2050 PATHWAYS PLATFORM

November 2022

ENHANCING LONG-TERM LOW-EMISSION DEVELOPMENT STRATEGIES

Guidance document:

Agriculture, Forestry and Other Land Use

CONTENTS

EXECUTIVE SUMMARY

The Agriculture, Forestry and Land Use (AFOLU) sector is a critical sector for the low-carbon transition but its integration into Long Term low greenhouse gas emission development Strategies (LTS) is currently under-developed. Signatories to the Paris Agreement are committed to develop an LTS, framing national pathways for decarbonisation and climate-resilient development up to 2050. While the sector has been included in most LTS, the focus has predominantly been on the mitigation potential of the sector without considering the co-benefits that climate action in the sector can deliver.

By integrating the AFOLU sector in LTS, countries could gain better leverage the sector to contribute to mitigation, adaptation, economic development, and nature protection goals. The AFOLU sector is uniquely characterised by its ability to leverage interventions that can simultaneously be beneficial to mitigation, adaptation, rural development and the protection of nature and ecosystems. While the sector provides plenty of opportunity for climate mitigation, adaptation is also critical given the sector's vulnerability to climate change, especially because many marginalised communities rely on the sector for their livelihoods. Moreover, climate interventions in the sector could contribute to the protection of the ecosystems that the sector relies on for its production.

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

- **Information:** understanding the emissions potential of the sector, as well as assessing physical climate risks and analysing relevant markets.
- **Interventions:** identification and appraisal of climate policy interventions in the sector, accounting for synergies between adaptation, mitigation, protection of nature 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 for stakeholder engagement and updating the strategy over time, and building capacity where needed.

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

- **Analyse sector physical climate risks:** an analysis of physical climate risks in the AFOLU sector is key to inform sector-specific adaptation policy.
- **Leverage cross-cutting interventions:** creating a holistic appraisal framework will help prioritise climate interventions in the AFOLU sector.
- **Consider Nature Based Solutions:** Nature Based Solutions are particularly promising climate interventions which can deliver a range of co-benefits of climate action.
- **Consideration and support of marginalised communities:** climate interventions which empower rural marginalised communities to develop an inclusive LTS.

The guidance set out in this note provides practical steps to further integrate AFOLU 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

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.[12]

This note provides practical guidance for integrating the Agriculture, Forestry and Land Use (AFOLU) sector into LTS, based on the experience of low-and-middle-income countries. It highlights the importance of considering the AFOLU sector 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 the AFOLU sector 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 the AFOLU sector 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.

The AFOLU sector accounts for a large and increasing share of global emissions, and has very significant potential as a source of emissions reduction. Agricultural emissions account for about 20% of total global emissions and, in a Business As Usual (BAU) scenario, emissions are projected to increase by 15-20% by 2050 as a result of population growth and changing food consumption patterns.[3] Moreover, deforestation and forest degradation account for approximately 11% of global carbon dioxide (CO_2) emissions.[4] However, despite the sector's high current emissions, there is plenty of scope for low-cost mitigation, including through developing natural carbon sinks through 'nature based solutions'. For example, reforestation and avoided forest conversion could together mitigate over 6 $GtCO_2e$ annually.[5]

The AFOLU sector is highly vulnerable to physical climate risk. Productivity in the AFOLU sector directly depends on the weather and climate which makes the sector particularly vulnerable to climate change.[6] Each degree Celsius increase in temperature is projected to lead to a global yield loss of about 5%.[7] Extreme weather, diseases and pest events are also expected to become more frequent and severe due to climate change, though their impact on agricultural output remains highly uncertain.[8]

Impacts on the AFOLU sector disproportionately affect the poor. Not only are physical risks concentrated in low- and middle-income countries, but the economies of these countries – and marginalised communities within them – depend on agriculture, with 65% of adults living under the poverty line of $1.90 a day depending on agriculture for their livelihoods.[9] Climate change interventions in the AFOLU sector have the potential to support poverty reduction and wider socioeconomic development.

There are many interactions between the natural environment and the AFOLU sector. Nature underpins many key activities in the AFOLU sector but the natural environment and associated ecosystem services are threatened by climate change and human activities. Climate action in the AFOLU sector can protect and improve the environment and minimise the environmental damages created by the sector.

Incorporating AFOLU in the LTS allows these rich interactions to be accounted for and managed effectively. The AFOLU sector is unique in that investments and changes in practice can have impacts across mitigation, adaptation, rural development and nature. For example, Nature Based Solutions (NBS) such as the sustainable management of forests, reduced deforestation and re/afforestation have high potential for carbon mitigation and sequestration, while providing resilience against floods, creating additional sources of income for communities, and protecting habitats. By taking a holistic approach, the LTS can account for the synergies and potential trade-offs across these dimensions.

A review of already-published LTS of low-and-middle-income countries has shown that there is little focus on the cross-cutting nature of climate action in the AFOLU sector. Most LTS outline an emissions mitigation strategy for the AFOLU sector, often based on a quantitative analysis of the sector's mitigation potential. However, the current LTS provide little analysis of the physical climate risks in the sector, their impacts on socioeconomic and ecosystem indicators or the implications for marginalised communities within the sector. This narrow analysis also translates into a narrow focus on forestry and a neglect of some cross-cutting and supporting actions such as investment in human capital and improvements of agricultural markets and supply chains.

The guidance provides an overview of how to integrate the AFOLU sector as well as detailed step-by-step guidance for four priority areas. The four priority areas are:

- **Analyse sector physical climate risks:** an analysis of physical climate risks in the AFOLU sector is key to inform sector-specific adaptation policy.
- **Leverage cross-cutting interventions:** creating a holistic appraisal framework will help prioritise climate interventions in the AFOLU sector.
- **Nature Based Solutions:** Nature Based Solutions are particularly promising climate interventions which can deliver a range of co-benefits of climate action.
- **Consideration and support of marginalised communities:** climate interventions which empower rural marginalised communities to develop an inclusive LTS.

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

This section outlines actions to integrate the Agriculture, Forestry and Land Use sector into LTS. It answers the following questions:

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

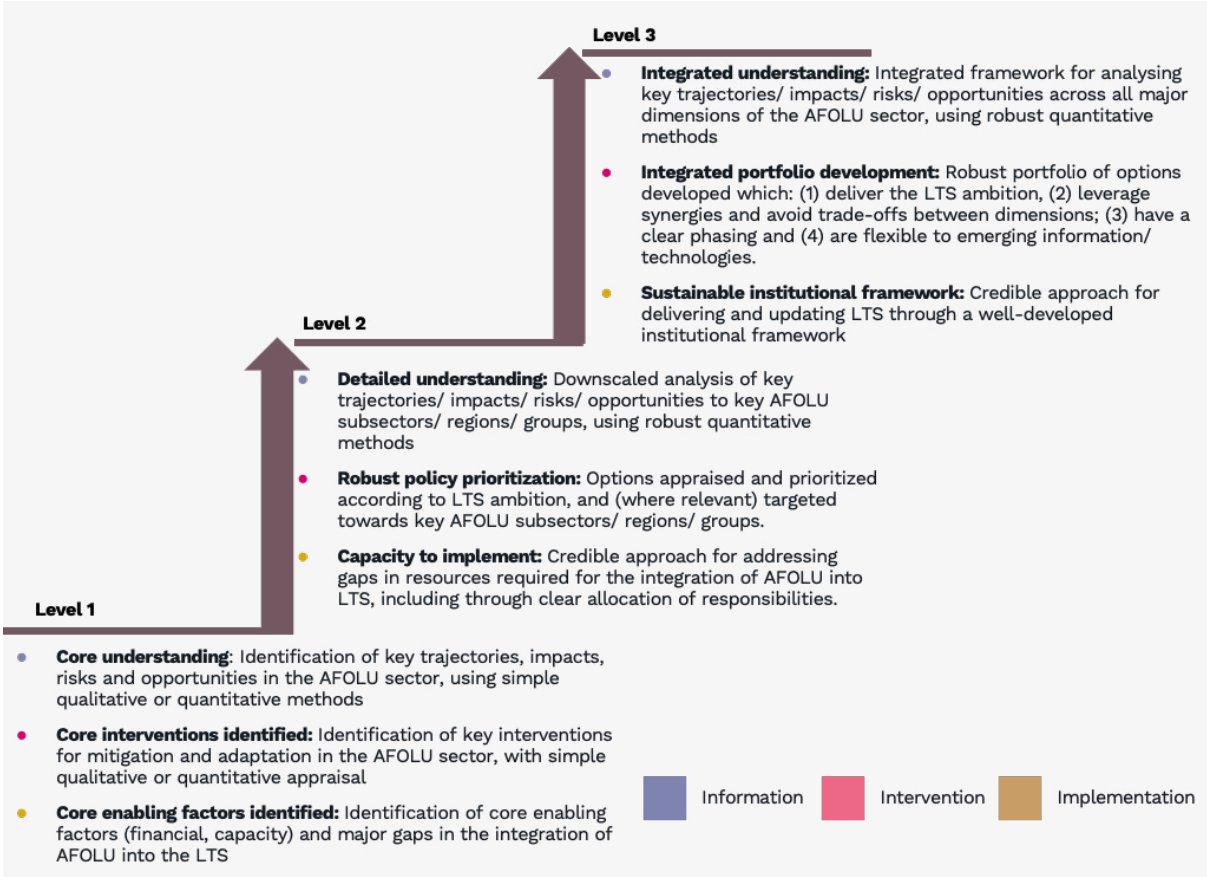
What does this guidance cover, and how should it be interpreted?

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 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 the AFOLU sector within the LTS?

Figure 2 outlines a set of actions for integrating the AFOLU sector into the LTS, disaggregated into the information, intervention and implementation categories.

Figure 2: *Actions for the integration of the AFOLU sector and priority areas*

Information

An analysis of the emission mitigation potential and climate risks within the AFOLU sector can underpin the LTS. A consistent set of land use scenarios can serve as a starting point for both mitigation and climate risk modelling. Emissions modelling, disaggregated by different greenhouse gases, can then inform the development of mitigation policy. A few countries, including Peru, Mexico and Ukraine, have used sophisticated land use models to analyse how land use changes would impact emission flows.[10] On adaptation, plans can be supported by analysis of the physical climate risks in the AFOLU sector, including a spatial, quantified account of potential economic losses and an assessment of social groups affected. For example, Chile's LTS shows a map of regional climate risks to agricultural outputs, forestry and biodiversity.[11] It finds that rainfed crops in the mountainous Southern areas are most vulnerable to climate risk. The most advanced modelling can integrate impacts of existing industrial strategies, macroeconomic projections, technological developments and wider changes in diets and food systems.

Intervention

This information can form the basis of a holistic assessment framework, in which multiple impacts of interventions are considered. Through identifying and ranking national priorities for the AFOLU sector, an appraisal framework can be developed which can help countries manage trade-offs. A brief guidance on how to conduct Multi-Criteria Decision Analysis (MCDA) can be found in Annex 1. Costa Rica and Chile provide examples of countries which have developed quantitative indicators for policy appraisal in their LTS development which include mitigation potential, costs and economic co-benefits.[12] NBS are climate interventions with a particularly wide range of benefits: for example, Colombia uses a range of models to analyse its natural capital and prioritises NBS interventions in those areas where ecosystem services are close to reaching their critical threshold of degradation.[13]

Implementation

A costed financing plan will give insight into the investment requirements of climate interventions in the AFOLU sector and outline potential sources of finance. There are opportunities in the AFOLU sector to leverage climate finance and revenue streams from carbon markets, which are largely neglected at present, mindful of Article 6 limits to claim emission reduction paid by others. Cambodia's LTS outlines the costs and benefits of each climate action as well as the public resources which should meet these costs.[14]

Specific focus on and engagement with marginalised communities can ensure planned interventions create inclusive benefits.[15] A quantitative analysis of exposure and vulnerability to climate hazards for marginalised communities as well as an assessment of climate policy risks and opportunities will inform the prioritisation of climate interventions which can empower rural communities. The outcomes of stakeholder engagement sessions with marginalised communities can form the basis of these analyses. A brief guidance on how to conduct stakeholder engagement can be found in Annex 1. Fiji's LTS is based on the targets set out in its National Development Plan which was developed around the principle of ensuring that the basic needs of all Fijians are met.[16]

The checklist in Figure 3 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 Annex 2. The next chapter goes into four of these action areas in detail, providing step-by-step guidance for identified priorities.

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 relate to commitment, engagement and capacity. Commitment to climate action is a 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. It is critical that responsibility is allocated to relevant decision makers: active participation from the ministries responsible for the AFOLU sector, as well as the ministries responsible for adjacent issues such as water management, social security, and the development of carbon markets, is therefore essential. To the extent that plans rely on budgetary support or international capital flows, the Ministry of Finance has a critical role. Given the localised nature of climate policy in the AFOLU sector, it is key that climate action is also prioritised across local agricultural institutions.
- Inclusive engagement can ensure that 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. When it comes to the AFOLU sector, stakeholder engagement with marginalised rural communities is of particular importance to protect these communities against climate change and promote a just transition.[17] Local agricultural institutions can play a vital role in bringing together local stakeholders such as district agricultural leads, cooperatives, NGOs and representatives of farmers and businesses.
- 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 (for example, monitoring fiscal risks) and leverage expertise from the private sector or overseas.

Figure 3: *Checklist of steps to integrate AFOLU into the LTS*

			Level 1	Level 2	Level 3
Information	**Develop feasible emissions pathways** • What are the key sources of emissions in the AFOLU sector and how are these likely to change over time? • What is the mitigation potential of the AFOLU sector?	**Analyse key drivers of emissions**	❑ Identify key drivers of emissions in the AFOLU sector	❑ Quantitatively analyse emission flows in the AFOLU sector	❑ Quantitatively analyse emission flows in the AFOLU sector
		Scope mitigation interventions	❑ Identify key mitigation interventions for the AFOLU sector	❑ Scope feasible emission mitigation interventions in the AFOLU sector	❑ Scope feasible emission mitigation interventions in the AFOLU sector
		Analyse mitigation potential	❑ Integrate AFOLU into mitigation pathways	❑ Quantitatively analyse mitigation potential of AFOLU sector	❑ Quantitatively analyse mitigation potential of AFOLU sector
	Assess sector physical climate risks • What are the key climate hazards impacting the AFOLU sector? • To what extent can the sector adapt to these climate hazards? • What will be the impact of physical climate change on socioeconomic and ecosystem indicators?	**Identify key climate hazards**	❑ Identify priority climate hazards	❑ Analyse hazard frequency and severity under climate change scenarios	❑ Analyse hazard frequency and severity under climate change scenarios, including tail events
		Conduct risk assessment	❑ Analyse drivers of exposure and vulnerability	❑ Conduct quantitative risk assessment	❑ Conduct quantitative risk assessment
		Socioeconomic and ecosystem impacts	❑ Identify secondary climate risks to economy (food security) and ecosystems	❑ Analyse secondary climate risks to economy (food security) and ecosystems	❑ Analyse secondary climate risks to economy (food security) and ecosystems
	Analyse sector market trends • How will physical climate change and climate policy, both domestically and globally, impact key markets in the AFOLU sector? • How does this interact with broader trends, such as diet change?	**Analyse key changes in supply**	❑ Identify key drivers of changing supply for AFOLU inputs and products	❑ Quantitatively analyse drivers of changing supply for AFOLU inputs and products	❑ Quantitatively analyse drivers of changing supply for AFOLU inputs and products
		Analyse key changes in demand	❑ Identify key drivers of changing demand for AFOLU inputs and products	❑ Quantitatively analyse drivers of changing demand for AFOLU inputs and products	❑ Quantitatively analyse drivers of changing demand for AFOLU inputs and products
		Synthesise analysis	❑ Identify impacts of changing markets on food security, trade and other key indicators	❑ Model impacts of changing markets on food security, trade and other key indicators	❑ Model impacts of changing markets on food security, trade and other key indicators
Intervention	**Leverage cross-cutting interventions** • How can policy makers leverage synergies and avoid trade-offs to deliver on mitigation, adaptation, socioeconomic and nature goals within the AFOLU sector?	**Develop an appraisal framework**	❑ Establish priorities for the AFOLU sector	❑ Establish priorities for the sector ❑ Develop an appraisal framework for assessing interventions	❑ Establish priorities for the sector ❑ Develop an appraisal framework for assessing interventions
		Develop a long list of interventions	❑ Develop a long list of interventions	❑ Develop a long list of interventions ❑ Horizon scanning of future interventions	❑ Develop a long list of interventions ❑ Horizon scanning of future interventions
		Appraisal against framework	❑ Prioritise high impact interventions	❑ Prioritise interventions through multi-criteria decision analysis	❑ Prioritise interventions through multi-criteria decision analysis ❑ Develop policy pathways
	Leverage NBS and nature-positive interventions • What are the priorities for NBS in the AFOLU sector? • How can a country leverage synergies and manage trade-offs of NBS interventions?	**Baseline assessment**	❑ Analyse trends in natural assets	❑ Develop a natural capital inventory	❑ Develop a natural capital inventory ❑ Develop future-looking land use scenarios
		Determine priorities and targets	❑ Identify relevant NBS options	❑ Estimate demand for negative emissions ❑ Develop appraisal framework for assessing NBS options	❑ Estimate demand for negative emissions ❑ Develop appraisal framework for assessing options
		Determine feasibility and spatial allocation	❑ Prioritise NBS options	❑ Prioritise NBS options ❑ Identify suitable locations using NBS potential maps	❑ Prioritise NBS options ❑ Identify suitable locations using NBS potential maps
Implementation	**Develop costed financing plans with innovate options explored** • What is the investment need for delivering AFOLU interventions? • What (domestic and international) sources of finance are available? • What innovative sources of finance could be leveraged (for example, finance from carbon markets)?	**Appraise AFOLU investment needs**	❑ Assess investment need for delivering AFOLU interventions	❑ Estimate investment need for delivering AFOLU interventions	❑ Develop quantified scenarios of AFOLU investment needs
		Analyse sources of climate finance	❑ Identify (domestic and international) sources of finance	❑ Quantify gaps in finance for the AFOLU sector ❑ Identify barriers and solutions	❑ Quantify gaps in adaptation finance ❑ Identify barriers and solutions
		Develop a financing strategy		❑ Scope innovative climate finance options for the sector ❑ Outline strategy to meet short-term investment needs	❑ Scope innovative climate finance options for the sector ❑ Develop a flexible long-term plan for investment in the sector
	Mainstream inclusivity throughout policy design and target-setting • What are the priorities for marginalised rural communities? • What are the physical climate risks and the climate policy risks and opportunities? • How can policy makers implement policies that can support and empower these communities?	**Determine priorities**	❑ Identify priorities for empowering marginalised rural communities through stakeholder engagement	❑ Identify priorities for empowering marginalised rural communities through stakeholder engagement	❑ Identify priorities for empowering marginalised rural communities through stakeholder engagement
		Analyse physical climate risks	❑ Identify drivers of physical climate risk for marginalized rural communities	❑ Quantitatively analyse exposure and vulnerability to climate hazards for marginalized rural communities	❑ Quantitatively analyse exposure and vulnerability to climate hazards for marginalized rural communities
		Assess climate policy risks and opportunities	❑ Identify climate policy risks and opportunities for marginalised rural communities	❑ Assess climate policy risks and opportunities for marginalised total communities	❑ Assess climate policy risks and opportunities for marginalised total communities
		Synthesis and policy response	❑ Identify policy priority interventions to empower rural communities	❑ Appraise policy interventions to empower rural communities	❑ Appraise policy interventions to empower communities ❑ Develop an inclusive institutional framework to empower communities

PRIORITY AREAS

This guidance notes provides a step-by-step guide for four priority areas. These four priority areas can unlock the transformative potential of the LTS, but a review of published LTS and stakeholder input suggests these are areas where additional guidance would be useful. Table 1 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 4 summarises the case studies, which are included in Annex 2.

Table 1: *Summary of priority areas*

Priority area	Importance	Level 1	Level 2	Level 3
Assess sector physical climate risks	• Identifies vulnerabilities in the AFOLU sector • Informs appropriate adaptation interventions	Analyse key physical climate risks and uncertainties for the AFOLU sector to inform adaptation needs	Quantitative and spatial analysis of physical risks in the AFOLU sector, based on land use change scenarios, to support prioritisation of adaptation interventions	Quantitative spatial analysis of physical climate risks which account for broader LTS priorities, as well as uncertainty, to form the basis of adaptive planning
Leverage cross-cutting interventions	• Facilitates the identification and prioritisation of win-win climate options • Allows for careful management of potential trade-offs	Identify interventions with strong synergies across mitigation and adaptation to inform high-impact action	Appraise interventions using quantitative multicriteria analysis to prioritise those which perform well across multiple dimensions	Robust policy appraisal to develop a portfolio of interventions which leverage synergies over time.
Integrate Nature Based Solutions	• Supports mitigation and adaptation while protecting natural capital and ecosystem services	Identify priority NBS options for delivering mitigation and adaptation objectives	Prioritise NBS options, based on quantitative and spatial methods to ensure optimal allocation of NBS	Leverage sophisticated toolkits to conduct integrated policy appraisal and develop a flexible strategy for NBS which is linked to national priorities, which could be financed through the voluntary carbon market
Support and empower marginalised rural communities	• Creates understanding of compounded challenges that rural communities face • Identifies policy options that can empower these communities	Identify drivers of climate risk and climate policy risk and identify priority interventions to empower marginalised rural communities	Analyse climate risks and climate policy risks which marginalised rural communities face and appraise policies which support rural development	Analyse climate risks and climate policy risks which marginalised rural communities face; develop a long-term approach to rural empowerment

Figure 4: *Summary of case studies*

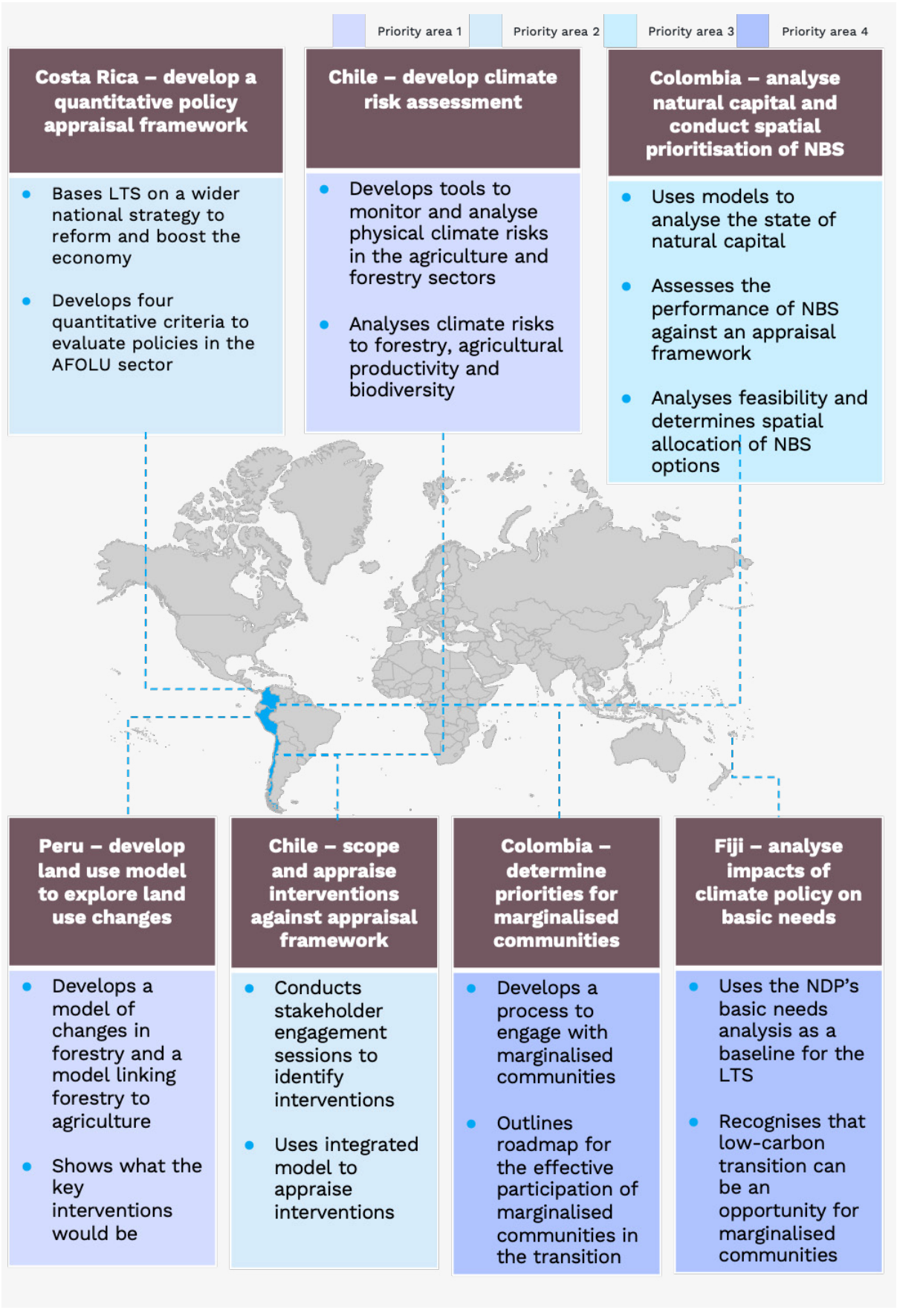
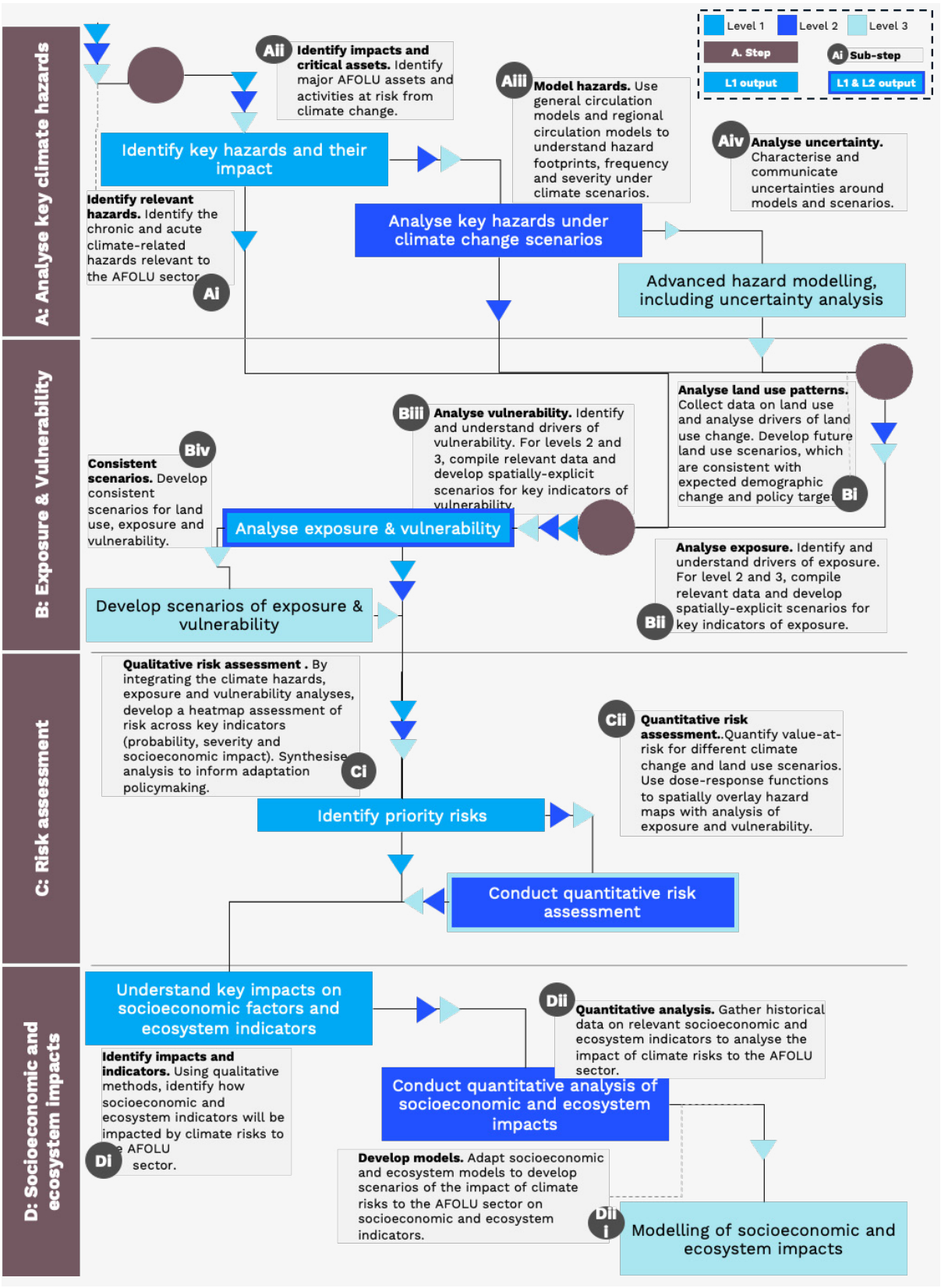


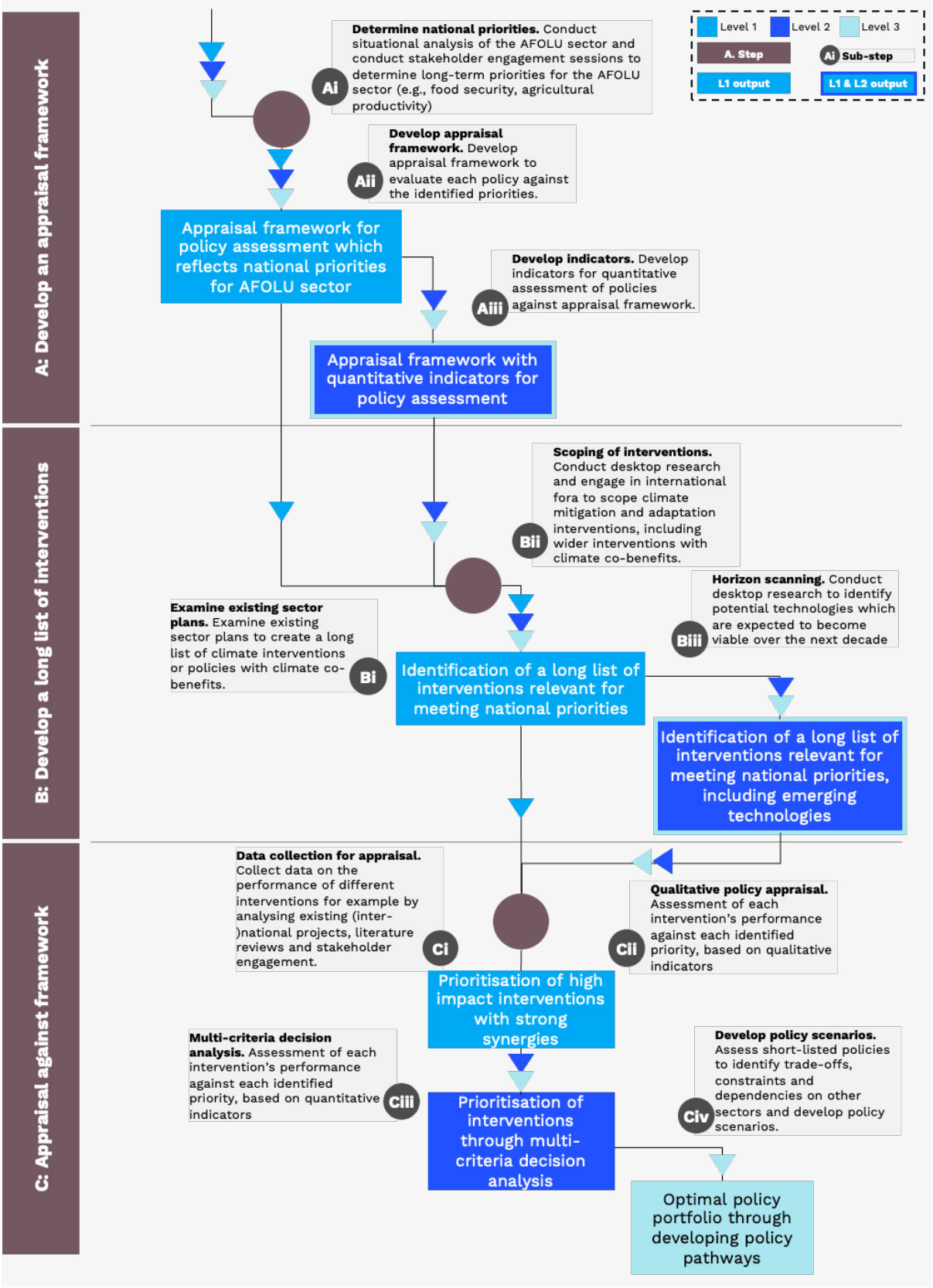
Figure 5-8 give a step-by-step overview of how to implement the four priority areas into LTS. Annex 3 gives an overview of the relevant resources for each of these steps.

Figure 5: *Priority Area 1: Assessing physical climate risks in the AFOLU sector*



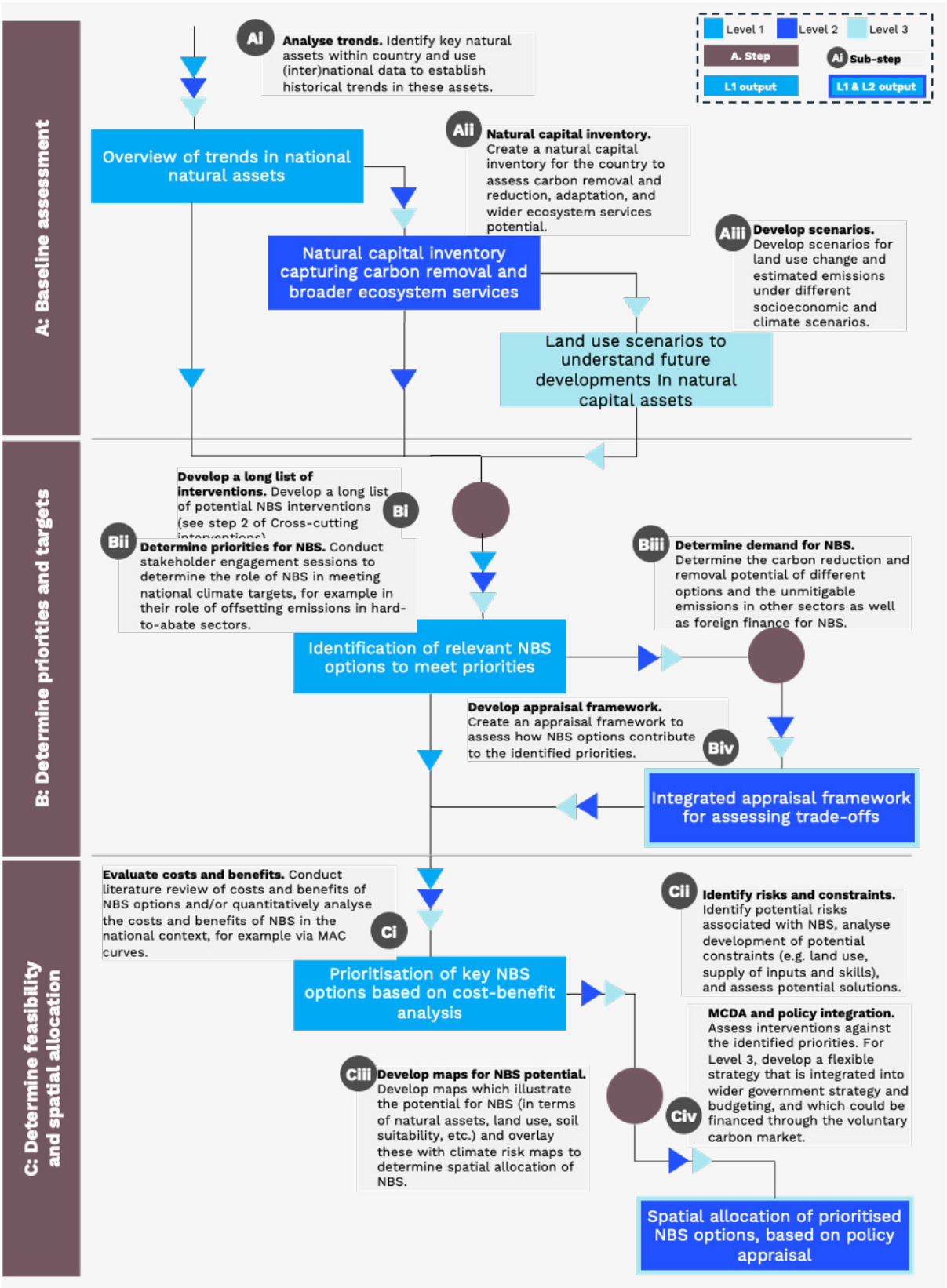
Note: *Where outputs cover multiple levels, this is indicated by using a different colour for the outline.*

Figure 6: *Priority Area 2: Leveraging cross-cutting interventions*



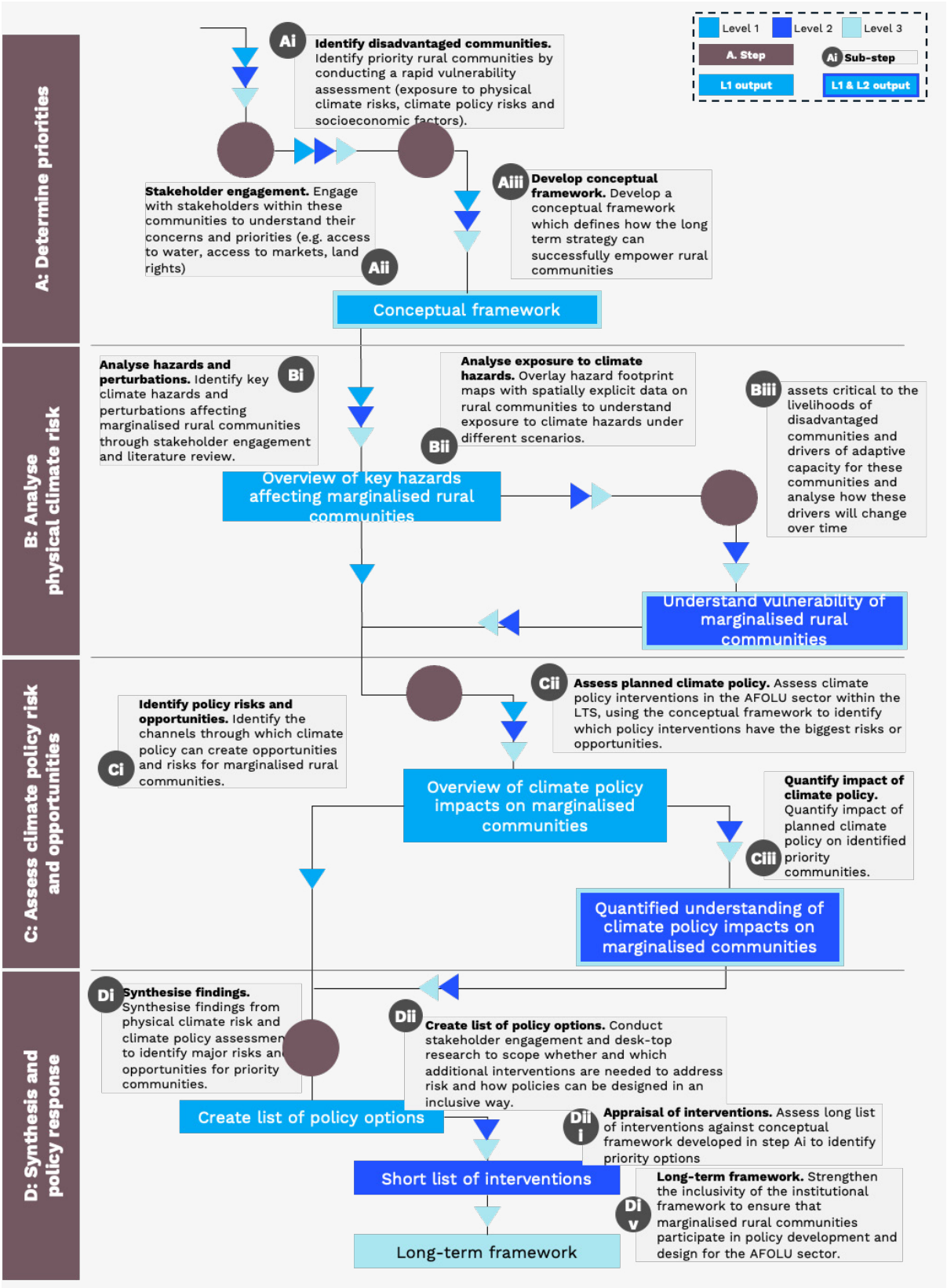
Note: *Where outputs cover multiple levels, this is indicated by using a different colour for the outline.*

Figure 7: *Priority Area 3: Integrating Nature Based Solutions*



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

Figure 8: *Priority Area 4: Empowering rural marginalised communities*



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

NEXT STEPS

Implementing this guidance on how the AFOLU sector can be incorporated into the LTS will require assigning key roles and responsibilities and ensuring effective coordination across government actors. Assigning responsibility for different elements of the LTS across sectoral stakeholders (such as relevant ministries and local authorities) creates accountability and may facilitate the mainstreaming of climate action within the sector. In AFOLU, the localised nature of interventions – and the specificity of their impact on communities and natural systems – may warrant a greater role for local governments in planning interventions and supporting their implementation. This could be done by setting up a specialised team that can drive the required changes for the low-carbon transition in the AFOLU sector at a regional scale or by capacity building within local agricultural institutions.

The identification and assessment of any gaps in resources and skills is required for an effective implementation and revision of the LTS. Key resources needed for the implementation and revision of the LTS may include finance, specific skills or project inputs. An assessment could be made of whether there are any gaps in these resources, either within the government bodies carrying out the LTS or within the communities adopting climate interventions, and a plan could be made to address these gaps. In the AFOLU sector, effective implementation of the LTS may depend on the ability to develop capacity at the local level for the training of farmers, foresters and land users.

The long-term nature of the LTS requires it to be flexible and to be able to incorporate emerging information through a Monitoring, Reporting and Verification framework. In the AFOLU sector, there remains a significant gap in knowledge of the mitigation and sequestration capacity of many NBS, a lack of understanding of how to measure different ecosystem services, and some uncertainty over how these can be certified in voluntary carbon markets. Moreover, there are large uncertainties around the impacts of climate change in the AFOLU sector. Therefore, an iterative framework is needed to revise and update the Long Term Strategy in light of the latest scientific findings and data as well as emerging risks, changing technologies and global trends and policies. In addition, a framework for the monitoring, reporting and verification of the outcomes of the LTS ensures accountability and will provide feedback that can be incorporated into the next iteration of the LTS.

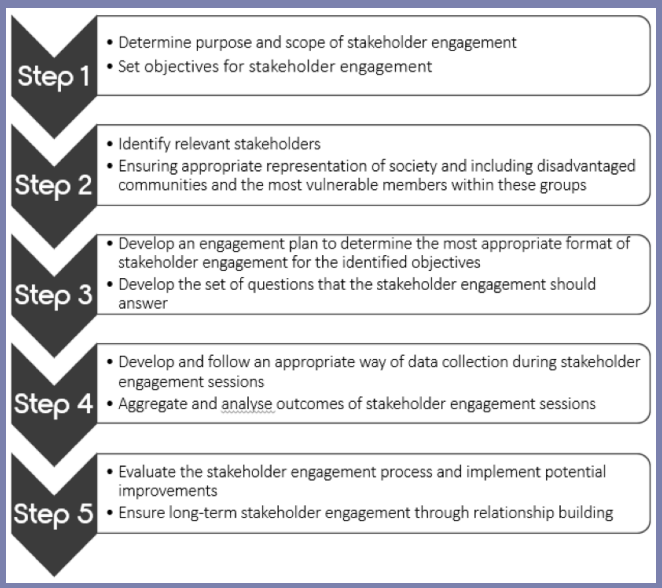
ANNEX

Supplementary guidance

BOX 3 | MCDA IS A DECISION-MAKING FRAMEWORK THAT CAN HELP POLICYMAKERS EVALUATE COMPLEX PROBLEMS THAT INVOLVE MULTIPLE DIFFERENT AND CONFLICTING OBJECTIVES AND CRITERIA

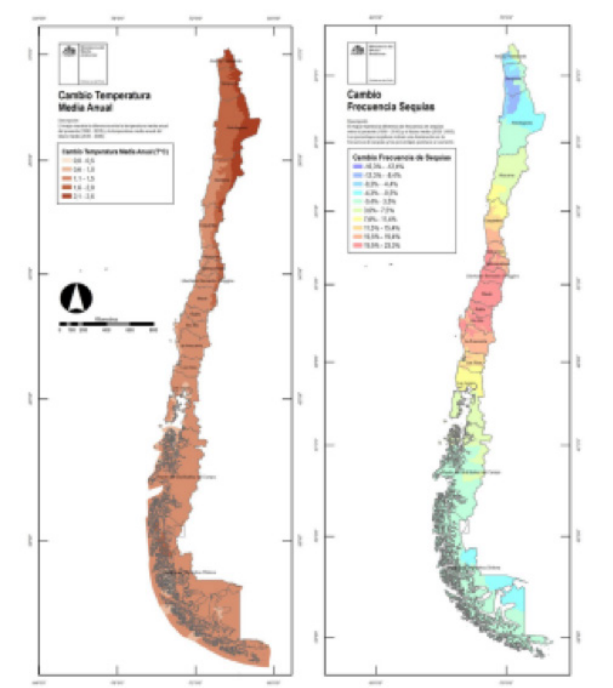
- Policymakers can follow four steps to conduct Multi-Criteria Decision Analysis:
- **Evaluation criteria:** identify indicators (e.g., costs, risks, feasibility, impact on vulnerable groups) for each priority which can measure and evaluate policy outcomes against each priority
- **Weighting:** conduct stakeholder engagement sessions to determine the relative weights or ranking of each identified priority
- **Scoring:** determine the qualitative or quantitative range of scores and for each indicator, determine the requirements for each score
- **Normalising scores:** score each intervention against each priority on the ranking scale, multiply weights by scores for each intervention and rank by final scores

BOX 4 | EFFECTIVE PARTICIPATION OF A WIDE RANGE OF STAKEHOLDERS THROUGHOUT LTS DEVELOP WILL FACILITATE THE IMPLEMENTATION AND ADOPTION OF THE LTS



BOX 5 | PRIORITY AREA 1 – CHILE HAS DEVELOPED SEVERAL TOOLS TO ANALYSE AND MONITOR PHYSICAL CLIMATE RISKS TO THE AFOLU SECTOR

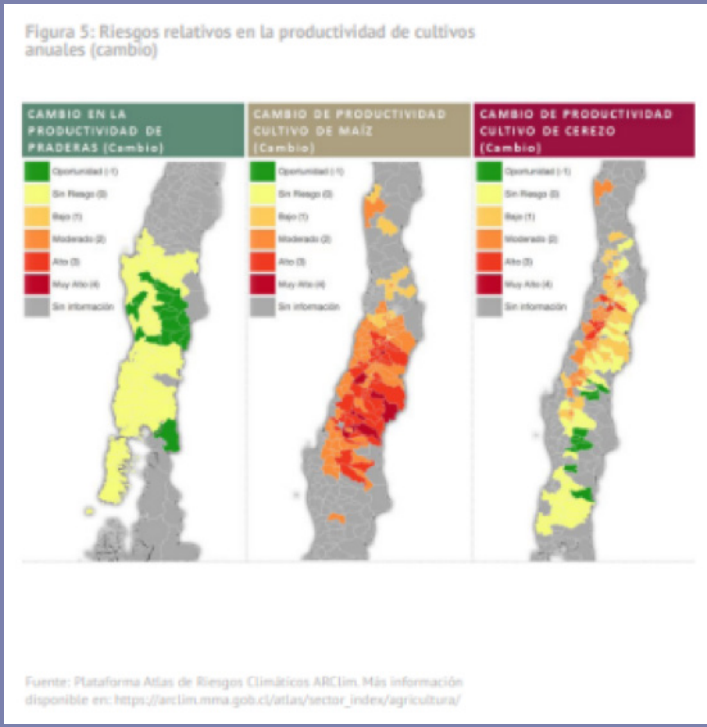
- The country has been developing tools to analyse and monitor physical climate risks of various sectors, including agriculture and forestry. This includes a platform, called Climate Risks Atlas, with climate projections for the country at the communal level. Another platform shows the projected changes in temperature, and the regional variation in precipitation and droughts. The analysis shows that 84% of the 345 communes will face one or more high climate risks.



Fuente: Plataforma Atlas de Riesgos Climáticos ARClim. Más información en: https://arclim.mma.gob.cl/amenazas/

- Chile has identified which agricultural crops (wheat, corn, beans and potatoes) are most important to the country and analysed the regional effects of climate change impacts, including variation in temperature, precipitation, radiation, relative humidity and wind speed) on these key agricultural products. The same analysis is conducted for the impact of climate change on fruit trees (including almond, walnut, cherry and apple trees), natural pastures and animal carrying capacity. Lastly, Chile has analysed the climate risks to forests.

- The results of these analyses were presented with maps which show the relative climate risk to each crop per region. The risks are classified on a scale from "opportunity" to "very high risk".



- In additional, Chile has analysed the losses in flora and fauna due to changes in precipitation and temperature. The impact of climate change on the geographic distribution of species is analysed, based on projections of the future spatial movement of species. The future spatial movement is derived from the current distributions of species and projections of climate change. The analysis identified the Central Southern region of Chile as the region with the highest relative risks for biodiversity. This means that the flora and fauna in this region have a relatively low resilience to the changing climate.

Based on: *Government of Chile & ECLP2050. (2021). Estrategia Climática de Largo Plazo de Chile. Available at: https://unfccc.int/sites/default/files/resource/CHL_LTS_2021.pdf.*

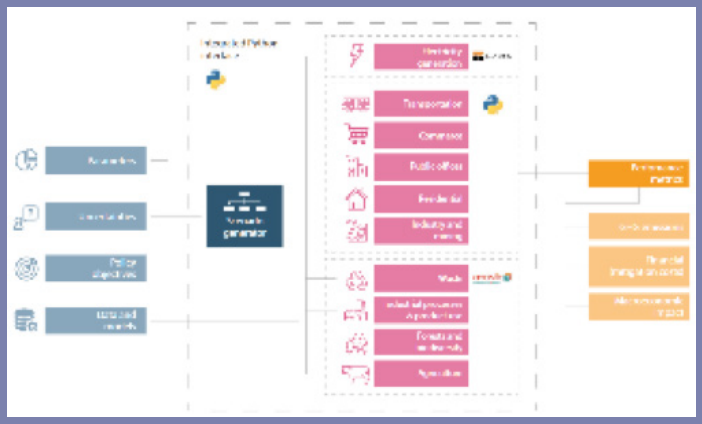
BOX 6 | PRIORITY AREA 2 – COSTA RICA HAS DEVELOPED A QUANTITATIVE FRAMEWORK FOR POLICY APPRAISAL

- Costa Rica's objective for the LTS is to become a decarbonised economy with zero emissions by 2050 and to become a global leader on climate change mitigation. The wider goal is for the country to become a "green, resilient and equitable economy without emissions". A key element of the LTS is to structurally reform and boost the economy without increasing pollution or damaging natural capital.
- The country sets out five priority actions, which includes "accelerating and scaling up transformation actions of the higher-emitting activities of the agricultural sector". Costa Rica has historically invested a lot in the conservation of biodiversity which underpins the country's ecotourism sector.
- Three of the country's ten main axes of decarbonisation include more efficient agricultural production, reduced emissions from livestock and the increase and maintenance of forest cover and ecosystem services based on NBS. The LTS sets out its transformation vision for each of these areas of climate policy.
- Four criteria were determined for a quantitative assessment of climate policies in the AFOLU sector:
    - The intervention's mitigation potential
    - Costs of the intervention
    - Economic benefits of the intervention (in particular in terms of health benefits– the LTS team is still figuring out how to calculate the co-benefits for ecosystem services)
    - The robustness of the underlying analysis of the policy's mitigation potential or costs of intervention
- The cost-benefits analysis for Costa Rica showed that climate policy nearly always provided net benefits for the country.
- In addition, multiple analyses were conducted to determine which sectoral transformations are needed to meet the emission reduction targets under a wide range of economic, environmental and technological scenarios.
- This policy assessment resulted in quantitative and time-bound targets for each of the three axes of the AFOLU sector. An example is Costa Rica's aim for 70% of the cattle herd and 60% of the areas dedicated to livestock to implement low-carbon technologies. Another example is to maintain the current forest cover and to restore forests to increase the forest cover to 60%.

Based on: *Government of Costa Rica. (2019). National Decarbonization Plan. Available at: https://unfccc.int/sites/default/files/resource/NationalDecarbonizationPlan.pdf.*

BOX 7 | PRIORITY AREA 2 – CHILE CONDUCTED STAKEHOLDER ENGAGEMENT SESSIONS TO IDENTIFY CLIMATE INTERVENTIONS AND DEVELOPED MODELS BASED ON THE OUTCOMES OF THESE SESSIONS

- Chile conducted stakeholder engagement sessions to identify the policies the people wanted to implement. These sessions identified already existing actions that could contribute to decarbonisation in each sector. They also included a mapping exercise of people's objectives, priorities, uncertainties and concerns across a matrix. Participants were then asked to identify what levers could achieve these objectives.
- The information coming out of these stakeholder engagement sessions was used as input for modelling exercises which helped determine the mitigation potential and feasibility of these interventions. Researchers developed an integrated model covering all sectors of the greenhouse gas inventory and separate models for each sector, the output of which was fed into the integrated model. The researchers modelled the AFOLU sector in Analytica. They also conducted uncertainty analyses by changing the underlying assumptions of the model.



- The LTS team followed a robust decision-making framework and took a participatory approach to the appraisal of interventions. As a result, interventions in agriculture, particularly focusing on soil care, and cross-cutting farming practices were identified.

Based on Government of Chile & ECLP2050. (2021). Estrategia Climática de Largo Plazo de Chile. Available at: https://unfccc.int/sites/default/files/resource/CHL_LTS_2021.pdf.; Banco Interamericano de Desarrollo. (2021). Opciones para lograr la carbono-neutralidad en Chile. Available at: https://publications.iadb.org/publications/spanish/document/Opciones-para-lograr-la-carbono-neutralidad-en-Chile-una-evaluacion-bajo-incertidumbre.pdf.

BOX 8 | PRIORITY AREA 3 – COLOMBIA'S LTS WAS INFORMED BY AN ANALYSIS OF NATURAL CAPITAL AND SPATIAL PRIORITISATION OF NBS

- Colombia has used several models to analyse the state of its natural capital and its capacity to deliver ecosystem services. These models include:
- A decarbonisation model, which uses an algorithm based on satellite and remote climate data to analyse the emission reduction and sequestration potential of several NBS in the AFOLU sector under different climate policy scenarios
- The model can also give insight into where deforestation is likely to happen, in particular deforestation as a result of palm plantations
- An Ecological Footprint model which calculated the ecological footprint of consumption and compared it with the biocapacity of the country (the Ecological Footprint measures the "human appropriation of biologically productive land and water – measured as biocapacity")
- Climate hazard data was later added to this model to determine how physical climate hazards affect the Ecological Footprint
- Macroeconomic models are used to understand how water security will change
- Macroeconomic models are also used to gain insight into the country's losses in different climate change scenarios without adaptation
- Colombia is developing a model which can improve the country's understanding of how forest fires affect ecosystems and to gain insight into which areas are more vulnerable to forest fires
- Colombia has also assessed the performance of past NBS interventions to learn which approaches worked well and which could be improved
- These models informed how much carbon the AFOLU sector could remove and sequester. While good data was available on the mitigation and sequestration potential of forests and mangroves, the country faced data constraints with regards to coral reefs and marine ecosystems.
- Colombia has been working closely together with the IUCN and has adopted the IUCN standard for its analysis. The country has also been working closely with scientific researchers who have been developing the models with historical data.
- Colombia has set quantitative targets for both mitigation and adaptation, which informs the demand for NBS. Colombia's LTS acknowledges the use of NBS to offset emissions which cannot be reduced. The use of NBS for adaptation is regarded as a priority for Colombia because the country experiences the highest number of natural disasters across South America. There is an objective to better connect mitigation and adaptation in agriculture and a focus on ecosystem-based adaptation and NBS development.

- The LTS outlines five criteria against which each NBS option is assessed which are:
    - Carbon storage potential
    - Costs
    - Co-benefits
    - Capacity for implementation
    - Technological maturity
- The LTS also analyses the barriers to implementation to each of these options and uses the Analytical Hierarchy Process to prioritise them.

CRITERIO	NOMBRE	VALOR
1	COSTOS	13,7%
2	COBENEFICIOS	13,1%
3	POTENCIAL DE ALMACENAMIENTO	51,9%
4	ESTADO DE DESARROLLO	15,4%
5	CAPACIDAD DE IMPLEMENTACIÓN	6,0%

- Colombia prioritises hotspot areas for biodiversity and water regulation as locations for NBS and it prioritises NBS which have win-win options for mitigation and adaptation. For example, Colombia's highlands were chosen as locations for NBS as they regulate water for lowland areas and have methane stocks. Mangroves sequester carbon and provide co-benefits for the food security of farmers. Moreover, NBS are prioritised in areas of the country where ecosystem services are close to passing the critical threshold of degradation.

Based on: *Government of Colombia. (2021). Estrategia climática de largo plazo de Colombia E2050 para cumplir con el Acuerdo de París. Available at: https://unfccc.int/sites/default/files/*

BOX 9 | COLOMBIA'S LTS WAS INFORMED THROUGH ENGAGEMENT WITH MARGINALISED COMMUNITIES

- The LTS development team worked together with NGOs (WWF and Conservation International) which were already working with indigenous and Afro-Colombian communities. These NGOs helped the team set up online working groups.
- Stakeholder engagement sessions were conducted with 9 Afro-Colombian communities, 13 indigenous groups. This also included some women who tend to be underrepresented in stakeholder engagement with these communities. Furthermore, the LTS development team spoke with 9 young organisations to gain perspective of young people's long term vision for Colombia.
- A conceptual framework was created to guide the stakeholder engagement, which includes 7 steps for effective participation of these communities in the low-carbon transition and adaptation to climate change. The 7 steps are:
    - Identification of communities and mapping of organisations that can represent them
    - Creation of a participation plan
    - Institutional coordination
    - Establishing an initial relationship with these communities
    - Validation of the participation plan with the communities
    - The stakeholder engagement sessions
    - Follow-up with communities after the stakeholder engagement
- A guiding document was created with the interpretation and translation into simple language of the underlying vision, principles, and commitments.
- Some examples of the questions asked during the workshops are:
    - These communities' perspectives on climate hazards
    - How these communities had adapted to climate hazards and changes in the past
    - These communities' vision for their territories
    - These stakeholder engagement sessions found that:
    - These communities were particularly worried about forest conservation and the implications for indigenous land rights and access
    - Indigenous communities could be involved in projects and participate on the carbon market
    - Some production systems could be changed such that indigenous communities could sell their products on markets
- The discussions on risk management to climate hazards helped the LTS team to broaden the range of actions considered during the LTS development. For example, communities in the Caribbean explained how they used flooding for crop production.

Based on: *Government of Colombia. (2021). Estrategia climática de largo plazo de Colombia E2050 para cumplir con el Acuerdo de París. Available at: https://unfccc.int/sites/default/files/resource/COL_LTS_Nov2021.pdf.; stakeholder engagement*

BOX 10 | FIJI'S LTS CONDUCTED SEVERAL ANALYSES TO UNDERSTAND THE LABOUR MARKET IMPLICATIONS OF THE LOW-CARBON TRANSITION AND THE POTENTIAL OPPORTUNITIES FOR MARGINALISED GROUPS

- Fiji's National Development Plan (NDP) was drawn up with the principle that it should meet the basic needs of all Fijians. Each target and policy relating to meeting all Fijians' basic needs within the NDP and within the sectoral plans was taken as the boundaries within which the Long Term Strategy could be developed. Sectoral specialists could then determine what climate interventions could contribute to the NDP within each sector. This approach ensured that the interventions set out within the LTS would also contribute to the basic needs objective.
- Green jobs assessment Fiji conducted a green jobs assessment to estimate the current green jobs for several sectors. A qualitative analysis was conducted on how the low-carbon transition may impact the creation and share of green jobs across Fiji's economy. The assessment is based on the International Labour Organization's (ILO) definition of green jobs and follows the methodology of "Assessing Green Jobs Potential in Developing Countries: A Practitioner's Guide". Across the agriculture and forestry sector, the assessment identified the following considerations:
- In agriculture, Fiji expects that conservation agriculture will lead to fewer employment opportunities while organic agriculture is expected to increase employment opportunities (when comparing the employment opportunities of each farming management style for the same agricultural output). [18]
- In forestry, green jobs may increase due to afforestation and reforestation interventions and woodland planting for electricity generation. In Fiji's Very High Ambition climate mitigation scenario, potentially 3000 new green jobs may be created by 2030 and 8000 by 2050.

Table 52. Preliminary Baseline Estimate of Green Formal Jobs in Fiji in Key Sectors (2018).

Industry or Sector	Jobs	Percent	Comment
Agriculture and agro-based products	1,068	12%	May be considerably underestimated
Forestry (Government staff only)	183	2%	Underestimate; no private sector data yet
Fisheries (Government staff only)	282	3%	Commercial fisheries generally not green
Energy	884	10%	Mostly sustainable electricity
Water Supply & Treatment	2,114	24%	State-owned enterprises only
Waste and Recycling	118	1%	Mostly private companies
Tourism (excluding food services)	2,140	24%	Resorts/hotels and tour services
Non-profits, regional & international	817	9%	Includes universities
Other Core government staff	90	1%	Climate Change Division & Dept of Environment
Misc. sustainability training, consulting	71	1%	Green consultants
Unallocated	1,030	12%	Not clearly attributable to one sector
Total	**8,797**	100%	

Total formal sector paid employment	196,800
Green jobs as percentage of total	**4.5%**

Note: Covers only paid employment (full-time equivalent), informal wage or salaried jobs. Rounded off to nearest percent.

- Capacity building assessment
- After the development of the LTS, a training and capacity building assessment was conducted in collaboration with the Australia Pacific Climate Partnership to determine the skills needed for the LTS interventions. The project's objective to help design educational programmes to provide the skills for the climate labour market and future skills demand and to address barriers to high demand skills development and jobs.
- The capacity building assessment identified the skills needed to meet the climate objectives of Fiji as well as the current gap in skills to meet these objectives. It splits the required actions for capacity building into 3 levels: awareness raising, training and on-the-job capacity. Sectoral experts would analyse each intervention set out in the LTS and determine what needs to be done on each of the 3 levels to support the implementation of these interventions. The project also analyses the barriers of Fijians to develop the skills needed for the low-carbon transition and in accessing the green jobs market.
- Opportunities for marginalised groups and plans for further analysesFiji's LTS acknowledges that the LTS provides an opportunity for marginalised groups such as women and youth to fill up the skill shortages in some sectors while simultaneously addressing the relative lack of representation of these groups in these sectors. The LTS is also planning to improve insight into the development of, and potential constraints to, informal green jobs.
- Furthermore, Fiji has adopted the Gender Action Plan which is aimed at increasing women's participation and leadership in climate action and including gender-related considerations in climate policy. Fiji is also planning to assess gender-related climate impacts.

Based on: *Government of the Republic of Fiji. (2018). Fiji Low Emission Development Strategy 2018-2050. Available at: https://unfccc.int/sites/default/files/resource/Fiji_Low%20Emission%20Development%20%20Strategy%202018%20-%202050.pdf. Australia Pacific Climate Partnership. (2021). Partnerships for knowledge brokering in the Pacific. Available at: https://ausclimateaid.com/APCP-Knowledge-Brochures-Pack.pdf. Government of the Republic of Fiji. (2017). 5-Year & 20-Year National Development Plan. Available at: https://www.fiji.gov.fj/getattachment/15b0ba03-825e-47f7-bf69-094ad33004dd/5-Year-20-Year-NATIONAL-DEVELOPMENT-PLAN.aspx*

Resources

Table 2: *Overview of useful resources for assessing physical climate risks*

Deepdive: assess physical climate risks	
Step a: analyse key climate hazards	
Substep	Resource
a.i	• IPCC. (2014). Agriculture, Forestry and Land Use. • FAO. (2021). The impact of disasters and crises on agriculture and food security • IFPRI. (2009). Climate Change. Impact on Agriculture and Costs of Adaptation
a.ii	• World Bank. (2021). Climate Risk Country Profiles. • KNMI and WMO. (2020). Climate Explorer.
a.iii	• National historical data on relevant climate hazards and perturbations • National historical data on losses and damages to assets and activities in the AFOLU sector
a.iv	• General Circulation Models (GCMs) or Regional Climate Models (RCMs) • Academic research
Step b: Analyse climate change exposure and vulnerability	
b.i	• Mirkatouli et al. (2015). Analysis of land use and land cover spatial pattern based on Markov chains modelling. • Zhao et al. (2020). Quantifying Land Use/Land Cover and Landscape Pattern Changes and Impacts on Ecosystem Services.
b.ii	• WRI. (2021). Aqueduct Tools. • FAO. (2021). Crop Ecological Requirements Database (ECOCROP).
b.iii	• Asian Development Bank. (2011). Community-Based Climate Vulnerability Assessment and Adaptation Planning. • UNFCCC. (2008). Resource Guide: Vulnerability and Adaptation to Climate Change.
b.iv	• World Bank. (2022). Agriculture tool resources. • Global Ecology Laboratory. (2012). Land Use Harmonization Model
Step c: Qualitative and quantitative risk assessment	
c.i & c.ii	• Jones and Boer. (2014). Assessing Current Climate Risks. • Jones and Mearns. (2004). Assessing Future Climate Risks. • IPCC. (2010). Guidance Note on Consistent Treatment of Uncertainties
Step d: Analyse socioeconomic and ecosystem impacts	
d.i	• IPCC. (2019). Climate Change and Land. • FAO. (2015). Climate change and food security: risks and responses.
d.ii & d.iii	• Dunford et al. (2015). Exploring climate change vulnerability across sectors and scenarios using indicators of impact and coping capacity.
Deepdive: leveraging cross-cutting interventions	
Step a: Identify priorities and develop appraisal framework for MCDA	
Substep	Resource
a.i	• FAO. (2022). Food and agriculture data. • National physical risk assessments • National demographic data • IFPRI. (2022). Publications & Tools. • FAO. (2017). The future of food and agriculture.
a.ii	• UN. (2020). Evaluation Framework. • UNEP. (2019). Approach for Assessment of Policy Effectiveness. • Stockholm University. (2015). Common Policy Appraisal Format.
a.iii	• IDB.(2022). Indicators to Assess the Effectiveness of Climate Change Projects.
Step b: Develop a long list of interventions	

b.i	• National development plans • National sector plans
b.ii	• FAO. (2021). Climate resilient practices. • Climate Focus. (2014). Mitigating Climate Change in Agriculture. • IPCC. (2014). Agriculture, Forestry and Other Land Use (AFOLU).
b.iii	• Institute of Risk Management. (2018). Horizon Scanning: A Practitioner's Guide. • National Academy of Sciences. (2020). Horizon scanning and foresight methods.
Step c: Appraisal of long list of interventions against appraisal framework	
c.i	• FAO. (2022). Economic and Policy Analysis of Climate Change. • UNFCCC. (2022). Projects, Case studies and Tools.
c.ii	• ICAT. (2021). Forestry Assessment Guide. • ICAT. (2021). Agriculture Methodology. • OECD. (2018). Cost-Benefit Analysis and the Environment.
c.iii	• OECD. (2019). Strategic Foresight for Better Policies. • GO Science. (2017). Tools for Futures Thinking and Foresight Across UK Government.
Deepdive: integrating NBS	
Step a: Baseline assessment	
Substep	Resource
a.i	• UNEP. (2021). Publications & Data. • UNEP. (2021). World Environment Situation Room. • UNSD. (2021). Environment Statistics.
a.ii	• United Nations. (2012). System of Environmental-Economic Accounting 2012: Central Framework. • SEEA. (2021). Ecosystem Accounting: Final Draft • UNSD. (2021). e-Learning Platform: System of Environmental Economic Accounting (SEEA). • Stanford University. (2022). InVEST.
a.iii	• PBL. (2021). IMAGE – Integrated Model to Assess the Global Environment. • Global Ecology Laboratory. (2012). Land Use Harmonization Model • FAO. (2022). Food and agriculture projections to 2050.
Step b: Determine priorities and targets	
b.i	• UNEP. (2021). Nature-based solutions for climate change mitigation. • IPCC. (2019). Climate Change and Land. • NBS Initiative. (2022). NBS Case studies. • ThinkNature. (2019). ThinkNature Nature-Based Solutions Handbook.
b.ii	• Chausson et al. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation. • Albert et al. (2021). Planning nature-based solutions: Principles, steps, and insights.
b.iii	• Sectoral climate mitigation strategies • NBS Initiative. (2022). The NbS Evidence Platform.
b.iv	• UN. (2020). Evaluation Framework. • UNEP. (2019). Approach for Assessment of Policy Effectiveness. • Stockholm University. (2015). Common Policy Appraisal Format.
Step c: Determine feasibility and spatial allocation	

c.i	• WEF & McKinsey. (2021). Consultation: Nature and Net Zero. • Griscom et al. (2017). Natural climate solutions. • Sowinska-Swierkosz & Garcia. (2021). A new evaluation framework for nature-based solutions. • NBS Initiative. (2022). The NbS Evidence Platform.
c.ii	• Nelson et al. (2020). Challenges to realizing the potential of nature-based solutions. • Seddon et al. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges.
c.iii	• Chausson et al. (2020). Mapping the effectiveness of nature-based solutions for climate change adaptation.
c.iv	• Mubeen et al. (2021). Planning and Suitability Assessment of Large-scale Nature-based Solutions for Flood-risk Reduction. • Guerrero et al. (2018). Locating Spatial Opportunities for Nature-Based Solutions.
Deepdive: support and empower marginalised rural communities	
Step a: Determine priorities and identify marginalised communities in AFOLU	
Substep	Resource
a.i	• Thomas et al. (2018). Explaining differential vulnerability to climate change. • Kuran et al. (2020). Vulnerability and vulnerable groups from intersectionality perspective.
a.ii	• CGIAR. (2016). Guidelines to Engage with Marginalized Ethnic Minorities in Agricultural Research for Development in the Greater Mekong.
a.iii	• UN University. (2006). Measuring Vulnerability to Natural Disasters. • UNFCCC. (2018). Considerations regarding vulnerable groups, communities and ecosystems in the context of the national adaptation plans.
Step b: Analyse physical climate risk of disadvantaged communities in AFOLU	
b.i	• FAO. (2007). Climate risk assessment at the community level in the agriculture sector. • FAO. (2015). Climate change and food security: risks and responses. • IMPACT. (2021). Climate Watch Thread.
b.ii	• Emergency Demonstration Project. (2009). Community Based Vulnerability Assessment.
b.iii	• CARE. (2019). Climate Vulnerability and Capacity Analysis Handbook. • Wongbusarakum and Loper. (2011). Indicators to assess community-level social vulnerability to climate change. • Crane et al. (2017). A systematic review of local vulnerability to climate change in developing country agriculture. • World Bank. (2010). Participatory Scenario Development Approaches.
Step c: Assess risk and opportunities of climate policy for rural marginalised communities	
c.i	• IMF. (2021). Transboundary Climate-related Risks. • Espagne et al. (2021). Developing countries' macroeconomic exposure to the low-carbon transition. • Orbitas. (2020). Agriculture in the Age of Climate Transitions.
c.ii	• ICAT. (2021). Forestry Assessment Guide. • ICAT. (2021). Agriculture Methodology. • National data on livelihoods in AFOLU sector
c.iv	• National demographic data
Step d: Synthesis and policy response	
d.i	• Previous analyses of climate risks and transitions risks
d.ii	• Action Aid. (2019). Principles for a Just Transition in Agriculture. • Hansen et al. (2019). Climate risk management and rural poverty reduction.
d.iii & d.iv	• Climate Strategies. (2021). Incorporating just transition strategies into developing countries NDCs and Covid-19 responses. • UNFCCC. (2020). Just Transition of the Workforce, and the Creation of Decent Work and Quality.

Summary of key terms

Table 3: *Overview of acronyms*

Acronym	Definition
AFOLU	Agriculture, Forestry and Land Use
BAU	Business as Usual
LTS	Long Term Strategy/Long Term Strategies
MCDA	Multi-Criteria Decision Analysis
NBS	Nature Based Solutions
NDP	National Development Plan
UNFCCC	United Nations Framework Convention on Climate Change

Table 4: *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

1 50 LTS have been published as of 8th 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.

2 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

3 McKinsey & Company. (2020). Agriculture and climate change. Available at: https://www.mckinsey.com/~/media/mckinsey/industries/agriculture/our%20insights/reducing%20agriculture%20emissions%20through%20improved%20farming%20practices/agriculture-and-climate-change.pdf

4 FAO. (2020). REDD+ Reducing Emissions from Deforestation and Forest Degradation. Available at: https://www.fao.org/redd/en/

5 Griscomb et al. (2017). Natural climate solutions. Available at: https://www.pnas.org/doi/pdf/10.1073/pnas.1710465114

6 World Bank. (2015). Agricultural risk management in the face of climate change. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/787511468170682886/agricultural-risk-management-in-the-face-of-climate-change

7 World Bank. (2015). Future of Food: Shaping a Climate Smart Global Food. Available at: https://documents1.worldbank.org/curated/en/645981468189237140/pdf/100046-WP-PUBLIC-dislcose-7am-10-8-15-Box393216B.pdf

8 World Bank. (2015). Agricultural risk management in the face of climate change. Available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/787511468170682886/agricultural-risk-management-in-the-face-of-climate-change

9 World Bank. (2016). Who Are the Poor in the Developing World? Available at: https://documents1.worldbank.org/curated/en/187011475416542282/pdf/WPS7844.pdf

10 Banco Interamericano de Desarrollo. (2021). Costos y beneficios de la carbono-neutralidad en Perú. SEMARNAT-INECC. (2016). Mexico's Climate Change Mid-Century Strategy. Available at: https://unfccc.int/files/focus/long-term_strategies/application/pdf/mexico_mcs_final_cop22nov16_red.pdf. Government of Ukraine. (2017). Ukraine 2050 Low Emission Development Strategy. Available at: https://unfccc.int/sites/default/files/resource/Ukraine_LEDS_en.pdf.

11 Government of Chile & ECLP2050. (2021). Estrategia Climática de Largo Plazo de Chile. Available at: https://unfccc.int/sites/default/files/resource/CHL_LTS_2021.pdf.

12 Government of Chile & ECLP2050. (2021). Estrategia Climática de Largo Plazo de Chile. Available at: https://unfccc.int/sites/default/files/resource/CHL_LTS_2021.pdf. Government of Costa Rica. (2019). National Decarbonization Plan. Available at: https://unfccc.int/sites/default/files/resource/NationalDecarbonizationPlan.pdf.

13 Government of Colombia. (2021). Estrategia climática de largo plazo de Colombia E2050 para cumplir con el Acuerdo de París. Available at: https://unfccc.int/sites/default/files/resource/COL_LTS_Nov2021.pdf.

14 Kingdom of Cambodia. (2021). Long-Term Strategy for Carbon Neutrality. Available at: https://unfccc.int/sites/default/files/resource/KHM_LTS_Dec2021.pdf.

15 Note that a focus on marginalised communities, and particularly inclusive stakeholder engagement, is crucial across all stages of the LTS development process (information, intervention and implementation)

16 Government of the Republic of Fiji. (2018). Fiji Low Emission Development Strategy 2018-2050. Available at: https://unfccc.int/sites/default/files/resource/Fiji_Low%20Emission%20Development%20%20Strategy%202018%20-%202050.pdf.

17 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.

18 Conservation agriculture is a way of farming that minimizes soil disturbance, promotes the maintenance of a permanent soil cover and the diversification of plant species whereas organic agriculture replaces synthetic inputs with management practices that maintain and increase long-term soil fertility and prevent pest and diseases.


2050
PATHWAYS
PLATFORM