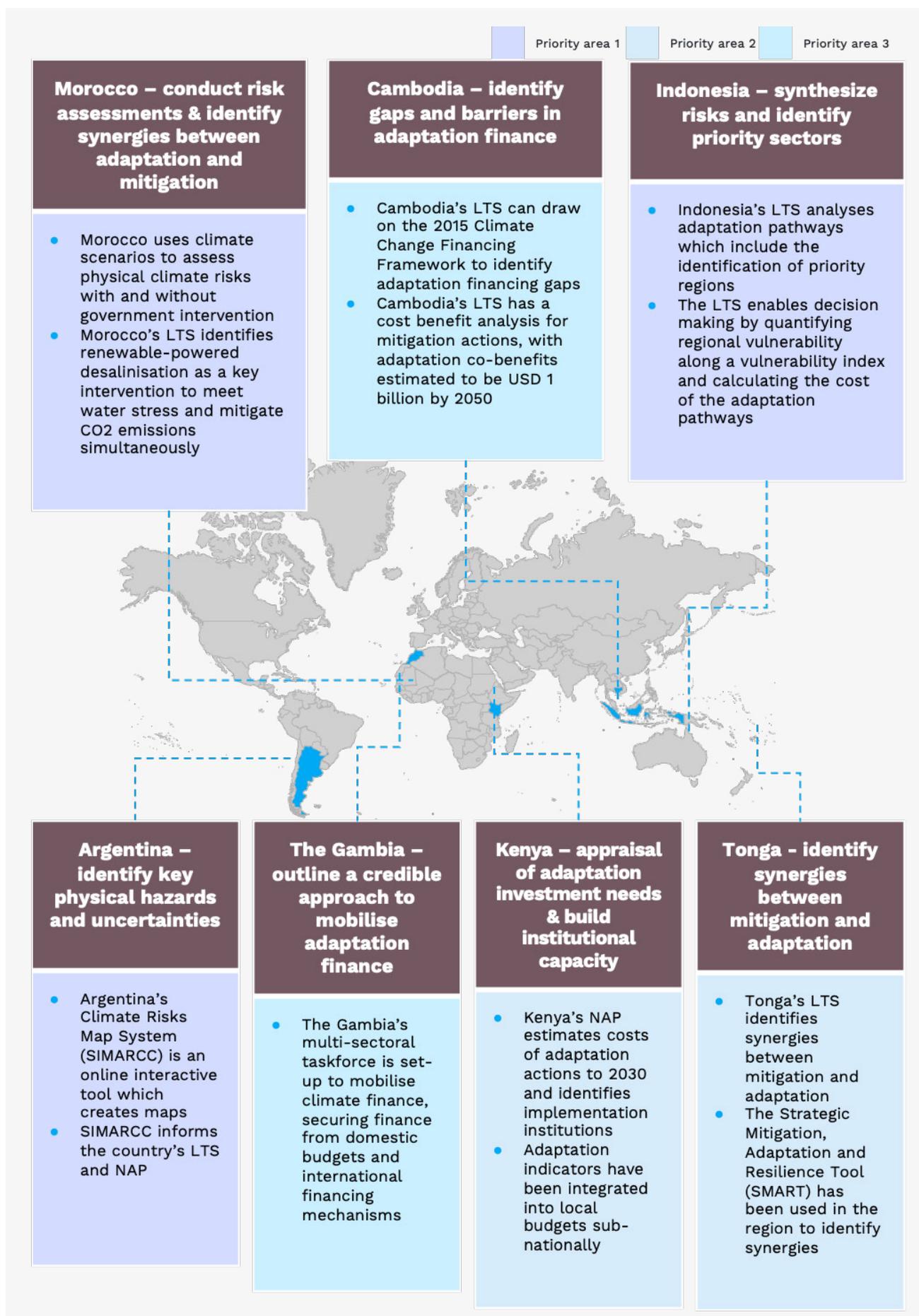
**The guidance is supported by case studies of analysis related to the four priority areas.** The case studies draw on a range of published LTS and other climate change plans to demonstrate what is achievable in the preparation of the LTS.

Figure 3 summarises the case studies, which are included in the Annex. Figures 4-6 give a step-by-step overview of how to implement the four priority areas into LTS. Table 3 in the Annex gives an overview of the relevant resources for each of these steps.

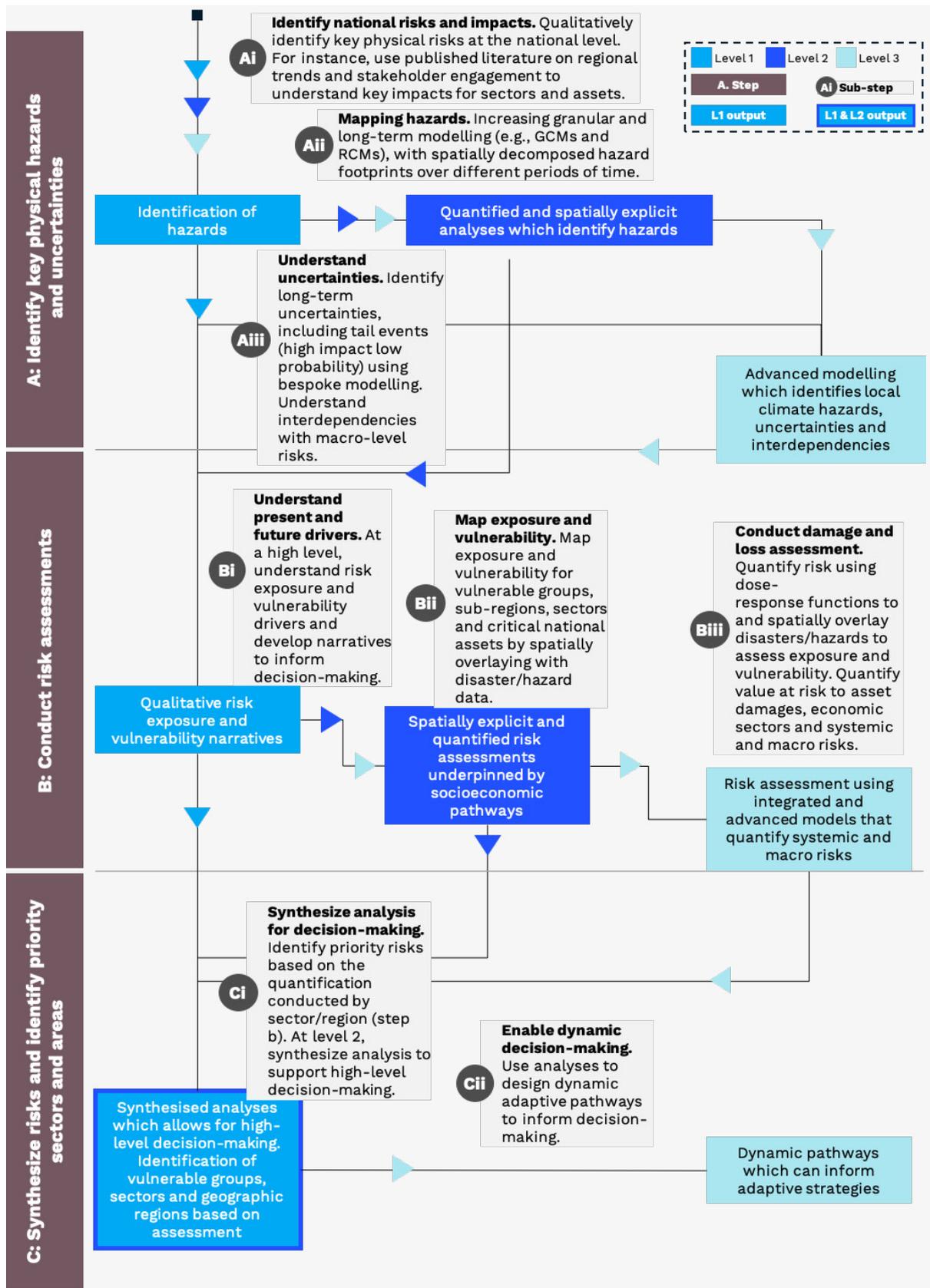
**Table 2:** *Summary of priority areas*

Priority area	Importance	Level 1	Level 2	Level 3
<b>1. Assess long-term physical risks and uncertainties</b>	<ul style="list-style-type: none"> <li>Understanding key long-term physical risks and impacts is key to developing long-term strategic approaches to risk management</li> <li>Indonesia's LTS estimates future climate change can have an impact of 0.66% -3.45% of national GDP across water, food, energy and health.<sup>27</sup></li> </ul>	Identify long-term physical risks to inform areas of intervention	Quantified climate risk assessment to prioritise adaptation interventions	Integrated and advanced quantitative models to design adaptive pathways
<b>2. Synergies between mitigation and adaptation</b>	<ul style="list-style-type: none"> <li>Integrated decision making between adaptation and mitigation can maximise synergies</li> <li>LTS can prioritise interventions which deliver multiple benefits, such as agroforestry in Tonga</li> <li>Mainstreaming adaptation in the LTS can realise co-benefits</li> </ul>	Identify synergies across adaptation and mitigation to inform policies across sectors	Integrated appraisal to support prioritisation	Comprehensive integrated modelling framework to prioritise interventions
<b>3. Climate finance for adaptation</b>	<ul style="list-style-type: none"> <li>Climate-related finance to developing nations increased to USD 79.6bn in 2019,<sup>28</sup> falling USD 20.4bn short of the USD 100bn committed annually by 2025 to be split equally between mitigation and adaptation.<sup>29,30</sup></li> <li>58 developing countries include adaptation needs estimates in their NDCs and NAPs, highest sectoral needs are in agriculture (26%) and infrastructure (23%)</li> <li>LTS can mobilise adaptation finance to meet long-term investment needs</li> </ul>	LTS outlines adaptation financing needs to inform existing gaps in finance	LTS identifies financing levers and develops a strategy to prioritise immediate adaptation needs	LTS mobilises finance to meet long-term adaptation investment needs

**Figure 3: Summary of case studies**

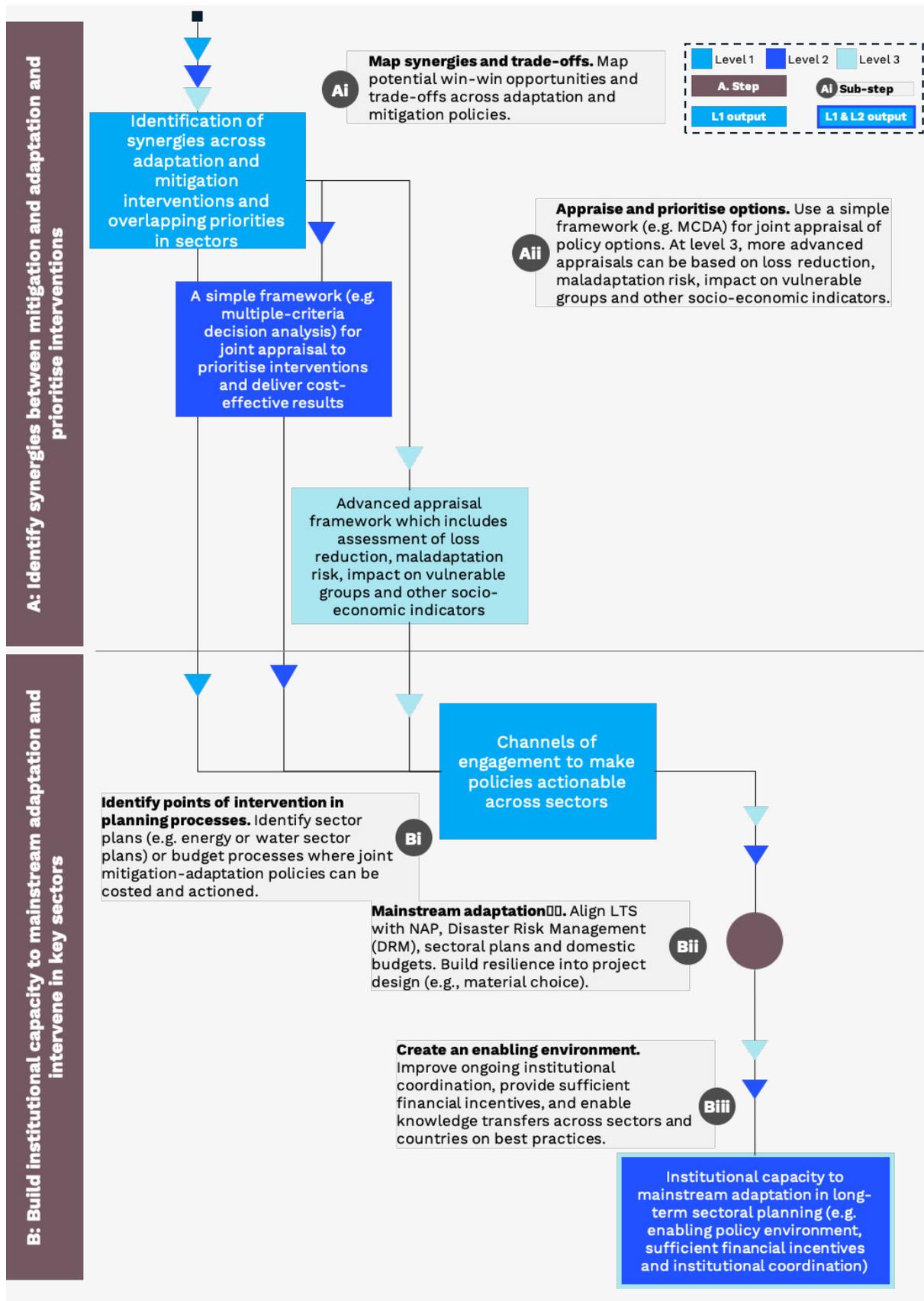


**Figure 4: Priority area 1: Assess long-term physical risks and associated impacts**



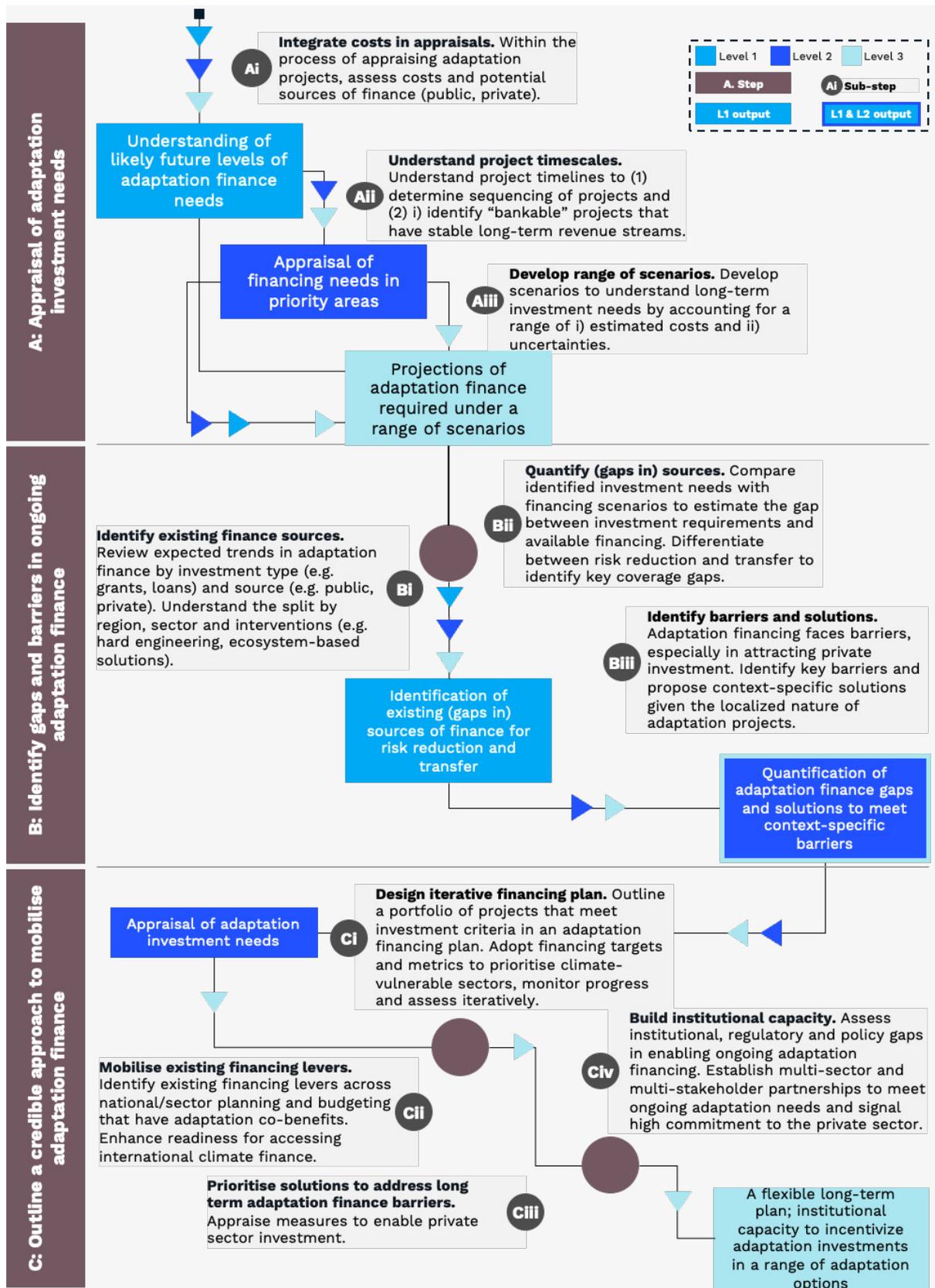
**Note:** Where outputs cover multiple levels, this is indicated by using a different colour for the outline.

**Figure 5: Priority area 2: Realise synergies between mitigation and adaptation**



**Note:** Where outputs cover multiple levels, this is indicated by using a different colour for the outline.

**Figure 6: Priority area 3: Mobilise finance for adaptation**



**Note:** Where outputs cover multiple levels, this is indicated by using a different colour for the outline.

# NEXT STEPS

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**Delivering on this guidance requires mainstreaming adaptation in long-term policymaking.** Implementing this guidance on how adaptation and resilience can be incorporated into the LTS will require assigning key roles and responsibilities and ensuring effective coordination across government actors. Increased inter-ministerial collaboration between Environmental Ministries, Finance Ministries and other key stakeholders is needed to:

- ensure sector development plans, national infrastructure planning and fiscal policy frameworks deliver adaptation interventions outlined in the LTS;
- align LTS with existing policy documents such as the NAPs and NDCs to build on existing adaptation planning frameworks and targets;
- mobilise financial resources through new and existing governance structures (e.g. taskforce to mobilise finance, domestic budgets);
- assign clear mandates for delivering the adaptation components of the LTS.

**There is a need for focus on building capacity to deliver the LTS.** Identifying and addressing capacity and information gaps is a key aspect of LTS implementation and updates. Examples are improving capacity to use and maintain physical risk data. Solutions can vary based on stages of LTS development. For example, countries with comprehensive physical risk data repositories may focus on strengthening adaptation appraisal processes to support risk reduction and response systems. The LTS should be able to respond to emerging information over time, with processes required for re-assessing physical risk and re-appraising adaptation interventions.

**Governance processes can ensure accountability and provide feedback for the next iteration of the LTS.** One example of this is a Monitoring, Reporting and Verification (MRV) framework which can be incorporated into the national statistics office to maintain a central repository of data and to leverage the data and frameworks that have been previously developed (e.g. adaptation and resilience indicators in the context of NDCs, NAPs or SDG planning). Key considerations include: development of a transparent data management system, the provision of training for verifiers, and a methodology to interpret the data and assess the outcomes against the targets set out in the LTS. The UNFCCC guidance can be used as a starting point for the development of an MRV or similar system.<sup>31</sup>



# ANNEX

**Table 3:** Overview of useful resources per priority area

<b>Priority area 1: Assess long-term physical risks and associated climate impacts</b>	
<b>Step a: Identify key physical hazards and uncertainties</b>	
Sub-step	Resource
a.i	<ul style="list-style-type: none"> <li>World Bank. (2021). <a href="#">Climate Risk Country Profiles</a>.</li> <li>KNMI and WMO. (2020). <a href="#">Climate Explorer</a>.</li> <li><a href="#">IPCC emissions scenarios and interactive atlas</a></li> <li>National climate models (e.g. <a href="#">SIMARCC national data in Argentina</a>)</li> </ul>
a.ii	<ul style="list-style-type: none"> <li><a href="#">EIB tool for assessing climate risks in developing countries</a></li> <li><a href="#">USAID Climate Risk Screening and Management Tools</a></li> <li><a href="#">World Bank's Climate &amp; Disaster Risk Screening Tools</a></li> <li><a href="#">Global Climate Models (GCMs) and Regional Climate Models (RCMs)</a><sup>3233</sup></li> </ul>
a.iii	<ul style="list-style-type: none"> <li><a href="#">European Central Bank (2021): Climate-related risk and financial stability: Chapter 2: Physical climate risks</a></li> </ul>
<b>Step b: Conduct risk assessments</b>	
b.i	<ul style="list-style-type: none"> <li><a href="#">UK Climate Change Committee (2020): Undertaking a climate change risk assessment</a></li> <li><a href="#">EIB tool for assessing climate risks in developing countries</a></li> <li><a href="#">USAID Climate Risk Screening and Management Tools</a></li> <li><a href="#">World Bank's Climate &amp; Disaster Risk Screening Tools</a></li> </ul>
b.ii	<ul style="list-style-type: none"> <li><a href="#">Steps to Resilience Overview, US Climate Resilience Toolkit</a></li> <li><a href="#">Global Exposure Database (GED)</a></li> <li><a href="#">Global Risk Data Platform</a></li> <li><a href="#">World Pop Open Street Maps</a></li> <li><a href="#">FEMA Vulnerability assessment guide</a></li> <li><a href="#">CAPRA (Probabilistic Risk Assessment) Platform (University of Colombia, IADB)</a></li> <li><a href="#">Asian Development Bank. (2011). Community-Based Climate Vulnerability Assessment and Adaptation Planning.</a></li> <li><a href="#">UNFCCC. (2008). Resource Guide: Vulnerability and Adaptation to Climate Change.</a></li> </ul>
b.iii	<ul style="list-style-type: none"> <li>Bespoke modelling – sector-level approaches with input and output modelling (IO models) or Computable General Equilibrium (CGE) modelling.<sup>3435</sup></li> <li><a href="#">Lifelines: The Resilient Infrastructure Opportunity (Hallegatte et al. 2019)</a></li> <li><a href="#">A systems framework for national assessment of climate risks to infrastructure (Dawson et al 2018)</a></li> </ul>
<b>Step c: Synthesize risks and identify priority sectors and areas</b>	
c.i	<ul style="list-style-type: none"> <li><a href="#">SEI (2021): Just transition in climate adaptation</a></li> <li><a href="#">GIZ (2020) Making long-term low GHG emissions development strategies a reality: Link to immediate steps and interim targets (NDC)</a></li> <li><a href="#">US Climate Resilience Toolkit</a></li> </ul>
c.ii	<ul style="list-style-type: none"> <li><a href="#">Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world (Hassnoot et al. 2013)</a></li> <li><a href="#">A review of the economics of adaptation and climate-resilient development (Watkiss et al. 2015)</a></li> </ul>

## Priority area 2: Assess long-term physical risks and associated climate impacts

### Step a: Identify synergies between mitigation and adaptation and prioritise interventions

a.i	<ul style="list-style-type: none"> <li><a href="#">GIZ - Long-term strategies in a changing climate (2019)</a></li> <li><a href="#">A Toolkit for Designing Climate Change Adaptation Initiatives (UNDP, 2020): Chapter 4, Key Tools and Methodologies for Designing an Adaptation Initiative</a></li> <li><a href="#">Realising the 'Triple Dividend of Resilience' (ODI,2015)</a></li> </ul>
a.ii	<ul style="list-style-type: none"> <li><a href="#">Adaptation Needs and Options (UNFCCC ,2014)</a></li> <li><a href="#">Assessing the costs and benefits of adaptation options (UNFCCC, 2011)</a></li> <li><a href="#">Climate Works (2018): SMART Tool Guide and briefing paper</a></li> </ul>

### Step b: Build institutional capacity to mainstream adaptation and intervene in key sectors

b.i	<ul style="list-style-type: none"> <li><a href="#">GIZ - Long-term strategies in a changing climate (2019)</a></li> <li><a href="#">Scaling up Ambition: Leveraging NDCs and Long-Term Strategies to achieve the Paris Agreement Goals (WRI, 2019)</a></li> <li><a href="#">Climate Work's Strategic Mitigation Adaptation and Resilience Tool (SMART)</a></li> <li><a href="#">Mainstreaming climate and environmental considerations into existing development programmes (K4D, 2019)</a></li> <li><a href="#">Mitigation &amp; Adaptation Synergies in the NDCs (Nordic Cooperation, 2017)</a></li> </ul>
b.ii	<ul style="list-style-type: none"> <li><a href="#">ADB (2020): Incorporating a DRF Framework into Country Management and Development Strategies</a></li> <li><a href="#">Promoting Synergy and Alignment: Between Climate Change Adaptation and Disaster Risk Reduction in the Context of National Adaptation Plans (UNDRR, 2021)</a></li> </ul>
b.iii	<ul style="list-style-type: none"> <li><a href="#">Linking Mitigation and Adaptation Goals in the Energy Sector in Canada (Morand et al, 2015)</a></li> </ul>

## Priority area 3: Enhancing capacity for accessing international climate finance

### Step a: Appraise adaptation investment needs

a.i	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> <li><a href="#">Realising the 'Triple Dividend of Resilience' (ODI,2015)</a></li> </ul>
a.ii	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> <li><a href="#">How to factor uncertainty? (Climate Adapt)</a></li> </ul>
a.iii	<ul style="list-style-type: none"> <li><a href="#">UNDP (2017) Hard Choices Integrated Approaches</a></li> <li><a href="#">OECD (2021) Forward-looking Scenarios of Climate Finance Provided and Mobilised by Developed Countries in 2021-2025: Technical note</a></li> </ul>

### Step b: Identify gaps and barriers in ongoing adaptation finance

b.i	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> </ul>
b.ii	<ul style="list-style-type: none"> <li><a href="#">UNEP Adaptation Gap Report 2021</a></li> <li><a href="#">Climate Policy Initiative - Global Landscape of Climate Finance</a></li> </ul>
b.iii	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> <li><a href="#">CDKN - Addressing the barriers to climate investment</a></li> <li><a href="#">UNFCCC Needs-based Finance (NBF) Project</a></li> </ul>

### Step c: Synthesize risks and identify priority sectors and areas

c.i	<ul style="list-style-type: none"> <li><a href="#">UNDP (2017) Hard Choices Integrated Approaches</a></li> </ul>
c.ii	<ul style="list-style-type: none"> <li><a href="#">InsuResilience Partnership (2021): Integrating Risk Finance into National Resilience Efforts</a></li> <li><a href="#">ADB (2020): Incorporating a DRF Framework into Country Management and Development Strategies</a></li> </ul>
c.iii	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> </ul>
c.iv	<ul style="list-style-type: none"> <li><a href="#">World Bank (2021): Enabling Private Investment in Climate Adaptation and Resilience</a></li> </ul>

# In depth case studies

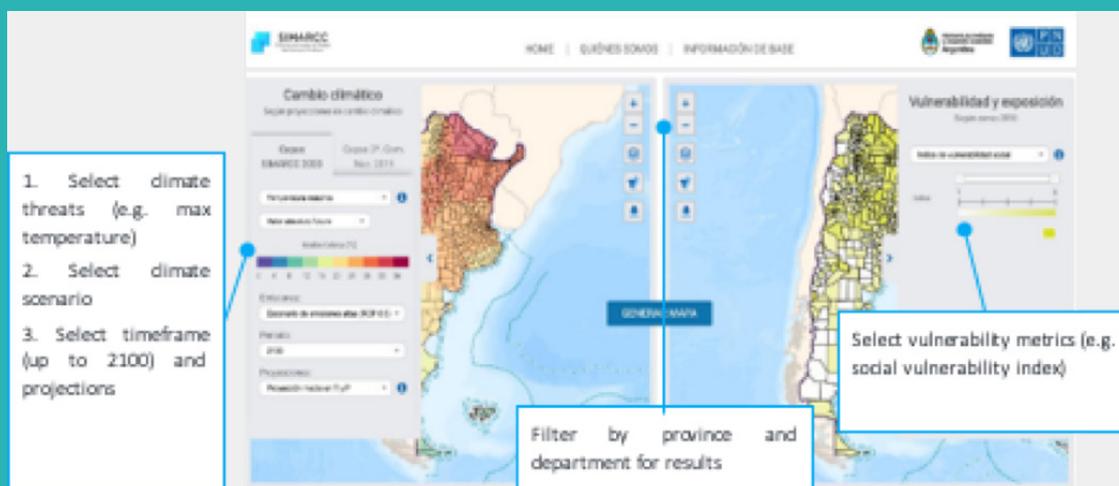
## BOX 3 | ARGENTINA'S CLIMATE RISKS MAP SYSTEM (SIMARCC) TO INFORM LTS AND NAP DEVELOPMENT

**Priority area/s:** Assess long-term physical risks and associated climate impacts

**Step/s:** Identify key physical hazards and uncertainties

- Argentina's National Climate Change Office and UNDP provide risk maps with different scenarios of threats and social vulnerabilities
- The online interactive tool has a user-friendly interface which allows decision makers to select variables to customise maps
- The tool is being used when designing the NAP and is currently being employed in understanding key risks in the LTS
- The tool will be improved and in future iterations will include: updated datasets (currently from 2012), projections of climate risks at the regional level, associated costs of climate impacts
- Analysis on tail events, or high impact low probability events, and quantified damages can also help policymakers use risk data to design interventions

### Overview of SIMARCC tool (adapted from User Manual)



**Source:** Based on National Climate Change Office Argentina and UNDP, SIMARCC. <http://devministerio.ecoclimasol.com/>

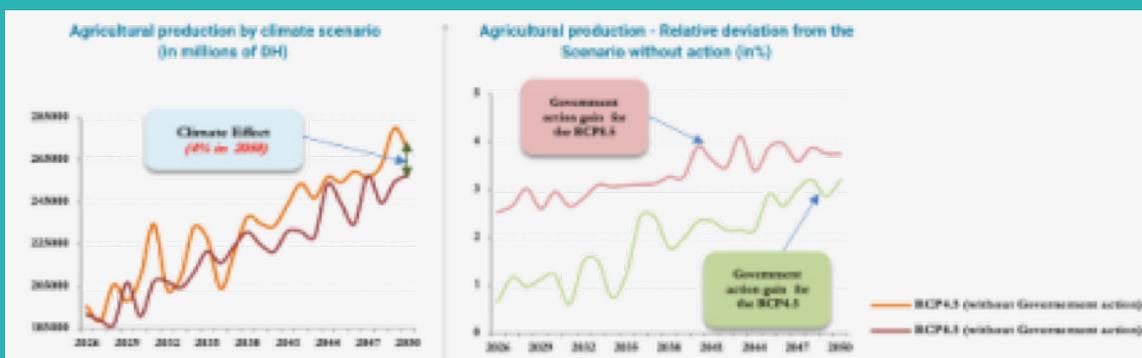
## BOX 4 | MOROCCO USES CLIMATE SCENARIOS TO ASSESS RISKS WITH AND WITHOUT GOVERNMENT INTERVENTION

**Priority area/s:** Assess long-term physical risks and associated climate impacts

**Step/s:** Conduct risk assessments

- The LPJmL and GEMMES project<sup>1</sup> models macroeconomic impacts of different climate scenarios on the Moroccan economy by 2050
- For example, the scenario analysis identifies water stress impacts on the agricultural sector with and without government intervention (e.g. impacts on agricultural production and household consumption)
- Morocco's LTS does not refer to GEMMES. However, the outputs of GEMMES could inform prioritisation of adaptation interventions. For example, incorporating future exposure and vulnerability scenarios in the LTS can inform sequencing and costing of interventions like desalinisation alongside mitigation actions.

### Overview of LPJmL and GEMMES model simulations



**Note:** 1.GEMMES or General Monetary and Multisectoral Macrodynamics for the Ecological Shift) is a macroeconomic model developed by the French Development Agency (AFD). The LPJmL (Lund-Potsdam-Jena managed Land) model, is a spatialized digital land use model used in partnership with the Mediterranean Institute of marine and terrestrial Biodiversity and Ecology (IMBE).

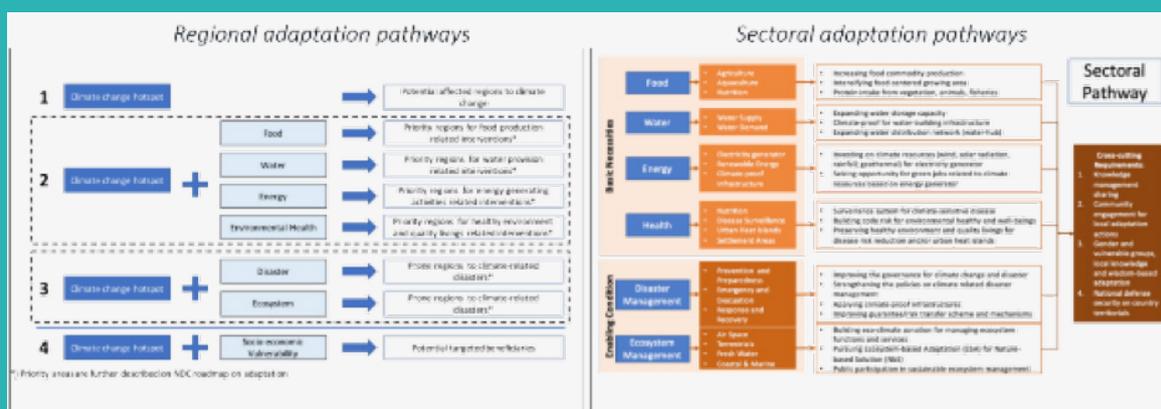
**Source:** Based on DEPF: *The Moroccan economy and the climate change challenges: impact scenarios by 2050 and relevant adaptation policies*; Government of Morocco (2021) *Stratégie Bas Carbone à Long Terme Maroc 2050*. Available from: [https://unfccc.int/sites/default/files/resource/MAR\\_LTS\\_Dec2021.pdf](https://unfccc.int/sites/default/files/resource/MAR_LTS_Dec2021.pdf)

## BOX 5 | DECOMPOSING REGIONAL AND SECTOR SPECIFIC PATHWAYS IN INDONESIA'S LTS

**Priority area/s:** Assess long-term physical risks and associated climate impacts

**Step/s:** Synthesize risks and identify priority sectors and areas

- Indonesia's LTS identifies priority areas of intervention using adaptation pathways
- Adaptation pathways are created at the regional and sector level. Priority areas are identified based on six dimensions (food, water, energy, environmental health, disasters and ecosystems), and the underlying socio-economic vulnerability of a region.
- The LTS estimates future climate change can have an impact of 0.66% to 3.45% of national GDP across four necessities: water, food, energy and health<sup>36</sup>
- Based on this assessment, Indonesia has set the target of limiting annual average losses from acute physical hazards to no more than 3.45% of GDP by 2050.
- The LTS supports decision making by:
  - (i) quantifying regional vulnerability along a vulnerability index, built by using flood and drought risk maps, socio-economic data, and environmental infrastructure
  - (ii) calculating the cost of the adaptation pathways and
  - (iii) outlining an institutional framework where LTS 2050 targets inform interim targets in the NDC, which then feed into Climate Action Plans and National and Sectoral Development Plans
- The LTS can leverage adaptation pathways to build platforms that enable real-time decision-making and account for uncertainties



**Source:** Based on Minister for Environment and Forestry (2021), Indonesia LTS-LCCR 2050, [https://unfccc.int/sites/default/files/resource/Indonesia\\_LTS-LCCR\\_2021.pdf](https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf)

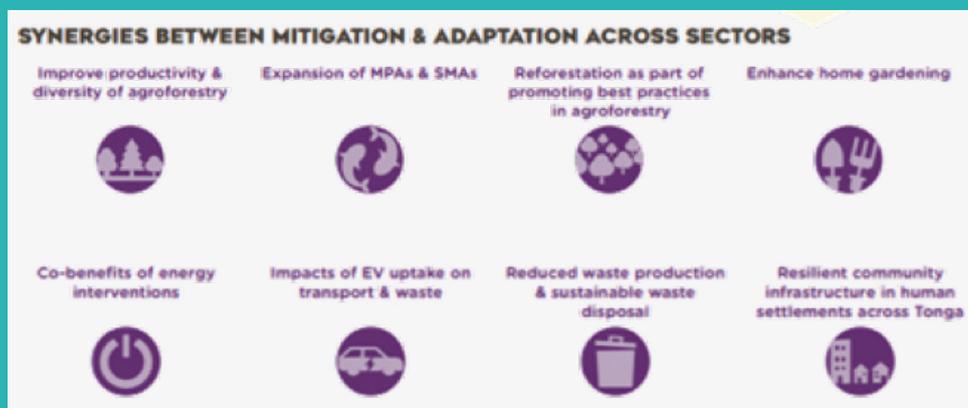
## BOX 6 | TONGA'S LTS IDENTIFIES SYNERGIES BETWEEN MITIGATION AND ADAPTATION

**Priority area/s:** Realise synergies between mitigation and adaptation

**Step/s:** Identify synergies between mitigation and adaptation and prioritise interventions

- Tonga's LTS was developed through a series of workshops in which stakeholders considered interactions, trade-offs, and benefits to Tonga's low carbon and climate resilient future:
- Workshop 1: Stakeholders considered and prioritised Knowledge Cards (based on criteria like sector priorities, national principles) to develop three visions for Tonga, which were later synthesised into one vision.
- Workshop 2: Stakeholders used Intervention Cards to outline the preferred pathways of each sector. Intervention cards provided participants with mitigation actions, GHG emissions reduction potential, likelihood (possible, plausible, probable), time horizon and benefits and constraints including resilience and adaptation considerations.
- Workshop 3: Stakeholders finalised the sector pathways with priority intervention-actions and outlined major first-step actions to implement the LTS.
- Based on this participatory approach, stakeholders identified priority interventions and recognized mitigation and adaptation synergies in Tonga's LTS.
- Chapter 5.3 in the LTS outlines joint policies such as: improved productivity and diversity of agroforestry, expansion of Marine Protected Areas and Special Management Areas, reforestation as part of promoting best practices in agroforestry, enhanced home gardening, co-benefits of energy interventions, impacts of electric vehicle (EV) uptake on transport and waste, reduced waste production and sustainable waste disposal, and resilient community infrastructure in human settlements

### *Example synergies identified in Tonga's LTS*



**Note:** Tonga's LT-LEDS was led by the Tonga Department of Climate Change, with support from ClimateWorks Australia, the Global Green Growth Institute (GGGI), and Relative Creative. The LT-LEDS was funded by the New Zealand's Ministry of Foreign Affairs and Trade. **Source:** Case study developed by ClimateWorks Australia and adapted by Vivid Economics; Government of Tonga (2021) Tonga LEDS 2021-2050 [https://unfccc.int/sites/default/files/resource/TONGA\\_LEDS\\_2021-2050.pdf](https://unfccc.int/sites/default/files/resource/TONGA_LEDS_2021-2050.pdf)

## BOX 7 | MOROCCO REALISES MITIGATION-ADAPTATION SYNERGIES VIA DESALINISATION

**Priority area/s:** Realise synergies between mitigation and adaptation

**Step/s:** Identify synergies between mitigation and adaptation and prioritise interventions

- Morocco's LTS identifies renewable-powered desalination as a key intervention to meet water stress and mitigate CO<sub>2</sub> emissions simultaneously
- **Mainstream adaptation in sectoral planning:** The LTS helps mainstream adaptation and align with sectoral policies such as the National Program of Drinking Water Supply and Irrigation 2020-2027 and the National Water Plan 2020-2050
- **Financial incentives:** Integrated planning can unlock domestic and international finance:
- Morocco's post-Covid recovery stimulus, the Mohammed VI investment fund, is being targeted at the agriculture and energy sectors, providing an opportunity for cross-sector collaboration on desalination
- International donors can have financing prerequisites, such as coal exclusion, making renewable-powered plants attractive investments
- **Institutional coordination:** Beyond the LTS, institutional coordination can be enabled via the National Commission on Climate Change and Biological Diversity, which connects representatives from public institutions, research and civil society, serving as an ongoing platform to realise synergies

### Mitigation and adaptation synergies in desalination

	Policy	Mitigation	Adaptation
	Renewables-powered desalination	Reduced fossil fuel consumption	Increased fresh water supply

**Source:** Based on Government of Morocco (2021) *Stratégie Bas Carbone à Long Terme Maroc 2050*. [https://unfccc.int/sites/default/files/resource/MAR\\_LTS\\_Dec2021.pdf](https://unfccc.int/sites/default/files/resource/MAR_LTS_Dec2021.pdf) ; FCDO (2021): *Assessment of Stimulus Packages across North Africa countries*; AfricMaroc (2020): *Announcement of National Climate Change Committee*. <https://www.agrimaroc.ma/maroc-commission-nationale-changements-climatiques/> ; Government of Morocco (2020): *Decree announcing National Climate Change Committee*. <http://www.sgg.gov.ma/Portals/0/commissions/decret2-19-721.pdf>

## BOX 8 | KENYA'S NATIONAL ADAPTATION PLAN (NAP) ESTIMATES COSTS AND MOBILISES INTERNATIONAL FINANCE USING ADAPTATION METRICS

**Priority area/s:** Enhancing capacity for accessing international climate finance

**Step/s:** Appraise adaptation investment needs; Outline a credible approach to mobilise adaptation finance

### Assessing investment needs to mobilise international climate finance

- Kenya's NAP estimates costs of adaptation actions to 2030 and identifies institutions responsible for their implementation
- Actions are divided into short (1-2 years), medium (3-5 years) and long-term (>6 years)
- Investment needs, timeframes and budget allocations are assessed for each macro-level action
- Processes in the NAP can be leveraged in the LTS by: extending timeframes of adaptation projects (beyond 10-20 years) and budget allocations (up till 2050); developing a range of scenarios to consider uncertainties around physical climate risks and constraints to financial allocations

### Sub-actions under 'Mainstream adaptation in the environment sector'

<b>Medium Term Sub-actions</b>	<ul style="list-style-type: none"> <li>• Strengthen the capacity of national and county institutions responsible for coordinating climate change adaptation.</li> <li>• Improve and expand existing climate change modelling work by Kenya Meteorological Department.</li> </ul>
<b>Long Term Sub-Actions</b>	<ul style="list-style-type: none"> <li>• Provide guidance and improve access to climate resilient tree species and cultivars.</li> <li>• Integrate ecosystem and community based approaches in sector strategies in support of adaptation to reduce natural resource based conflicts.</li> <li>• Continue the rehabilitation of water catchment areas in order to provide sustainable ecosystem services.</li> </ul>
<b>Budget</b>	US\$ 636,149,705
<b>Responsibility</b>	Ministry responsible for environment, MDAs, County Governments, research institutions and academia, civil society and private sector.

## Using adaptation and resilience metrics to identify synergies with sub-national climate funding

- Kenya's NAP lists adaptation indicators for monitoring and evaluation (e.g. national vulnerability index, number of households with timely access to climate information at county level)
- Some indicators have been used in Isiolo County to attract climate finance, in line with Kenya's National Climate Change Action Plan
- Linking institutional structures responsible for planning, budgeting and M&E of projects at the ward level, can help secure funding using local adaptation metrics
- Processes in the NAP can be leveraged in the LTS by: ensuring longevity of institutional structures that link adaptation metrics and budgeting
- Similar adaptation indicators have also been developed in Mozambique, and have been used to develop a national level output budgeting tool in Uganda

### Example adaptation indicators in Kenya's NAP

ADAPTATION INDICATORS		
National	Sector	County
<ul style="list-style-type: none"> <li>• Human development index</li> <li>• Percentage of climate related national loss and damage in the public and private sectors</li> <li>• Population living below the poverty line</li> <li>• National vulnerability index</li> </ul>	<ul style="list-style-type: none"> <li>• Number of sectors planning, budgeting and implementing climate change adaptation actions</li> <li>• National and county performance contracting systems integrating climate change adaptation targets</li> <li>• Amount of loss and damage from climate hazards per sector</li> </ul>	<ul style="list-style-type: none"> <li>• Number of counties that have integrated climate change adaptation in their CIDPs</li> <li>• Number of counties budgeting and implementing adaptation programmes;</li> <li>• No of national and county level programmes/projects incorporating ecosystem-based adaptation and community-based adaptation approaches</li> <li>• Number of households with timely access to climate information</li> </ul>

Based on Republic of Kenya (2017) Kenya National Adaptation Plan. [https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya\\_NAP\\_Final.pdf](https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Kenya_NAP_Final.pdf); IIED (2014) Tracking Adaptation and Measuring Development in Kenya. <https://pubs.iied.org/10101iied>; IIED (2014) Tracking Adaptation and Measuring Development in Mozambique. <https://pubs.iied.org/10102iied>; IIED (2015) Strengthening frameworks to monitor and evaluate climate adaptation in Uganda. <https://pubs.iied.org/17287iied>

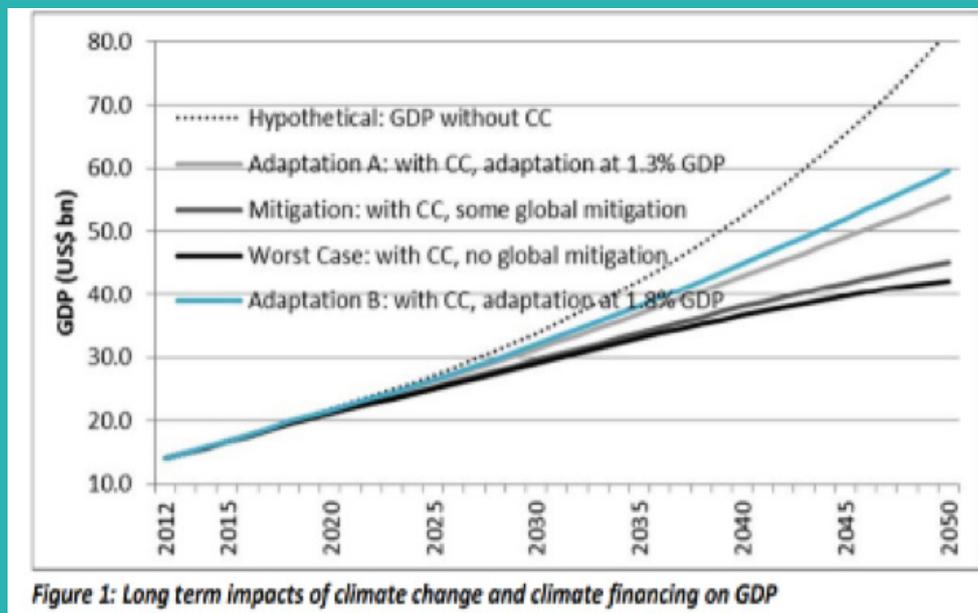
## BOX 9 | CAMBODIA'S LTS CAN LEVERAGE THE 2015 CLIMATE CHANGE FINANCING FRAMEWORK TO IDENTIFY ADAPTATION FINANCING GAPS

**Priority area/s:** Enhancing capacity for accessing international climate finance

**Step/s:** Identify gaps and barriers in ongoing adaptation finance

- Cambodia's LTS has a cost benefit analysis for mitigation actions, with adaptation co-benefits estimated to be USD 1 billion by 2050 based on the LTS4CN scenario, modelling actions in sectors such as AFOLU, energy and waste
- The LTS can be further enhanced by adopting a financing framework to cost out adaptation measures and identify gaps in long-term adaptation financing
- For example, the 2015 financing framework reports the current level of adaptation related expenditure and estimates for the next five years in which profiling and costing of the proposed adaptation response indicated Cambodia would require adaptation spending to be 3.3% of GDP (versus 1.22% in 2012) between 2015-2050

**Climate-related public expenditure on climate change response in Cambodia was estimated to be 1.3% of GDP**



Based on Government of Cambodia (2021) Long-Term Strategy for Carbon Neutrality. [https://unfccc.int/sites/default/files/resource/KHM\\_LTS\\_Dec2021.pdf](https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf) ; Cambodia's National Council for Sustainable Development (2015) National Financing Framework

## BOX 10 | THE GAMBIA'S MULTI-SECTORAL TASKFORCE IS SET-UP TO MOBILISE CLIMATE FINANCE

**Priority area/s:** Enhancing capacity for accessing international climate finance

**Step/s:** Outline a credible approach to mobilise adaptation finance

- The multi-sectoral task force on mobilization of climate finance is an initiative from the Low Emissions Climate Resilience Development Strategy of The Gambia (LECRDS) from 2018 – 2030
- The taskforce has not yet been implemented, however, the ambition is it will help create 'bankable' projects to deliver on interventions listed in the LECRDS
- The taskforce will work in close collaboration with The Gambia Climate Fund in the Ministry of Finance to leverage pre-existing initiatives to secure finance from domestic budgets and international financing mechanisms
- An example of a recent adaptation finance project in The Gambia is a recent grant of USD 40 million secured from the World Bank's International Development Association (IDA) to promote the development of inclusive, resilient, and competitive agricultural value chains, with specific focus on smallholder farmers and agribusinesses in The Gambia

**Note:** The task force consists of the following: the National Designated Authority (NDA) of the GCF, the Designated National Authority (DNA) of the Clean Development Mechanism (CDM), the National Implementing Entity (NIE) for the Adaptation Fund and the National Designated Entity (NDE) of the Technology Mechanism.

Based on Republic of The Gambia (2017) Low Emissions Climate Resilient Development Strategy of the Gambia. [https://meccnar.gov.gm/sites/default/files/2021-06/LOW%20EMISSION%20CLIMATE%20RESILIENCE%20DEVELOPMENT%20STRATEGY%20REPORT-%202017-FINAL\\_0.pdf](https://meccnar.gov.gm/sites/default/files/2021-06/LOW%20EMISSION%20CLIMATE%20RESILIENCE%20DEVELOPMENT%20STRATEGY%20REPORT-%202017-FINAL_0.pdf) and World Bank (2021) Gambia Secures \$40 Million for an Inclusive, Resilient and Competitive Agriculture. <https://www.worldbank.org/en/news/press-release/2021/11/24/gambia-secures-40-million-for-an-inclusive-resilient-and-competitive-agriculture>

## Glossaries

**Table 4:** Glossary of acronyms

Acronym	Definition
AFOLU	Agriculture, Forestry and Land Use
BAU	Business As Usual
CDKN	Climate and Development Knowledge Network
CDM	Clean Development Mechanism
CGE	Computable general equilibrium model
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DNA	Designated National Authority
DRF	Disaster Risk Finance
DRM	Disaster Risk Management
EIB	European Investment Bank
EV	Electric Vehicle

FCDO	Foreign, Commonwealth and Development Office
GCF	Green Climate Fund
GCM	General Circulation Models or Global Climate Models
GDP	Gross Domestic Product
GEM	General Equilibrium Model
GEMMES	General Monetary and Multisectoral Macrodynamics for the Ecological Shift
GHG	Greenhouse gas
IADB	Inter-American Development Bank
IO	Input-Output model
IPCC	Intergovernmental Panel on Climate Change
KNMI	Koninklijk Nederlands Meteorologisch Instituut
LECRDS	Low Emission and Climate Resilient Development Strategy
LPJmL	Lund-Potsdam-Jena managed Land
LTS	Long Term Strategy/Long Term Strategies
MIROC	Model for Interdisciplinary Research on Climate
MRV	Monitoring, Reporting and Verification
NAP	National Adaptation Plan
NBS	Nature Based Solutions
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NDE	National Designated Entity
NIE	National Implementing Entity
NOAA	National Oceanic and Atmospheric Administration
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
RCM	Regional Climate Models
RCP	Representative Concentration Pathway
SDG	Sustainable Development Goals
SEI	Stockholm Environment Institute
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
WMO	World Meteorological Organization
WRI	World Resources Institute

**Table 5:** *Glossary of terminology*

Term	Definition
Assess	synthesize information (e.g. hazard information) for assessments like a risk assessment
Analyse	develop a deeper understanding of
Appraise	costs and benefits considered
Characterise	use taxonomies or high level categories for classification
Estimate	high level quantification (e.g. global trends)
Identify	non-exhaustive list of factors, variables, risks or impacts
Understand	qualitative information gathered about a topic at a high-level

# ENDNOTES

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- 1 LTS are low-emission development strategies, so have mostly been seen in terms of mitigation and development. However, even if not in the main articles (4.19 of [PA](#) and para 32-35 of the [Glasgow Climate Pact](#)), there is language around “pathway towards low greenhouse gas emissions and climate-resilient development”. (e.g., Article 2 of the PA and para 50, 54 and 85 of Glasgow Climate Pact).
- 2 UNDP (2019): NAP-Ag - Addressing agricultural resilience in long term climate planning instruments. Available at: <https://www.slideshare.net/UNDP-Adaptation/napag-addressing-agricultural-resilience-in-long-term-climate-planning-instruments?ref=https://www.adaptation-undp.org/webinar-recordings-addressing-agricultural-resilience-long-term-climate-planning-instruments>
- 3 50 LTS have been published as of 8<sup>th</sup> March 2022. UNFCCC (2022). Communication of long-term strategies. Available at: <https://unfccc.int/process/the-paris-agreement/long-term-strategies>. Lower middle income: Benin, Cambodia, Indonesia, Morocco, Nepal, Nigeria, Ukraine. Upper middle income: China, Colombia, Costa Rica, Fiji, Guatemala, Marshall Islands, Mexico, North Macedonia, South Africa, Thailand Tonga.
- 4 Countries are classified as low-income economies; lower middle-income economies; upper middle-income economies or high-income economies as per World Bank (2022), World Bank Country and Lending Groups. Available at: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>
- 5 McKinsey Climate Analytics.
- 6 McKinsey Global Institute (2020). Climate risk and response: Physical hazards and socioeconomic impacts. <https://www.mckinsey.com/business-functions/sustainability/our-insights/climate-risk-and-response-physical-hazards-and-socioeconomic-impacts>.
- 7 [Mckinsey Global Institute \(2020b\)](#)
- 8 The adaptation finance gap is described as “the difference between estimated costs of meeting adaptation targets and the amount of finance available to do so” as per the UNEP (2021) Adaptation Gap Report 2020. <https://www.unep.org/resources/adaptation-gap-report-2021>
- 9 UNEP (2021) Adaptation Gap Report 2020. Available at: <https://www.unep.org/resources/adaptation-gap-report-2021>
- 10 Definitions and metrics on climate investment are not standardized. Climate Policy Initiative (CPI) tracks ‘adaptation finance’ as i) investment with a primary function to create adaptation benefits and ii) flows that improve understanding of climate risk - CPI (2021) Global Landscape of Climate Finance. <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021/>; CPI (2019) Tracking Adaptation Finance: Advancing Methods to Capture Finance Flows in the Landscape. <https://www.climatepolicyinitiative.org/publication/tracking-adaptation-finance-advancing-methods-to-capture-finance-flows-in-the-landscape/>
- 11 Kenya’s LTS is still under development and this is based on stakeholder discussions on the process of leveraging NAPs, NDCs and other policy documents.
- 12 Ministry of Economy, Government of the Republic of Fiji (2018), [https://unfccc.int/sites/default/files/resource/Fiji\\_Low%20Emission%20Development%20%20Strategy%202018%20-%202050.pdf](https://unfccc.int/sites/default/files/resource/Fiji_Low%20Emission%20Development%20%20Strategy%202018%20-%202050.pdf)
- 13 AGNES (2020): Aligning Mid-Century Long-term Low Carbon Climate Resilient Development Strategy (LTS) with National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs) for Ghana, Kenya, Uganda and Zambia. Available at: <https://agnes-africa.org/aligning-mid-century-long-term-low-carbon-climate-resilient-development-strategy-lts-with-national-adaptation-plans-naps-and-nationally-determined-contributions-ndcs-for-ghana-kenya-uganda-and/>
- 14 Minister for Environment and Forestry (2021), Indonesia LTS-LCCR 2050, [https://unfccc.int/sites/default/files/resource/Indonesia\\_LTS-LCCR\\_2021.pdf](https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf)
- 15 As per the UNFCCC, risk reduction measures are undertaken before an extreme event occurs and may be used effectively in the case of climate-related stressors which occur frequently and have relatively small impacts. Risk retention approaches could be defined broadly as allowing a country to ‘self-insure’ itself against climatic stressors. Risk transfer approaches help to shift the risk of loss and damage, mostly financial, from one entity to another. [https://unfccc.int/files/adaptation/groups\\_committees/loss\\_and\\_damage\\_executive\\_committee/application/pdf/synopsis\\_literature](https://unfccc.int/files/adaptation/groups_committees/loss_and_damage_executive_committee/application/pdf/synopsis_literature)

[review.pdf](#)

- 16 “Lock-in effects entail a degree of irreversibility. This can occur through choices about site location, infrastructure, supply chain networks or core business models, which are difficult to reverse and can increase exposure to subsequent risks long-term or lock-in to future interventions to manage exposure”. Climate Change Committee (2021), Third UK Climate Change Risk Assessment (CCRA). <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Chapter-6-FINAL.pdf>
- 17 Actions that may lead to increased risk of adverse climate related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence. IPCC (2022) Introduction to WGII AR6 Fact Sheets. [https://report.ipcc.ch/ar6wg2/pdf/IPCC\\_AR6\\_WGII\\_IntroductionWGII.pdf](https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_IntroductionWGII.pdf)
- 18 An example of maladaptation is the use of air conditioners for cooling which can exacerbate heatwave conditions from wasted heat during operation and associated emissions. Salamanca et al (2014). Anthropogenic heating of the urban environment due to air conditioning. Journal of Geophysical Research: Atmospheres. <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2013JD021225>
- 19 GIZ (2019) [Long-term strategies in a changing climate](https://www.preventionweb.net/publication/long-term-strategies-changing-climate). <https://www.preventionweb.net/publication/long-term-strategies-changing-climate>
- 20 WRI (2019) [Scaling up Ambition: Leveraging NDCs and Long-Term Strategies to achieve the Paris Agreement Goals](https://www.wri.org/research/scaling-ambition-leveraging-nationally-determined-contributions-and-long-term-strategies). <https://www.wri.org/research/scaling-ambition-leveraging-nationally-determined-contributions-and-long-term-strategies>
- 21 Kingdom of Cambodia (2021) [Long-Term Strategy for Carbon Neutrality](https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf). [https://unfccc.int/sites/default/files/resource/KHM\\_LTS\\_Dec2021.pdf](https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf) (p35)
- 22 Kingdom of Cambodia (2021) [Long-Term Strategy for Carbon Neutrality](https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf). [https://unfccc.int/sites/default/files/resource/KHM\\_LTS\\_Dec2021.pdf](https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf)
- 23 Republic of The Gambia (2017) [Low Emissions Climate Resilient Development Strategy of the Gambia](https://meccnar.gov.gm/sites/default/files/2021-06/LOW%20EMISSION%20CLIMATE%20RESILIENCE%20DEVELOPMENT%20STRATEGY%20REPORT-%202017-FINAL_0.pdf). [https://meccnar.gov.gm/sites/default/files/2021-06/LOW%20EMISSION%20CLIMATE%20RESILIENCE%20DEVELOPMENT%20STRATEGY%20REPORT-%202017-FINAL\\_0.pdf](https://meccnar.gov.gm/sites/default/files/2021-06/LOW%20EMISSION%20CLIMATE%20RESILIENCE%20DEVELOPMENT%20STRATEGY%20REPORT-%202017-FINAL_0.pdf)
- 24 The just transition describes an equitable and inclusive low-carbon and climate resilient transition, where opportunities are accessible to all and disproportional impacts are mitigated.
- 25 UNHCR (2020) [Uganda’s Vulnerability and Essential Needs Assessment \(2020\)](https://reliefweb.int/sites/reliefweb.int/files/resources/REACH_UGA_VENA-Report_Oct2020.pdf). [https://reliefweb.int/sites/reliefweb.int/files/resources/REACH\\_UGA\\_VENA-Report\\_Oct2020.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/REACH_UGA_VENA-Report_Oct2020.pdf)
- 26 GIZ (2019) [Long-term strategies in a changing climate](https://www.preventionweb.net/publication/long-term-strategies-changing-climate). <https://www.preventionweb.net/publication/long-term-strategies-changing-climate>
- 27 Minister for Environment and Forestry (2021), [Indonesia LTS-LCCR 2050](https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf), [https://unfccc.int/sites/default/files/resource/Indonesia\\_LTS-LCCR\\_2021.pdf](https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf)
- 28 UNEP (2021) [Adaptation Gap Report 2020](https://www.unep.org/resources/adaptation-gap-report-2021). <https://www.unep.org/resources/adaptation-gap-report-2021>
- 29 The USD 100 bn commitment per year by 2020 was first agreed in [2009 in Copenhagen](#), reiterated in Cancun and Paris, and committed USD 100 bn to be split equally between mitigation and adaptation. Under COP26 (2021)’s Finance Delivery Plan “developed countries will make significant progress towards the USD 100 bn goal in 2022 and express confidence that it would be met by 2023.” <https://ukcop26.org/wp-content/uploads/2021/10/Climate-Finance-Delivery-Plan-1.pdf>
- 30 UNFCCC (2021): [António Guterres: 50% of All Climate Finance Needed for Adaptation](https://unfccc.int/news/antonio-guterres-50-of-all-climate-finance-needed-for-adaptation). <https://unfccc.int/news/antonio-guterres-50-of-all-climate-finance-needed-for-adaptation>
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- 32 GCMs “use mathematical equations to characterize how energy and matter interact in different parts of the ocean, atmosphere, land”, NOAA (2021) [Climate Models](https://www.climate.gov/maps-data/climate-data-primer/predicting-climate/climate-models). <https://www.climate.gov/maps-data/climate-data-primer/predicting-climate/climate-models>
- 33 RCMs downscale this information and as a result “can generally be run more quickly and at a higher resolution than GCMs, Carbon Brief (2018): [Q&A: How do climate models work?](https://www.carbonbrief.org/qa-how-do-climate-models-work) <https://www.carbonbrief.org/qa-how-do-climate-models-work>
- 34 Input-output analysis is “a modeling technique that divides the economy into final demand and production and accounts for the direct and indirect interdependencies among different sectors”, Science Direct (2005) [Input Output Analysis](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/input-output-analysis). <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/input-output-analysis>

- 35 CGE models can “provide an initial estimate of how the costs and benefits of climate change policies could affect economies, how they will be distributed among different economic agents and how they will influence the allocation of resources and the rate of growth”, IADB (2015): Technical Note on CGE Modelling. <https://publications.iadb.org/publications/english/document/CGE-Modeling-The-Relevance-of-Alternative-Structural-Specifications-for-the-Evaluation-of-Carbon-Taxes-Impact-and-for-the-Integrated-Assessment-of-Climate-Change-Effects-Simulations-for-Economies-of-Latin-America-and-the-Caribbean.pdf>
- 36 The impact on energy, food, and water was the result of a dynamic calculation analysis using climate change projections for Indonesia which were translated into sensitivity analysis of an increase in temperature of 1 to 3 degrees and a change in rainfall of -30 to 30% from the baseline condition. Meanwhile, the impact on the health sector was analysed based on the changed area affected by vector borne disease simulated using projected climates from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Model. for Interdisciplinary Research on Climate (MIROC) climate models in the Representative Concentration Pathway (RCP) 4.5 scenario.

