

TIMOR-LESTE'S NATIONAL ADAPTATION PLAN

**Addressing climate risks and building
climate resilience**



**DEMOCRATIC REPUBLIC OF TIMOR-
LESTE**

**Secretariat of State for Environment, Coordinating Minister for Economic
Affairs**



Contents

List of Tables	vi
List of Figures	vi
List of Annex	vi
Annex 1. Full details to Table 3 of the body of the NAP with activities by type under each program 77	vi
Abbreviations	vii
Foreword	ix
Executive Summary	x
Chapter 1. Introduction	1
1.1. Overview of the process to formulate and implement the National Adaptation Plan	1
1.2. Guiding Principles of the National Adaptation Plan	2
1.3. Overview of NAP contents	3
Chapter 2. Legal Basis and Institutional/Administrative Arrangements for the National Adaptation Plan	6
2.1. Introduction	6
2.2. Legal Basis	6
2.3. Administrative Arrangements	9
2.4. Sectoral Considerations	10
Chapter 3. National Circumstances	15
3.1. Introduction	15
3.2 Geographic Characteristics of Timor-Leste	15
3.3 Economic Context	16
3.4. Environmental Context	17
3.5. Social Context	19
3.6 Gender issues and context	21
3.7. Legacies of Colonization and Occupation	22
Chapter 4. Rationale for Conducting Adaptation in Timor-Leste	23
4.1. Introduction	23
4.2 Climate context: general climate characteristics	23
4.2 Climate Change Overview	25
4.3. A note on data availability	27
4.4. Sectoral baselines and current and future vulnerabilities	27
Chapter 5. National Adaptation Plan Alignment with Existing Strategic, Legal, and Regulatory Frameworks	33
5.1. Introduction.	33
5.2. Existing progress on climate change and related environmental issues.	33
5.3 Climate Change Plans and Policies	34
5.4 Other relevant Documents and Policies	36

5.5. Political Processes, Trends, Trajectories, and Considerations	39
5.6. Identified barriers, gaps, and obstacles within policy and institutional Landscape	39
Chapter 6. Summary of Results of Impact, Risk, and Vulnerability Assessments	40
6.1 Introduction	40
6.2 Summary of Vulnerability Assessment Results	42
Chapter 7. Priority Adaptation Programs for Timor-Leste	44
7.1 Introduction	44
7.2 Priority Adaptation Programs	44
Chapter 8: NAP Implementation Considerations	52
8.1 NAP Interim Implementation Arrangements	52
8.1.1. High-Level Decision-Making Body	52
8.1.2. High-Level Operational Body	52
8.1.3. Technical Coordinating Body/Interim Secretariat	53
8.1.4. Other relevant information	53
8.2. NAP implementation plan	55
8.2.1. Near-term (2020-2022)	56
8.2.2. Medium-term (2023-2025)	57
8.2.3. Long-term (2026-2030)	57
Chapter 9. Conclusion and Next Steps for Advancing Timor-Leste's National Adaptation Plan Process	64
9.1 Introduction	64
9.2 Next Steps	65
References	67

List of Tables

Table 1. Indicative Climate Change vulnerabilities to Strategic Development Plan 2011-2030 priorities ..	7
Table 2. Potential increase in hazard occurrence and economic losses due to climate change (source: GCF 109).....	31
Table 3. Priority adaptation programmes by sector showing the source and lead agencies (detailed activities under each are given in the annex 1).	45
Table 4. Priority policies and concrete activities (physical investments) extracted from Table 3, and arranged by system to show a timeline for planned implementation.	47
Table 5. Summary of short, medium, and long-term NAP objectives	55
Table 6. Near-Term Programs of the NAP	59

List of Figures

Figure 1: Overview of Timor-Leste's NAP Process.....	2
Figure 2: NAP entry points and alignment with sectoral planning and budgeting processes	11
Figure 3: Municipalities of Timor-Leste.....	16
Figure 4: Tropical Rainforest in Timor-Leste in Nino Konis Santana National Park, Lautem Municipality	18
Figure 5: Tara Bandu Ceremony in Timor-Leste.....	20
Figure 6: Agro-climatic zones of Timor-Leste	24
Figure 7: Rural girls are collecting water far from their homes.....	29
Figure 8: Interim implementation arrangements for NAP	54
Figure 9: Timor-Leste NAP Roadmap.....	65

List of Annex

Annex 1. Full details to Table 3 of the body of the NAP with activities by type under each program	77
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Abbreviations

ADB	Asian Development Bank
AR4	Fourth Assessment Report (to the IPCC)
AR5	Fifth Assessment Report (to the IPCC)
CCWG	Climate Change Working Group (CCWG)
CCA	Climate Change Adaptation
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
ENSO	El Niño Southern Oscillation
FAO	Food and Agriculture Organization
FBO	Faith Based Organization
GCF	Green Climate Fund
GCM	Global Climate Model
GEF	Global Environmental Facility
GoDRTL	Government of the Democratic Republic of Timor-Leste
HDI	Human Development Index
HNAP	Health National Adaptation Plan
HSO	Human Security Objective
IMCB	Inter-Ministerial Coordination Body
INC	Initial National Communication (to the UNFCCC)
INDC	Intended Nationally Determined Contribution
IOD	Indian Ocean Dipole
IPCC	Intergovernmental Panel on Climate Change
IVA	Integrated Vulnerability Assessment
IWRM	Integrated Water Resource Management
IOD	Indian Ocean Dipole
LDC	Least Developed Country
LEG	Least Developed Countries Expert Group
MAF	Ministry of Agriculture and Fisheries
MCIE	Ministry of Commerce, Industry, and Environment
M&E	Monitoring and Evaluation
MERL	Monitoring, evaluation, reporting and learning
MJO	Madden-Julien Oscillation
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoI	Ministry of Interior
MoPW	Ministry of Public Works
MSME	Micro-, Small-, and Medium-sized Enterprises
MUPD	Ministry of Urban Planning and Development
MSSI	Ministry of Social Solidarity and Inclusion
MTC	Ministry of Transport and Communication
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NBSAP	National Biodiversity Strategy and Action Plan 2011-2020
NCCP	National Climate Change Policy
NDA	National Designated Authority (for the GCF)
NDCC	National Directorate for Climate Change

NDDRM	National Directorate for Disaster Risk Management
NDMG	National Directorate of Meteorology and Geophysics
NDRMP	National Disaster Risk Management Policy
NOAA	National Oceanic and Atmospheric Administration (US)
NSP	NAP Support Programme
PDO	Pacific Decadal Oscillation
PWD	Persons with Disabilities
RCP	Representative Concentration Pathway
SCCF	Special Committee for Climate Finance
SDG	Sustainable Development Goal
SDP	Strategic Development Plan 2011-2030
SIDS	Small Island Developing State
SNC	Second National Communication (to the UNFCCC)
SLR	Sea Level Rise
SSCP	Secretary of State for Civil Protection
SSE	Secretary of State for Environment
SST	Sea Surface Temperature
TFR	Total Fertility Rate
TWG	Technical Working Group
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNTL	Universidade Nacional Timor Loro Sa'e
USAID	United States Agency for International Development
USGS	United States Geological Survey
USP	University of the South Pacific
VA	Vulnerability Assessment
WFP	World Food Program
WHO	World Health Organization
WMO	World Meteorological Organization

Foreword

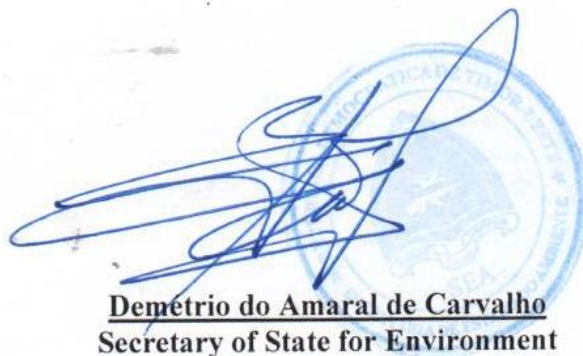


The Democratic Republic of Timor-Leste is fully aware that climate change is one of the world's main challenges today. It has been bringing various catastrophes to our socio- economic and environment and is expected to get much worse in the near future. In fact, Timor-Leste has been experiencing massive floods, droughts, landslides, fires and extreme wind events. In addition, sea level is rising about 5.5 mm per year with coastal erosion damaging infrastructure and other assets in the coastal areas. These climate change impacts lead to a decrease in agricultural production, food insecurity, water shortage, destruction of infrastructure, loss of human life and biodiversity as well as human displacement. The Government of Timor-Leste considers a national climate change adaptation plan critically important for addressing climate change risks and building climate resilience as well as reducing vulnerability in the future.

Being party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, Timor-Leste, as a Least Developed Country (LDC) as well as a member of Small Island Developing States (SIDS), is well aware of the many decisions of the Conference of the Parties (COP) that facilitate technical and financial support to the LDCs for the production and implementation of National Adaptation Plans (NAP). Timor-Leste is pleased to present its NAP to the global community under the UNFCCC and the Paris Agreement. The NAP describes its vulnerabilities to climate change and presents its priority adaptation needs for addressing climate change risks and achieving climate-resilient sustainable development goals in the country. The NAP is well aligned with our nationally determined contribution (NDC) to the Paris Agreement and the Green Climate Fund (GCF) country programme.

We are thankful to the NAP Global Support Program (NAP-GSP) and UNDP Timor-Leste for their technical and financial assistance in formulating this NAP. We are also grateful to the technical guidance and support that we received from the LDC Expert Group and the UNFCCC Secretariat.

As a member of the LDCs and SIDS, the successful implementation of our NAP will rely heavily on international financial, technological and capacity support. While we do our part by allocating what we can from our national budget, international assistance will be necessary to help us fully achieve our adaptation goals and objectives. We look forward to working with the GCF and other Convention/Paris Agreement Funds, and all other partners for the successful implementation of this NAP in a timely manner.



Demétrio do Amaral de Carvalho
Secretary of State for Environment

Executive Summary

This document serves as Timor-Leste's first National Adaptation Plan (NAP); and is being submitted to the United Nations Framework Convention on Climate Change (UNFCCC). The process to formulate and implement the NAP (NAP process) was established under the UNFCCC in 2010. It is a *continuous, progressive, and iterative process that follows a country-driven, gender-sensitive, participatory, and fully transparent approach that builds on past and on-going efforts*. Thus, more information becomes available, further and updated versions of the NAP will be produced.

The overall vision of the NAP for Timor-Leste is “**to build a climate resilient development trajectory for the country and its people**”. It is aligned with other policies and strategies relevant to Timor-Leste's adaptation response to climate change. The NAP also establishes clear linkages with the Strategic Development Plan 2011-2030.

The NAP process has two main objectives:

1. *To reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience; and*
2. *To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate (UNFCCC decision 5/CP.17, paragraph 1).*

The NAP for Timor-Leste builds on these objectives and is designed to fulfill the following functions:

1. The NAP will serve as the national policy instrument for coordinating and driving actions of all actors and stakeholders in pursuit of adaptation goals and outcomes.
2. The NAP will guide future assessment of progress and reporting on adaptation.
3. The NAP communicates the importance of addressing climate change, to all stakeholders nationally and internationally, through adaptation by showing key impacts already being felt and what is likely to be felt under climate projections for the country in the future.
4. The long-term process that is in place and has supported the formulation and implementation of the NAP will serve as the main national programme and coordinating mechanism of adaptation in the country and will seek further support through the GCF for maintaining this process and for implementation of the NAP, complemented by other sources of financing.
5. The NAP will serve as the umbrella plan of action for adaptation, embracing all other relevant national plans, sectoral strategies and plans at various subnational levels.
6. The NAP contains several essential programmes and projects that have been identified based on available assessments and past work through the GCF Country Programme and the NDC. An updated NAP will be produced with revised priorities when new and additional vulnerability and risk assessments are completed.
7. The NAP will serve as the umbrella plan of action for adaptation, embracing all other relevant national plans, sectoral strategies and plans at various subnational levels, including a focus on vulnerable groups (women and youth), and links to traditional/indigenous systems through the *Tarabandu*.
8. The NAP will serve as the Adaptation Communication to the Paris Agreement.

Timor-Leste has been working on adaptation for several years initially through the preparation and implementation of National Adaptation Programmes of Action (NAPAs), the INDC in November 2016 and the GCF Country Programme in February 2019. A few assessments and projects have been implemented with different partners, and more needs to be done. These adaptation efforts are being brought together under the NAP process, led by the National Directorate for Climate Change (NDCC). The NDCC has conducted a national stakeholder consultation workshop, a NAP validation

workshop as well as several consultation meetings with key national agencies. The result is the first National Adaptation Plan, which will be submitted to the UNFCCC prior to the end of 2021.

This NAP follows the general “NAP Prototype” outline by the Least Developed Countries Expert Group (LEG) during 2019 in response to requests from LDCs that had not yet submitted their first NAPs. This NAP is being submitted in 2020 and responds to the vision of the LDC Group and the LEG for the submission of the first NAPs by end 2020, or soon after. Submission of the first NAP in 2020 will facilitate implementation of adaptation actions, sooner rather than later, and will also help inform revisions of NDCs in 2020 and submission of adaptation communications. As climate finance is scaled up in 2020, NAPs will facilitate the focus on implementation of adaptation priorities that have been designed through the rigorous NAP process according to its guiding principles outlined above. The GoDRTL established a goal for itself in completing its first NAP prior to the end of 2020, and this document represents the realization of that goal.

This NAP aggregates adaptation activities for the country, encompassing recent past and ongoing activities by different actors into a coherent national programme and identifies several priority activities in main sectors for further action, including under: disaster risk management, agriculture (including livestock, crops, fisheries, and forestry), water and sanitation, health, coastal systems and marine resources, infrastructure and tourism.

Over the last few years, several assessments have looked at specific sectors and systems, providing the beginnings of a strong knowledge base and baseline for future adaptation work. These include a national coastal vulnerability assessment, ecosystem assessment and mapping along the coast including of coral reefs, a national hazard risk assessment, assessment of groundwater; and various regional arrangements for the Pacific that also included Timor-Leste. Much more remains to be done, before a complete picture of vulnerability and climate risk for the country are well understood. As the country continues to build institutional and human capacity, capacity-building will remain a priority activity as part of the NAP process going forward.

Key climate hazards

Main climate-related hazards include the following:

- Floods
- Erratic and extreme rainfall
- Landslides
- Cyclones
- Coastal erosion
- Strong winds
- Excessive heat (heat waves)
- Drought
- Forest fires
- Sea-level rise
- Ocean acidification
- Water-borne diseases.

Key impacts, vulnerabilities and risks

Key impacts, vulnerabilities and risks due to climate change are mainly related to the following (this list is not exhaustive):

- Water security
- Environmental degradation
- Food security and agriculture
- Life and safety

- Human health and well-being, including income security
- Livestock health
- Coral reef ecosystem health and Impact on deep-water fishing
- Destruction of infrastructure: roads and bridges, water supply systems, flood defenses, irrigation systems, settlements

Priority Adaptation Activities

A number of concrete adaptation priorities have been identified through recent participatory processes, including the NAPA, GCF Country Programme, INDC and other assessments. These can be summarized into the following key priorities (these activities are extracted from broader programmes as presented in Table 3 of the main document as well as adaptation priorities under the GCF country programme):

I. Policies

1. Timor-Leste is in the final stages of preparing a **National Climate Change Policy**. This policy will define objectives and a vision for addressing climate change and will provide the necessary mandate for the NAP.
2. Several issues will be integrated into ***Tarabandu*** (traditional customary rules) including: water conservation, water use management, and climate risk reduction

II. Projects and Programmes

Several priority projects and programmes have been identified from the GCF country programme, the INDC and include those priorities identified in the NAPA that have yet to be implemented.

A. Strengthening the capacity of national, local institutions and communities in managing climate risks (floods, drought, landslides)

1. Improve physical infrastructure and natural vegetation methods to prevent **landslides** in hill sites, roads and **river banks** that are made vulnerable by climate change
2. Review existing laws, regulation and standards to enhance climate change resilience of critical infrastructure
3. Enhancing **Early Warning Systems** to build greater resilience **to hydro and meteorological hazards** in SIDS (*taking a regional approach, in prep, part of the GCP Country Programme, with UNEP and the Government of Timor-Leste*)

-B. Addressing the needs of vulnerable communities and groups

4. Reduce the vulnerability of **farmers and pastoralists** to increased **drought and flood events**
5. Improve institutional and community (including vulnerable groups such as **women and children**) capacity to prepare for and respond to climate change-induced natural disasters
6. Integrate climate risk information into **traditional disaster risk reduction and management**
7. Integrate water conservation, water use management, and climate risk reduction approaches into ***Tarabandu*** (traditional customary rules – *also included under policies*)

C. Using ecosystem-based DRR in coastal areas and coral reefs

8. Maintain mangrove plantations and promote awareness to protect coastal ecosystems from impacts of sea level rise

D. Improving water resources management under climate change

9. Build climate-proof and environmentally sustainable **infrastructure to protect water resources**, including enhancing water harvesting storage tanks and irrigation farm ponds, distribution and management systems, particularly in drought-prone areas

10. Create and enhance water harvesting, water distribution and management systems to avoid water shortage due to climate change

11. Develop integrated agroforestry and watershed management to reflect impacts of climate change on agriculture and forestry systems

12. Control volume/amount of water used by industry, and water pollution control standardization including large facilities coffee bean processing waste management in climate change context

13. Design a **water management system** that includes assessment of demand projections and sustainable supply systems disaggregated by end use, and existing status of the water sources and supply systems

14. Implement **integrated water resource management** approaches to protect and rehabilitate watersheds critical for **sustainable water supply** along the river basin or agriculture and domestic purposes

15. Enhance government and community strategies to respond to drought exacerbated by climate change

16. Promote water conservation, protection of springs and recharge of the **ground water sources** including strong **linkages between up-stream and down-stream** communities

E. Promoting sustainable land management under climate change

17. Implement integrated sustainable land management which promote climate resilient practices such as fixed/permanent agriculture, reduced burning, reduced erosion, and improved soil fertility

18. Reduce climate vulnerability of forests through reforestation degraded lands and provide a sustainable source of fuel wood

19. Adapt to climate change and enable sustainable land management through productive rural communities in Timor-Leste

20. Reduce climate vulnerability **in the agricultural sector** through promotion of sustainable and conservation agriculture with minimal negative impact on the environment, and avoiding agricultural activities in climate-risk prone areas

F. Improving public health services to deal with climate related public health issues

21. Develop a **health database and data management system** which includes climate sensitive health risk and vulnerability information to facilitate effective, targeted and efficient delivery of health services

22. Establishing surveillance for **health early warning systems** and response mechanisms for climate-related health risks

G. Building climate-resilient livelihoods

23. Develop alternative **livelihood options to enhance community resilience** through **fisheries and marine ecosystem-based bio-physical resources**

III. A national support programme for the NAP process¹

Support to the NAP process in Timor-Leste, proposal to the GCF NAP Readiness window

Support to the NAP process in Timor-Leste, proposal to the GCF NAP Readiness window

Building on the continuous, progressive, and iterative nature of the NAP process, support is being mobilized from the Green Climate Fund (GCF) readiness window for the formulation of NAPs to support the national “NAP support programme (NSP)” under the NDCC. This version contains several recommendations for strengthening the human and institutional capacities as well as for improving Timor-Leste’s knowledge management infrastructure to support climate change adaptation. These recommendations should be incorporated into the funding proposal to the GCF to support the ongoing activities of the NAP process in Timor-Leste under the NSP.

The adaptation cycle will be applied to each of the key sectors under the NSP upon receipt of the GCF NAP readiness funding, hopefully between end 2020 and 2022 (the adaptation cycle includes (i) research and systematic observation; (ii) governance and institutional arrangements; (iii) analysis and assessment; (iv) plan development; (v) implementation strategy; (vi) implementation; (vii) monitoring and evaluation; (viii) reporting; (ix) update and revision of the plans.

Detailed vulnerability assessments will be synthesized along the following sectors (where necessary, additional vulnerability and risk assessments will be conducted to fill knowledge gaps in key geographic areas):

1. **Infrastructure** priority programs include (i) identification of infrastructure vulnerabilities, (ii) establishing institutional and human capacities, (iii) improving regulatory framework for climate-smart and climate-proof infrastructure, and (iv) climate-proofed infrastructure development.
2. **Biodiversity and ecosystem** adaptation priorities programs include (i) building human and institutional capacities for ecosystem-based adaptation and (ii) incorporating ecosystem-based adaptation into planning and regulatory frameworks.
3. **Health sector** adaptation priority programs include (i) integrating climate change considerations into health sector planning and regulatory frameworks and (ii) Improving health sector capacities for managing climate risks.
4. **Agriculture sector** adaptation priority programs include (i) improving research and knowledge management capacities to support climate-smart agriculture and resilient land management, (ii) incorporating climate change into agriculture sector planning and management practices, (iii) mainstreaming climate change considerations into agriculture sector regulatory frameworks, (iv) supporting private sector and Micro-, Small-, and Medium-sized Enterprises (MSME) climate-smart agriculture, agroforestry and aqua/mariculture, (v) promote climate-smart livestock practices, and (vi) implementing community-centric climate-smart agriculture and resilient land management programs.
5. **Water sector** adaptation priority programs includes (i) incorporating climate resilience into water sector planning and regulatory frameworks, (ii) implementing climate-smart water management among large-scale users, (iii) empowering communities to utilize climate-smart water management techniques, and (iv) building new/retrofit existing water infrastructure for climate resilience.
6. **Disaster risk reduction** adaptation priority programs include (i) enhancing community-level integration of DRR and CCA and (ii) strengthening national capacities for climate change responsive disaster risk reduction and disaster risk management.

¹ The NAP process in Timor-Leste facilitates the coordinated and structured identification of key adaptation issues, gaps, priorities, and resource requirements for more effective adaptation planning, implementation, and monitoring of adaptation in Timor-Leste. These gaps, and recommended measures to address them, are identified throughout this document.

7. **Tourism sector** adaptation priority programs include (i) supporting climate-resilient tourism resources in Timor-Leste and (ii) strengthening the market for climate-resilient nature-based tourism.

In addition to this NSP to be funded by the GCF NAP support, the following will also be addressed:

- Formalized institutional arrangements will be established;
- Finalization of administrative arrangements and the legal basis for the NAP *including on data*;
- Development of a centralized data archive system to support the work on NAPs, building on data collected for specific sectoral assessments and projects (this will include a data policy);
- A “theory of change” that maps Timor-Leste’s long-term adaptation goals at national and subnational levels and identified clear pathways for reaching these goals will be developed through a fully participatory process. This theory of change will also include mapping behavior change pathways in priority sectors to encourage people, organizations, and institutions to adopt climate resilient development pathways;
- Developing cost estimates of prioritized adaptation options;
- Development of a comprehensive financing plan to support implementation of the NAP;
- Formulation of a monitoring, evaluation, reporting and learning (MERL) framework;

This NAP represents the first stage in developing a comprehensive and coordinated long-term approach to reducing vulnerability and increasing resilience and adaptive capacity at all levels in Timor-Leste.

Chapter 1. Introduction

1.1. Overview of the process to formulate and implement the National Adaptation Plan

The process to formulate and implement National Adaptation Plans (NAP process) was established under the United Nations Framework Convention on Climate Change (UNFCCC) in 2010 as part of the Cancun Adaptation Framework. The process enables Parties to the UNFCCC to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs and for developing and implementing strategies and programs to address those needs. The NAP is a continuous, progressive, and iterative *process* that follows a country-driven, gender-sensitive, participatory, and fully transparent approach. The agreed objectives of the NAP process are²:

- *To reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and*
- *To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.*

In practical terms, these objectives cover not only specific projects and programs aimed at decreasing vulnerability, but also a broader evolution of governance so that climate change considerations are mainstreamed into day-to-day processes of governance. The Government of the Democratic Republic of Timor-Leste (GoDRTL) officially launched its NAP process on 27 September 2019, building on ongoing work on adaptation under the NAPA, assessments under the national communications, and adaptation work in specific sectors. Timor-Leste continues to implement the NAPA and is actively seeking funding from the GCF for implementation, in parallel to seeking funding to support the NAP process.

The overall vision of the NAP for Timor-Leste is **to build a climate resilient development trajectory for the country and its people**. It is aligned with other policies and strategies relevant to Timor-Leste's adaptation response to climate change. The NAP also establishes clear linkages with the Strategic Development Plan 2011-2030.

This first NAP builds on Timor-Leste's first Nationally Determined Contribution (NDC) to the Paris Agreement, the country's National Adaptation Programme of Action (NAPA), the Initial National Communication to the UNFCCC (INC), the Second National Communication (SNC) to the UNFCCC³, and the recently-developed Green Climate Fund Country Programme, as well as other national and international efforts to enhance resilience to climate change and disasters. The NAP process will continue to facilitate the coordinated and structured identification of key adaptation issues, gaps, priorities and resource requirements for more effective planning, implementation and monitoring of adaptation in Timor-Leste. It is anticipated that a revised NAP will be submitted a few years from now after in-depth assessments under the GCF NAP Readiness Support (proposal being prepared).

Timor-Leste recognizes that establishing synergies and linkages, where possible, between the National Adaptation Plan and these other key processes is essential to:

² UNFCCC decision 5/CP.17, paragraph 1.

³ The SNC is currently in preparation.

- Contributing to achieving the Global Goal on Adaptation under the Paris Agreement by reducing vulnerability through integrating adaptation considerations into all relevant plans, policies and strategies, and prioritizing and planning for adaptation;
- Submitting the adaptation communication through multiple channels, including through the NAP;
- Working towards coherence with disaster risk reduction strategies under the Sendai Framework;
- Aligning long-term national development priorities with the Agenda 2030 Sustainable Development Goals (SDGs) framework.

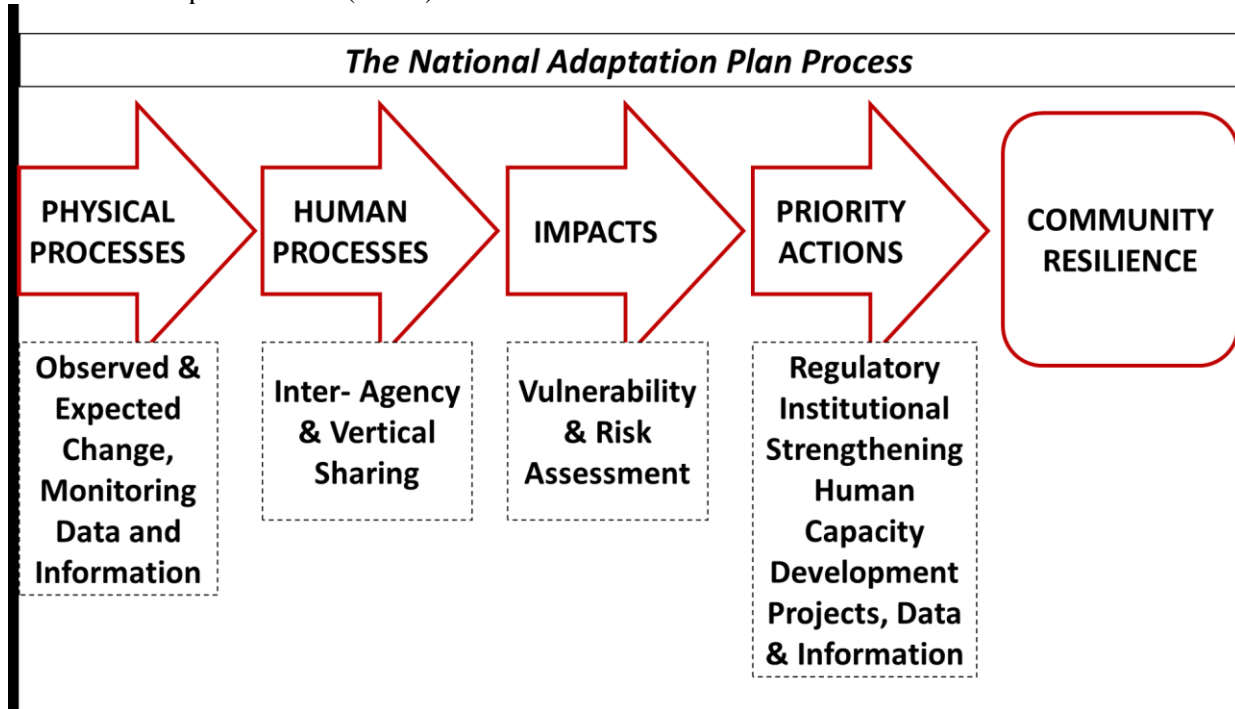


Figure 1: Overview of Timor-Leste's NAP Process

Drafting of Timor-Leste's NAP began in November 2019. This current version also incorporates insights from an "Open NAP" workshop conducted with a number of stakeholders in Dili in March, 2020, as well as feedback from consultations with several key government ministries and the LDC Expert Group. These stakeholders provided important inputs and insights with respect to the NAP's steering mechanism, its linkages to the Strategic Development Plan 2011-2030, linkages to sectoral planning and budgeting processes, as well as legal/administrative options that should be in place to facilitate implementation of the NAP.

1.2. Guiding Principles of the National Adaptation Plan

The guiding principles of the NAP shall be:

- **National Ownership.** The NAP shall be consistent with the Strategic Development Plan 2011-2030 and will be integrated into sectoral policies and plans such that the entire government is engaged and takes ownership towards climate resilient development.
- **Demography, Gender, and Social Inclusion Considerations.** The NAP and its recommended measures will incorporate the differential impacts of climate change on men, women, children, elderly people, and other potentially vulnerable groups.
- **Nationally Appropriate Climate Actions.** The NAP will facilitate moving beyond urgent climate adaptation needs, advancing medium- and long-term adaptation and resilience building measures in a way that is appropriate to the national needs and conditions.

- **Development of Human Capital.** The NAP will identify specific actions to build and utilize human capital in Timor-Leste for building resilience, both within the government and among non-government stakeholders. This will include empowering stakeholders to identify pathways for autonomous adaptation.
- **Youth Engagement.** The NAP will identify specific opportunities for youth to be mobilized as climate change ambassadors for long-term climate-resilient development.
- **Whole-of-Government Approach.** The NAP will identify sustainable financial packages and resources to ensure optimal implementation of identified priorities by relevant stakeholders.
- **Nexus between Nation Building Priorities and Low Carbon Growth Pathways.** The NAP's medium- to long-term orientation, integrating the priorities from the SDP 2011-2030, will contribute to a climate resilient and low carbon economic development trajectory.
- **Integration of Climate, Resilience, and Livelihood Approaches.** The NAP will guide implementation of climate change adaptation actions in an integrated way to promote efficiency and effectiveness of the implementation of the Plan. By embracing climate resilience into livelihood options, the integrated interventions contribute towards economic growth, environmental and socio-economic benefits.
- **Climate Responsive Planning and Budgeting.** The NAP will identify entry points and will guide integration of climate change adaptation considerations into sectoral planning and budgeting processes as part of its focus on mainstreaming of climate change adaptation into day-to-day processes of governance.
- **Community-Based Adaptation Approach.** The NAP will identify and implement community-centric and community-driven approaches in which communities are empowered to build their adaptive capacity and enhance adaptation mechanisms for long term climate resilience, including through traditional approaches.
- **Ecosystem-Based Adaptation Approach.** The NAP will identify implementation pathways that build the resilience of biodiversity and ecosystem resources and will adopt a systems approach to adaptation with respect to natural capital.
- **Innovation.** The NAP will provide innovative tools and techniques to enhance efficiency and delivery for maximizing the impact of priority actions.
- **Conflict Sensitivity and Social Cohesion.** The priority actions in the NAP will be designed in such a way to bring people together, ensuring that all groups in targeted communities are included to maintain and further improve the existing efforts for improving social cohesion. The selection of interventions and coordination at the planning, design, and implementation of policy interventions will be made in a way that embraces conflict sensitivity and promotes long-term peace and prosperity.
- **Transfer and Adoption of the Best Appropriate Technology.** The use of best technologies appropriate for the conditions in which the adaptation measures are implemented will ensure a high return on investment as well as ensure the sustainability of the interventions.

These guiding principles will be incorporated into each part of the NAP process and will inform the recommendations that stem from the NAP. This includes incorporation into the monitoring, evaluation, reporting, and learning (MERL) framework to be developed for the NAP process during the period 2020-2022 under the GCF NAP Readiness Support.

1.3. Overview of NAP contents

The NAP consists of eight chapters. Chapter 2 focuses on the **legal basis and institutional/administrative arrangements** for the NAP process. The chapter contains important information and recommended actions for ensuring the relevance of the NAP to sectoral agencies, and also for linking the NAP to existing legal and administrative frameworks in Timor-Leste (with special attention on the Strategic Development Plan 2011-2030, and for ensuring that there is a clear mandate for NAP implementation that encourages ownership and buy-in from all relevant stakeholders. This chapter also proposes institutional and administrative arrangements for NAP implementation, including a high-level inter-ministerial steering mechanism and a technical working

group. The chapter also presents considerations for ensuring buy-in from sectoral stakeholders and a mechanism for facilitating mainstreaming of the NAP into sectoral processes. The chapter also presents potential entry points for integrating guidance from the NAP into the annual planning and budgeting cycle. Lastly, the chapter presents some challenges and barriers that representatives from key sectoral agencies articulate during consultations conducted in February, 2020, and how the NAP process will address these.

Chapter 3 describes the **national circumstances and context** for adaptation planning in Timor-Leste. This includes an overview of geographic, political, socio-economic, environmental, and cultural characteristics of the country. These details are important because they describe the conditions under which adaptation should take place in Timor-Leste, and also the societal characteristics that interact with the physical changes of climate change to produce not only vulnerabilities, but also opportunities to improve resilience in the country. Key elements here are ensuring that the NAP is integrated into the Government's efforts to expand and diversify the agricultural sector to improve rural livelihoods and food security, and also to rely on ecosystem-based adaptation to maximize co-benefits between adaptation efforts and environmental protection. **The chapter also describes the uniquely Timorese cultural tradition of *Tara Bandu* and suggests this as an important mechanism for facilitating community-led climate change adaptation.** The chapter addresses gender considerations, noting that as the NAP process evolves in the short term, it will be important to provide more clarity concerning the differential impacts of climate change between men and women, as well as to develop clear guidelines for mainstreaming gender into Timor-Leste's adaptation response. Lastly, the chapter addresses nation building and conflict resolution as they relate to the NAP process.

Chapter 4 provides the **climate rationale** for conducting adaptation in Timor-Leste. The chapter provides much of the **evidence base** to support climate-smart decision-making processes in Timor-Leste, building on the assessments under the second national communication that is about to be submitted to the UNFCCC. This includes a general overview of observed climate conditions in the country followed by a description of expected and/or projected changes for the future. The chapter summarizes baseline conditions and observed and possible future impacts from climate change on the priority sectors. The chapter also provides recommendations for improving Timor-Leste's overall capacity to generate and utilize climate data and information. Projections cover temperature, precipitation, sea surface temperatures and ocean chemistry, tropical cyclones, sea level rise, and patterns of interannual variability. The chapter also includes sectoral baselines for disaster risk management, agriculture and food security, water and sanitation, health, coastal systems and marine resources, infrastructure, and trans-boundary climate change issues.

Chapter 5: National Adaptation Plan Alignment with Existing Strategic, Legal, and Regulatory Frameworks. Another critical element in successful implementation of adaptation priorities is ensuring that the NAP process is **aligned with existing legal and policy frameworks**. This demonstrates national ownership over the NAP process and also ensures that the NAP is consistent with previously identified national goals and Timor-Leste's overall socio-economic development trajectory. This is also important for securing external financing for adaptation measures. This chapter describes existing strategy and policy documents related to climate change in Timor-Leste and how these have and will continue to inform the NAP process. The chapter also describes how the NAP process aligns with national development planning processes, Timor-Leste's efforts to meet the Sustainable Development Goals (SDGs), and connections to other sectoral and cross-cutting issues (e.g. disaster risk reduction/disaster risk management). In addition, this chapter discusses the current decentralizations reforms that are being implemented in Timor-Leste, and how the NAP process can be aligned with the trajectory of decentralization. Lastly, this chapter compiles information about barriers and gaps with respect to the policy and institutional landscape and suggests some short-term measures to address these over the 2020-2022 timeframe.

Chapter 6 summarizes the results of existing vulnerability and risk assessments. Among the most important components of the National Adaptation Plan is a rigorous assessment of risks and vulnerabilities at the national (sectoral) and subnational (generally geographic) levels. Vulnerability

and risk assessments help to establish the evidence base to inform and prioritize adaptation measures. As the NAP process in Timor-Leste evolves and expands over the near term (2020-2022), additional vulnerability and risk assessments will be conducted. This chapter provides a baseline for future vulnerability and risk assessments by compiling the results from previously conducted vulnerability and risk assessments; and identifies additional gaps that should be covered by future assessments.

Chapter 7 describes the adaptation priorities for the NAP. The chapter synthesizes all of the previously identified priorities from climate change-relevant strategies, policies, and plans, and compiles them into adaptation plans according to priority sector (infrastructure, biodiversity and ecosystems, health, agriculture, water and sanitation, disaster risk reduction, and tourism). Each priority is assigned a lead agency, while recognizing that several ministries will need to be involved to fully implement each activity, given the multi-sectoral nature of most adaptation activities. These priorities will serve as the basis for immediate adaptation action in Timor-Leste.

Chapter 8 recommends several next-steps that should be undertaken over the immediate near-term (2020-2022) to facilitate implementation of the NAP priorities and to further expand activities support the ongoing Timor-Leste's NAP process. It is recommended that most of the process steps be included in one or more GCF NAP Readiness support proposals, while pursuing full-scale funding under the different windows of the GCF, including the project preparation facility. .

Chapter 2. Legal Basis and Institutional/Administrative Arrangements for the National Adaptation Plan

2.1. Introduction

This chapter describes the legal basis for the National Adaptation Plan, including the **mandate** for the NAP and its linkages to Timor-Leste's broader economic and social development strategies. There is clear evidence that an essential prerequisite for effective implementation of NAPs is a legal mandate that empowers government stakeholders (e.g. line ministries and subnational governments) to incorporate guidance from the NAP into day-to-day processes of governance, such as planning, budgeting, personnel decisions, and regulatory frameworks. Therefore, this chapter proposes legal arrangements to encourage buy-in from government stakeholders at the national and subnational levels to ensure that the priorities described in the NAP are implemented. This chapter also designs institutional and administrative arrangements for NAP implementation, including a high-level inter-ministerial steering mechanism and a technical working group. The chapter also presents considerations for ensuring buy-in from sectoral stakeholders and a mechanism for facilitating mainstreaming of the NAP into sectoral processes, along with potential entry points for integrating guidance from the NAP into the annual planning and budgeting cycle. Lastly, the chapter presents some challenges and barriers that representatives from key sectoral agencies articulate during consultations conducted in February 2020, and how the NAP process will address these.

2.1.1. Key recommendations to improve the NAP process. Based on the information contained in this chapter, there are several priorities with respect to improving the NAP process that should be addressed in the 2020-2022 timeframe. The overall short-term recommendation is to establish a formalized and clear legal basis for the formulation and implementation stages of the NAP. This should include the following:

- Establish a Government Decree Law (or Government Decree) to legally empower line agencies to incorporate guidance and recommendations from the NAP into their planning and budgeting processes, and to implement the priorities described in the NAP. This Government Decree Law (or Government Decree) should be advanced by the Coordinating Minister for Economic Affairs, and would need to be approved by the Council of Ministers.
- Establish a high-level inter-agency coordinating mechanisms to steer the formulation of successive NAPs and to guide implementation. Nominate and appoint members and alternate members at the minister or deputy minister level from key government agencies. Appoint the National Directorate for Climate Change to serve as secretariat for the coordinating mechanism, and provide technical and capacity building support.
- Establish a technical working group to manage the formulation and implementation of the NAP and to ensure proper coordination at the technical level among relevant agencies.
- Appoint and provide capacity building support to sectoral focal points and sectoral adaptation teams, which will guide the process of mainstreaming climate change adaptation and implementation of the NAP within sectors.
- Complete the establishment of the Special Committee for Climate Finance (SCCF), appoints its members, establish standard operating procedures, and provide technical and capacity building support.

2.2. Legal Basis

An important part of establishing the legal basis for the NAP in Timor-Leste is to clearly define linkages to the national development planning process as well as other legal pillars. This section provides recommendations for establishing the legal basis for the NAP and aligning it to existing development planning and sectoral processes in Timor-Leste.

2.2.1. Linkage to Strategic Development Plan 2011-2030. The Strategic Development Plan 2011-2030 (SDP) is a twenty year vision that reflects the aspiration of the Timorese people to create a prosperous and strong nation, and forms the foundation for all government actions in Timor-Leste. The SDP covers three key areas: social capital, infrastructure development, and economic development. Within these three key areas, the SDP describes a range of strategies, actions and goals. The ability of Timor-Leste to implement many of these strategies and to meet the goals of the SDP will likely be impacted by climate change, and therefore the SDP creates **an implicit mandate** for taking action to address climate impacts. Specific examples from the SDP 2011-2030 are included in the table below.

Table 1. Indicative Climate Change vulnerabilities to Strategic Development Plan 2011-2030 priorities

Key Area	Goal	Indicative Climate Impacts
Social Capital: Health	By 2030, Timor-Leste will have a healthier population as a result of comprehensive high quality health services accessible to all Timorese people. In turn, this will have reduced poverty, raised income levels, and improved national productivity.	Increasing temperature will increase heat-related illness and mortality, and could lead to the spread of vector-borne diseases. Increased disaster frequency and intensity has a range of implications for health. Climate impacts on agricultural productivity will indirectly impact health by threatening food security.
Social Capital: Social Inclusion	By 2030, Timor-Leste will be a strong, cohesive and progressive nation where the rights of its most vulnerable citizens are protected	Climate change impacts fall disproportionately on already-vulnerable and marginalized groups in society, further exacerbating social imbalances and inequities.
Social Capital: Environment	By 2030, in Timor-Leste the strong bond between Timorese people and the environment will be restored and our natural resources and our environment will be managed sustainably for the benefit of all.	Changes in climatic conditions may adversely impact biodiversity and ecosystem resources by aiding the spread of invasive species, reducing critical habitats, and reducing the provision of ecosystem services. Pressures from changing climate conditions will make existing human pressures on the natural environment worse.
Infrastructure Development: Roads and Bridges	An extensive network of quality and well-maintained roads will connect our communities, promote rural development, industry and tourism and provide access to markets.	Long-term increases in temperature and rising sea levels threaten to erode the expected benefit stream of infrastructure investments and increase operations and maintenance costs; an increase in frequency and intensity of weather-related extreme events will contribute to more infrastructure failures
Infrastructure Development: Water and Sanitation	By 2030, all citizens in Timor-Leste will have access to clean water and improved sanitation.	Changes in rainfall patterns and longer dry periods will affect both surface and groundwater resources; coastal aquifers will be susceptible to salt-water intrusion from rising sea levels. Increased flooding

		is likely to have adverse impacts on sanitation and hygiene.
Infrastructure Development: Seaports	New seaports are a national priority to support our growing economy and meet future industry and freight demands	Sea level rise may impact on port infrastructure investments if not incorporated into design processes
Infrastructure Development: Airports	To meet the future demand for air traffic and boost key industry sectors, we will expand out international airport and build a network of district airports	Weather and climate hazards in the future (e.g. increased flooding; sea level rise) may impact on airport investments if not incorporated into siting and building processes.
Economic Development: Rural Development	The creation of local jobs is the best way to improve the lives and livelihoods of people living in rural areas	Long term changes in temperature and precipitation regimes, as well as increased extreme hydrometeorological disasters may adversely impact investments in agriculture and rural infrastructure, thereby negatively impacting job creation and livelihood improvements.
Economic Development: Agriculture	A thriving agriculture sector is needed to reduce poverty, provide food security, and promote economic growth in rural areas and our nation as a whole.	Long term changes in temperature and precipitation regimes, as well as increased extreme hydrometeorological disasters may adversely impact on investments in agriculture and rural infrastructure, thereby negatively impacting job creation and livelihood improvements. In addition, productive agricultural lands near the coast will be increasingly susceptible to salt-water intrusion, affecting productivity
Economic Development: Tourism	With much to offer international visitors, we will position ourselves to provide a range of tourism experiences that take advantage of our natural beauty, culture, and heritage.	Medium- and long-term changes in the physical environment driven by changing climate conditions may negatively impact on nature-based tourism resources (e.g. coral reefs, biodiversity).

2.2.2. Linkages to sectoral planning and implementation.

Linking implementation of NAPs to sectoral planning and budgeting processes improves effectiveness of adaptation. A legal mandate would encourage government agencies and other stakeholders to follow the guidance of the NAP. To this end, this document suggests a two-pronged approach to establishing a legal mandate to ensure that government agencies are legally empowered to follow the guidance contained in the NAP through its successive iterations:

1. Create a Government Decree Law for the effective implementation of the NAP and integrating climate change adaptation into respective relevant sectoral policies, plans and activities. This Ministerial Decree Law would be advanced by the Minister responsible for environmental issues. This Government Decree Law would go into effect after being approved by the Council of Ministers. The proposed Government Decree Law would contain provisions directing the relevant ministries to formally refer to the National Adaptation Plan when developing sectoral strategy and action plans as well as in their budgetary requests. The Law would also direct the relevant agencies to take necessary steps to implement the

priorities contained within the NAP, including incorporating climate change considerations into sectoral regulatory frameworks.

2. Using the implicit mandate of the SDP 2011-2020 to implement the NAP priorities to improve the ability of government stakeholders to fulfill the priorities of the SDP in the midst of changing climatic conditions, and also to ensure the resilience of the social and economic development progress achieved under the guidance of the SDP 2011-2020.

2.3. Administrative Arrangements

This section describes the current roles and responsibilities for the relevant stakeholders in the NAP process. Many of these roles and responsibilities are outlined in the draft National Climate Change Policy. The section also provides suggestions for establishing formalized steering and technical working mechanisms for the NAP process.

To effectively coordinate Timor-Leste's climate change adaptation response at national and subnational levels, specific institutional arrangements will need to be clarified and formalized. In the past Timor-Leste has utilized sectoral/thematic working groups when developing the NAPA and other documents, however these arrangements have been ad-hoc, have had little legal mandate or authority extending beyond planning, and have not been effective at preserving institutional knowledge. The NAP process envisions a permanent mechanism that will be empowered to coordinate and guide not only planning for climate change adaptation, but also implementation.

The institutional arrangements for the NAP process should consist of two primary levels. The first of these would be an interagency coordinating body consisting of high-level members (ministers and director generals) from priority sector ministries and agencies. This group would also consist of membership from national private sector organizations, academic institutions, and other relevant stakeholders. Development partners should be granted observer status. This body should meet at least quarterly and should be legally empowered to develop strategies, policies, workplans, and other relevant directional guidance related to climate change adaptation. The body would also steer the process for integrating NAP priorities into national development planning, sectoral policies, and planning processes at the subnational level. This interagency coordinating body would also be responsible for reviewing and evaluating the implementation of the NAP, and for establishing timelines and roadmaps for subsequent NAPs.

The second tier would consist of a technical working group, most likely organized around sectoral themes and other focal areas (e.g. subnational integration, scientific research, etc.). Like the inter-ministerial body, the technical working groups would be permanent and established by statute, empowered with specific mandates and responsibilities. The technical working groups would serve under the direction of the interagency coordinating mechanism. Specific responsibilities should be determined over the near-term (2020-2022). The membership of both the interagency working group and the technical working groups should include:

- Secretariat of State for the Environment (Chair, with NDCC serving as secretariat)
- Ministry of Agriculture and Fisheries
- Ministry of Public Works
- Ministry of Transport and Communication
- Ministry of Interior/Secretariat of State for Civil Protection
- Ministry of Health
- Ministry of Tourism
- Ministry of Education
- Ministry of Finance
- State Secretariat for Gender Equality

- Ministry of Petroleum and Minerals
- National Authority of Petroleum and Minerals
- National University of Timor Lorosa'e
- Private Universities Representative

In addition, the GoDRTL is in the process of establishing a Special Committee on Climate Finance (SCCF), which will be responsible for facilitating and coordinating access to international climate finance to support adaptation and mitigation projects.

2.4. Sectoral Considerations

2.4.1. Relevance of the NAP to sectoral stakeholders. To encourage buy-in and ownership over NAP formulation and implementation on the part of sectoral stakeholders, it is important to establish the relevance of the NAP to the priority sectors. This subject was discussed thoroughly during the NAP Stakeholder Consultation Conference conducted in Dili on 4-5 March, 2020. The assembled stakeholders agreed that to establish its relevance to sectoral stakeholders, the NAP shall play the following roles with respect to the priority sectors:

- Encourage high-level political support and awareness for action on climate change adaptation at the sectoral level. To this end, this NAP includes an analysis of current and potential vulnerabilities to climate change for each of the priority sectors. These sectoral analyses synthesize existing vulnerability and risk assessments and are based on the most recent, best available science. Future work to expand the NAP process will focus on elaborating and updating these sectoral vulnerability and risk assessments. Securing high-level buy-in and ownership along with a solid legal foundation and mandate will help to ensure that the NAP is implemented effectively.
- Raise awareness among sector stakeholders about the importance of understanding climate risks and vulnerabilities. This includes enhancing awareness about sectorally-relevant physical processes associated with climate change, their impacts, and potential adaptation action, both on the part of government and non-government stakeholders.
- Provide guidance with respect to building institutional and human capacities within line ministries with responsibilities related to the key sectors and also among non-government stakeholders to adapt to observed and expected climate change impacts. To this end, institutional and human capacity development actions have been identified within each of the priority programs described in Chapter 7 of this NAP.
- Provide specific guidance, targets, and indicators for mainstreaming of climate change into priority sector policy frameworks. This will include an analysis of legal and regulatory frameworks for each of the priority sectors, and recommendations for moving forward with respect to incorporating climate change and climate change adaptation considerations into these frameworks.
- Improve the integration of climate information into sectoral decision-making processes. This includes identifying and addressing data and information gaps, and improving capacities within sector agencies, supporting agencies, non-governmental and academic institutions, and potential the private sector to provide relevant decision-support information, tools, and methodologies to sectoral stakeholders.
- Identify pathways to build resilience and adaptive capacity among the most vulnerable groups (e.g. women, persons with disabilities, youth, elderly, rural and urban poor).
- Align climate change planning processes with the appropriate financial resources to support implementation. To facilitate this function the NAP provides a financing plan that identifies the appropriate sources of support for the different elements of each priority adaptation program.
- Provide mechanisms to mobilize external financing to support the identified priorities. The financing plan mentioned above also identifies priorities for external financing that are linked to the country's NDC and its GCF Country Programme, and thus will serve as a guide to

coordinate planning and implementation of donor-funded activities, ensuring these are harmonized with the overall objectives of the NAP.

2.4.2. Sectoral engagement plan. To involve the priority sector agencies in the NAP process, this NAP recommends that the Secretary of State for Environment steer a high-level mechanism for iterative NAP formulation and implementation based on given mandate under the Government Decree Law no-15/2019. The NDCC under the State Secretariat for Environment should lead and coordinate a formalized coordination mechanism at technical level, to include the following elements:

- Technical coordination mechanism (described above).
- Sectoral focal points. Sectoral focal points will serve as contact-person for each relevant agency. These focal points will be members of the technical working group, and they will also serve as the primary coordination lead within the agency to guide mainstreaming processes, including integrating NAP priorities into sectoral planning and budgeting and to identify resource needs.
- Sectoral adaptation teams. Sectoral adaptation teams shall be assembled from existing personnel within each relevant agency and shall include representatives from each directorate within the agency. Sectoral adaptation teams will receive technical training and capacity building support through Readiness programs and other development partner-supported initiatives.

2.4.3. Specific linkages to sectoral processes. This subsection describes entry points for linking the NAP to day-to-day processes of governance in the priority sectors. Sectoral agencies in Timor-Leste follow four steps when formulating annual plans and budgets: (1) planning and preparing for the budget, (2) considering budget submissions, (3) approving the proposed budget, and (4) implementation or spending the approved budget. This section describes these steps and how activities of the NAP process especially implementation of adaptation can be linked to them.

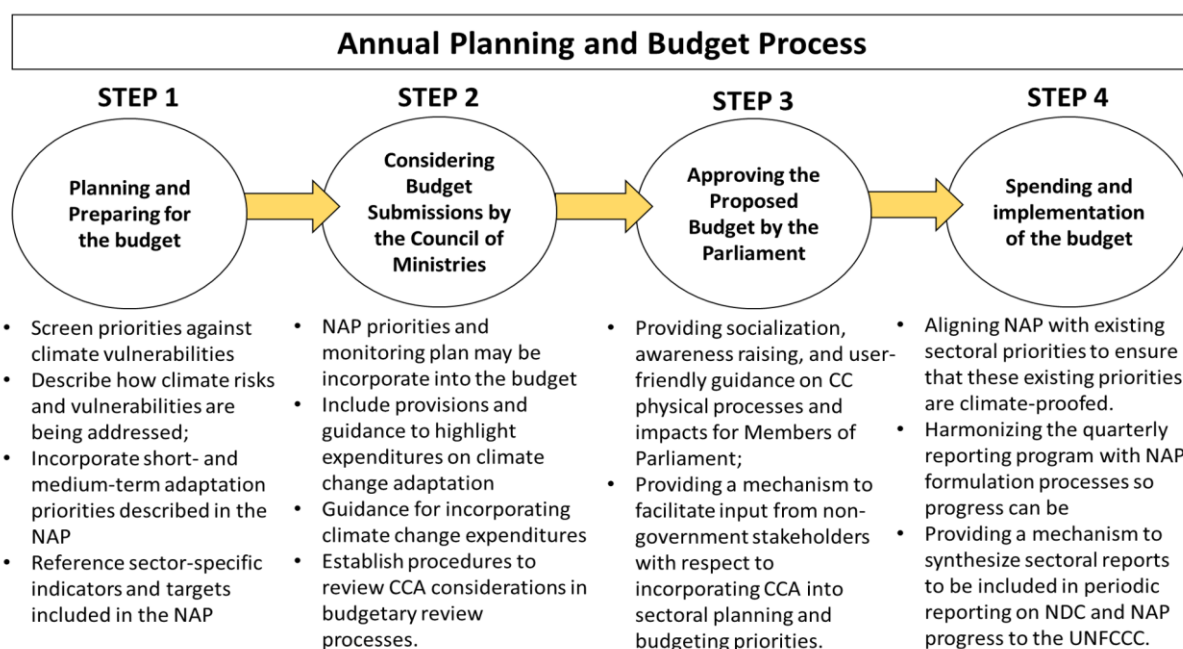


Figure 2: NAP entry points and alignment with sectoral planning and budgeting processes

1. Planning and Preparing for the Budget

Sectoral ministries begin the cycle by identifying and preparing their Annual Action Plans which capture their key sectoral objectives and activities for the coming budget year. Then, the sectoral ministries develop their budget strategy and priorities as well as the total amount of budget for the prioritized programs. This identification of annual priorities and budget preparation should serve as an entry point for the alignment of NAP priorities into the sectoral plans and programs. At this point in the process, sectoral ministries may:

- Screen identified sectoral priorities against climate vulnerabilities described in the NAP;
- Formulate a brief description on how climate risks and vulnerabilities are being addressed;
- Incorporate short- and medium-term adaptation priorities described in the NAP that are relevant to the sector, including institutional and human capacity building priorities;
- Reference the sector-specific indicators and targets included in the NAP monitoring framework.

Once the Government has decided the broad budget strategy, the Budget Office from the Ministry of Finance prepares a **budget call circular** that comprises a summary of the strategy of the Government for the coming budget, outlining the budget process and timetable for the implementation. This budget call circular is distributed to all ministries together with supporting templates and spreadsheets that are necessary for completing the budget documents from each ministry. This is the formal invitation to start **preparing budget submissions** from sectoral ministries. Once the ministries complete their respective sectoral budget submissions, these documents can be put into Performance Budgeting, which is part of the integrated financial system of the Government. This means that the ministries submit their budget plans to the Ministry of Finance, then the budget Directorate from the Ministry of Finance analyzes each budget submission and submit it to the Budget Review Committee. The Budget Review Committee consists of the Prime Minister, the Ministry Finance and other key ministers invited by the Prime Minister. The process creates several additional entry points and opportunities for NAP alignment:

- MoF may refer to the NAP priorities (including climate financing that would be mobilized to address the adaptation needs) and monitoring plan and incorporate these into the budget call circular.
- MoF may adapt templates and spreadsheets to include provisions and guidance to highlight income and expenditures on climate change adaptation-related items. This would help to track total government expenditures on climate change adaptation and would also help to highlight climate change **additionality** with respect to budgets.
- MoF may issue guidance for incorporating climate change expenditures in budget submissions.
- MoF may establish procedures and develop human capacities to review climate-change adaptation considerations in budgetary review processes.

2. Considering Budget Submissions by the Council of Ministers

After the budget submissions are prepared by the ministries, the Budget Review Committee assesses and revises each budget submission and invites sectoral ministries to defend and explain reasons for each submission. The Committee once again prioritizes and chooses the most worthy initiatives from the sectoral ministries by considering the budget limitation. The Budget Review Committee forms a proposed budget and presents it to the Council of Ministers for their consideration. Then the council of Ministers provide their consideration to the budget submission and submit it to the National Parliament for the approval. There are entry points to align the NAP with this process as well:

- The NAP should provide a coordination mechanism so that the NAP's high-level steering mechanism⁴ can liaise with the Budget Review Committee with respect to climate change priorities.

⁴ The specific nature of the high-level steering mechanism is to-be-determined and will be established during late 2020 or 2021.

- The NAP process should provide awareness raising opportunities to members of the Budget Review Committee with respect to climate change including opportunities for climate financing, as well as technical tools and support to the Committee and the Council of Ministers for evaluating budget requests for climate change adaptation funding requests. This may include support to identify potential climate risks to proposed investment projects.

3. Approving the Proposed Budget by the Parliament

Once the proposed budget is submitted to the Parliament, then the Parliament Commissions discuss and review the proposed budget by inviting ministers to explain their proposed budget and receiving the comments from parliaments and civil society organizations. The NAP priority elements for each sector to be funded from national sources can be defended by related ministers in this discussion. Then the proposed budget is presented to the Plenary of the Parliament by the Prime Minister. The Parliament debates the proposed budget, including asking questions for all ministries about clarity of budget from each ministry and requesting the Ministry of Finance for clarifying some key issues related to budget in general. After hearing the rationalities and clarities around the proposed budget, the Parliament approves the budget, and then the proposed budget is sent to the President of the Republic to consider and sign the budget. The President of the Republic promulgates the proposed budget and publishes it in the Journal of the Republic, then the budget will be ready to be implemented. Entry points for the NAP process may include:

- Providing a baseline of adaptation priorities which are aligned with existing development priorities for Parliament to refer to in approving budgets;
- Providing socialization, awareness raising, and user-friendly guidance on climate change physical processes and impacts for Members of Parliament;
- Providing a mechanism to facilitate input from non-government stakeholders with respect to incorporating climate change adaptation into sectoral planning and budgeting priorities.

4. Spending and implementation of the budget

After the proposed budget is approved by the Parliament and promulgated by the President of the Republic, the ministries start spending the approved budget and implementing their sectoral programs. The ministries are requested to provide quarterly reports on physical and financial progress of the budget to the Parliament in order to ensure transparency and accountability. This reporting system will also cover the implementation of the state-funded NAP priorities under the different programs implemented by each sector. Entry points for alignment the NAP may include:

- Aligning the NAP monitoring plan with existing sectoral priorities to ensure that these existing priorities are climate-proofed or otherwise made resilient to climate change.
- Harmonizing the quarterly reporting program with NAP formulation processes so that sectoral agency progress can be tracked in the NAP process and can form the basis for articulation of priorities in subsequent updates of the NAP.
- Providing a mechanism to synthesize sectoral reports to be included in periodic reporting on NAP progress to the UNFCCC including through the adaptation communication.

2.4.4. Sectoral gaps and needs. During the open-NAP workshop and subsequent consultations with key stakeholders, a number of gaps and needs were identified. These gaps and needs will be addressed through the NAP process to enhance the ability of priority sector agencies to address climate change adaptation, including integrating NAP priorities into sectoral plans and subsequent implementation of the NAP.

Gaps that were identified, as well as recommended measures to address them include:

- Lack of coordination between national and local authorities. To address this, clear arrangements for coordination between national and municipal authorities that is consistent with Timor-Leste's decentralization trajectory (see section 5.5) will be developed as part of the ongoing work under the NAP process. The process will also identify institutional and

human capacity strengthening measures so that subnational authorities are competent to implement the NAP.

- Lack of sharing data and information between government and international agencies. To address this issue, the NAP will prioritize the establishment of data and information management protocols to facilitate harmonization and sharing of data and information between different stakeholders, and where necessary, will consider developing a data policy. The data protocols will include arrangements for all data collected under different projects to be archived in a central government data center and made available to all stakeholders and for use in future assessments.
- Lack of up to date data and information. To address this gap, the NAP process will include an analysis of data and information gaps, and will prescribe steps to address these gaps and improve the capability of relevant stakeholders in Timor-Leste to gather data and produce and disseminate relevant, useful, and accessible information products, as well as through funded adaptation projects.
- Limited access to funding for adaptation. To address this gap, the NAP process will develop a financial mobilization plan that identifies appropriate and diversified sources of financing to support sectoral adaptation priorities and how to access such sources. This mobilization plan will identify agencies and partners that will be responsible for taking action to prepare proposals to access financing.
- Limited awareness among sectoral officials with respect to climate change. To address this gap, the NAP process will embark on comprehensive awareness raising and capacity development programs for relevant sectoral agencies.
- Inadequacy of sectoral regulations and enforcement with respect to climate change issues. To address this gap, the NAP process will provide technical support to identify regulatory gaps and will also support the relevant sectoral agencies in formulating regulatory programs which incorporate climate change.
- Lack of coherence between climate change adaptation and disaster risk reduction (DRR) activities. To address this issue, the NAP process will support improved coordination between the National Directorate of Climate Change and agencies responsible for DRR. To support improved coordination and data sharing with respect to climate change and disaster reduction interventions and to reduce overlaps and redundancies among all stakeholders, the NAP process will promote activities that promote and achieve coherence with disaster management. Common and shared databases will be established where possible, to service different sectoral agencies, municipal and local authorities, development partners, and national and international NGOs. Other recommendations from the LEG on coherence with DRR efforts under the Sendai Framework will also be considered.

Chapter 3. National Circumstances

3.1. Introduction

This chapter provides general background information about socio-economic, political, environmental, and cultural conditions in Timor-Leste. The chapter describes some of the challenges that Timor-Leste faces as a post-conflict least developed country (LDC) with the understanding that the NAP process should be consistent with the specific national and local conditions in Timor-Leste and should be consistent with the aspirations of the Timorese people. The chapter also describes the unique cultural tradition of *Tara Bandu* as an entry point for community-led climate change adaptation. The chapter provides a general overview of gender considerations that should be mainstreamed into the NAP process, as well as nation building and conflict resolution efforts which the NAP should be consistent with.

3.1.1. Key considerations to enhance the NAP process. Several short-term actions should be prioritized with respect to the subject matter in this chapter. The following recommendations should be incorporated into requests for financial and technical support over the 2020-2022 timeframe:

- Ensure proper coordination between the NAP process and the implementation of the National Food and Nutrition Security Policy to ensure that efforts to improve food security and agricultural productivity are designed to be resilient to potential future climatic conditions;
- Build capacities and knowledge for embracing ecosystem-based adaptation (EbA) approaches to maximize synergies between environmental conservation and rehabilitation efforts and the NAP process;
- Increase awareness among government and non-government stakeholders about the potential impacts of climate change on particularly vulnerable groups and the potential for climate change to exacerbate rural poverty;
- Ensure from an early stage when implementing the NAP to engage with efforts to expand the agricultural, tourism, and industrial sectors for economic diversification to ensure that plans and investments are climate-proofed to the extent possible;
- Establish a research partnership to identify entry points for community-led climate change adaptation into local *Tara Bandu* cultural practices and formulate an action plan for integration;
- Establish and capacitate a focal point on gender and climate change at the National Directorate of Climate Change, and implement a research program in coordination with the National University of Timor-Lorosa'e to track observed and potential future impact of climate change on women. Formulate principles for ensuring the gender responsiveness of the NAP process as well as sectoral and subnational policies, projects, and programs for advancing climate change adaptation; and
- Commission research to inform a white paper with policy recommendations addressing the nexus of climate change adaptation, peace building, and conflict resolution.

3.2 Geographic Characteristics of Timor-Leste

Timor-Leste is located in Southeast Asia at the eastern end of the Lesser Sunda Islands of the Indonesian archipelago, approximately 400 kilometers north of Australia. It occupies the eastern half of the island of Timor and includes the small islands of Atauro and Jaco, and the exclave of Oecusse, which is located in West Timor. Timor-Leste lies between latitudes 8°15' and 10°30' south and longitudes 124°50' and 127°30' east and has an area of approximately 14,954 km². This includes the main land area at 13,989 km², Oecusse exclave at 817 km², Atauro Island at 140 km² and Jaco Island at 8 km². Administratively, Timor-Leste consists of 13 municipalities.



Figure 3: Municipalities of Timor-Leste

Timor-Leste has complex topography. Most of the country's land area has a slope of between 8-25%, and approximately 44% of the country has a slope of greater than 40%. There is significant altitudinal variation in the country, ranging from the coasts to the mountainous interior, which is dissected by steep-sided river valleys. The interior of the country is dominated by a mountain range which has several peaks rising to over 2000 meters, the highest of which is Mount Ramelau (2986m). On the northern side, the mountains extend almost to the coast, but on the southern part the mountains taper off some distance from the coast, which provides areas of coastal plain. Timor-Leste has more than 100 rivers, but the longest is only 80 kilometers in length, and very few streams flow year-round; only 8 river courses have consistently perennial flows. Timor-Leste's is geologically different from the other islands of the Lesser Sunda Arc. The country's soils are generally shallow, rocky, alkaline, do not store water well and are easily eroded (Molyneux et al 2012). However some small areas with better alluvial soils exist in the river valleys and the flat land along the coasts.

3.3 Economic Context

Economically Timor-Leste is classified by the United Nations as a least developed country (LDC). In 2014 the country's gross domestic product (GDP) was US\$4.18 billion, with the oil industry accounting for US\$2.8 billion (66%). Timor-Leste is among the most oil-dependent economies in the world, but the country has been able to leverage its hydrocarbon wealth to finance impressive development gains over the last decade as investments in public services and infrastructure have driven economic growth (USAID 2017). However, the overall contribution of the petrochemicals sector to the national economy has declined in recent years both in absolute terms and in relation to other sectors. In addition, expansion of the oil and gas sector has done little to create jobs in part because there are no processing facilities in Timor-Leste, and so all production is processed abroad. Despite this, moving forward the GoDRTL expects the oil and gas sector to play a significant role in its economic development and is actively courting investment aimed at expanding production, establishing processing facilities, and providing the requisite infrastructure to increase exports. A recent agreement with Australia to settle competing claims over offshore oil and gas resources is expected to provide stability and thus improve the investment climate in this sector.

Besides petrochemicals, the Strategic Development Plan 2011-2030 identified agriculture, manufacturing, and tourism industries as three strategic and priority sectors to diversify the economy and reducing, in medium term reliance on petrochemical industry. Therefore, NAP is an imperative purpose and guidance for designing and to ensure that planning for investment in those three strategic sectors contemplate resilience mechanisms and procedures to anticipate and reduce potential impact of climate changes.

The economic growth has been to some extent relatively steady, though with some variations caused by the contractions in regional and world economy, since the restoration of independence of the country in 2002. Per capita GDP in 2014 was US\$3,566. However, according to the World Bank, in 2018 economic activity declined for the second consecutive year. The Bank predicted that Timor-Leste's economy would begin to expand again in 2019, with stable inflation (World Bank 2019). Overall, though, the country's economy still struggles with job creation, as labor force participation rate is low at 30.6%, which reflects the continued prominence of subsistence agriculture (MoH 2019). In addition, the cost of doing business in Timor-Leste is still very high, due to inadequate economic infrastructure and lack of appropriate enabling environments (GoDRTL 2010). As an LDC the country benefits from significant aid and development assistance flows, which account for approximately 6% of gross national income.

The agriculture sector is extremely important as more than 66% of the rural population depends on agriculture as the main source of income (FAO 2019), but at the same time agriculture contributes only 30% of the non-oil GDP of the country (GoDRTL 2010). In addition, while the majority of the population depends on subsistence agriculture, food production is not sufficient to meet the population's needs, and it is estimated that 30-40% of food is imported (GoDRTL 2010). Historically agriculture has been in the form of rain-fed shifting cultivation with some sedentary agriculture where soil and water conditions are more favorable (e.g. river and coastal plains). During the violent withdrawal of the Indonesian army and supporters in 1999, widespread intentional damages were done to Timor-Leste's agriculture related infrastructures.

To address this issue, the Government of Timor-Leste is working to achieve its national food security by using local and imported nutritive food for its citizens. The National Food and Nutrition Security Policy was approved in 2017 with the vision that by 2030 Timor-Leste will be free from hunger and malnutrition and Timorese people will enjoy healthy and productive lives, and that people in Timor-Leste will be well-fed principally from an increased variety of locally-produced and imported nutritious food and in the meantime, carefully manage the country agro-ecosystem to significantly improve and increase food production in Timor-Leste. This prioritization of expanded and diversified agriculture creates an essential entry point for consideration of climate change impacts and adaptive measures with respect to the country's development trajectory. As the NAP process in Timor-Leste evolves, it will clearly highlight the potential climatic changes as they relate to the agricultural sector, and will describe potential vulnerabilities associated with these changes, along with prioritized adaptation measures that will help to ensure that government- and non-government-led efforts to diversify and expand agricultural output will continue to provide the expected benefits regardless of changing climatic conditions.

3.4. Environmental Context

3.4.1. Terrestrial ecosystems. Timor-Leste is situated in a high biodiversity hotspot (the Coral Triangle) comprising a number of globally significant ecosystems and endemic species. The country is recognized as a region with some degree of plant biodiversity and endemism, with approximately 41,000 plant species, 70% of which are endemic to the region. Timor-Leste has 30 declared protected areas, which includes the majority of the country's remaining primary forest cover. Approximately 35% of the land area has some type of forest cover, but deforestation is a significant problem (see below). The country also contains globally significant ecosystems, including tropical rainforests, mangroves, wetlands, and important marine ecosystems. These ecosystems play a critical part in climate regulation, sequestration of carbon, and in building adaptive capacity to climate change. Timor-Leste has established 24 protected areas to conserve and protect important ecosystems and is working to develop ecotourism in these areas. However, it is important in long distant future to consider the likely impacts of climate change on both the management of the protected area system and the development of ecotourism as a viable economic sector.



Figure 4: Tropical Rainforest in Timor-Leste in Nino Konis Santana National Park, Lautem Municipality

Timor-Leste consists of five generalized ecological zones (GoDRTL 2010), each of which should be considered in ecosystem-based adaptation approaches:

- Marine and coastal zone
- Arid lowland zone
- Mountainous zone
- Highland plains zones
- Wetlands and lakes.

3.4.2. Marine Ecosystems. As noted above, Timor-Leste is part of the Coral Triangle, of high biodiversity. The coastal waters around Timor-Leste contain remarkable seascapes and species assemblages, but there is little to no existing comprehensive data on coastal habitats. This makes effective, evidence-based marine resources planning and management difficult, but it also means that the waters of Timor-Leste represent tremendous opportunities for exploration and discovery. For example, a 2012 marine survey found seven potentially new marine species and extremely high concentrations of biodiversity, with 734 fish species and 360 species of corals in one area alone.

The marine and coastal zone around Timor-Leste consists primarily of shallow seas with coral reefs and other valuable marine resources, including fish, sea-grasses, and seaweed. This area also includes the most extensive mangrove forests in the world as well as juvenile growth areas for tuna and other commercial fish species of global importance. Approximately 42% of all sucos (villages) in Timor-Leste have a coastal border, and so coastal resources are an important part of the livelihoods of many communities (UNDP 2018), while Timor-Leste's coastal waters comprise a rich variety of species and seascapes but there is no existing comprehensive data on coastal habitats. Therefore, as the NAP process evolves in Timor-Leste, it should be a priority to ensure that climate change considerations and potential vulnerabilities be factored into near-shore and marine resource management planning.

3.4.3. Environmental problems. The most pressing environmental problems in Timor-Leste include deforestation, land degradation, natural disaster vulnerability due to climate variability, poor

water quality and water scarcity, waste management, and loss of biodiversity and ecosystem services. Among the most pressing issues are:

- **Climate variability** frequently causes droughts and floods which are likely to increase in frequency and intensity due to climate change;
- **Land degradation** associated with unsustainable agriculture practices and overgrazing, especially from goats, leads to groundcover change and soil erosion and degradation;
- **Water scarcity** is high in many parts, especially in northern parts of country where the dry season is longer;
- **Water quality** is an issue in many urban areas. Pollution is evident and caused by domestic sewage and waste, non-compliance domesticated animals husbandry rules, and as well as sedimentation due to soil erosion. In addition, nonexistent sewage systems and inadequate systems for collection and disposal of wastewater have resulted to some extent pollution of near surface groundwater level
- **Waste management.** Similarly to lack of wastewater management, in most of the country there are no effective systems for the management of solid waste in place, and sanitation infrastructure is severely inadequate as only about one-third of Timor-Leste's population has access to improved sanitation.
- **Deforestation** is deemed to be a critical issue in Timor-Leste affecting all 13 municipalities in the country. The current rate of deforestation is thought to be around 1.3% per year.
- **Mangrove degradation.** Related to the deforestation problem, the degradation of mangrove ecosystems is an issue of extreme importance as well. Direct human stressors have been and continue to be a significant threat to the country's remaining mangrove forests, but increasingly sedimentation resulting from erosion due to haphazard and unregulated development in both the upland and coastal zones is degrading mangrove habitats and converting them into dry, sandy flats (UNDP 2018).
- **Overfishing** is seen to be a significant problem as well. This was exacerbated during the period of occupation by Indonesia, as transmigration of settlers brought with it unsustainable fishing practices, including the use of dynamite, cyanide, and the unsustainable and destructive harvesting of sea cucumbers. A 2014 study by the Asian Development Bank estimates that illegal fishing results in an annual loss of US\$40 million to the country's economy (UNDP 2018)

As evidenced by the adaptation priorities identified in this NAP, there is potential for significant environmental co-benefits from investments in adaptation, as well as opportunities to exploit synergies between building resilience to climate change and addressing environmental and resource management challenges. Therefore, wherever possible, Timor-Leste's adaptation response should include **ecosystem-based adaptation (EbA)** and other nature-based approaches.

3.5. Social Context

Timor-Leste is a diverse country, with 16 languages and between 34 and 36 dialects (UNDP 2018). According to the 2015 Population and Housing Census, the population of Timor-Leste was estimated at 1,183,643 people with a population density of approximately 79 people per square kilometer, which is one of the lowest population densities in the Southeast Asian region. The largest city is the capital, Dili, with an estimated population of 252,884, according to the 2015 census. Other centers of population concentration include Ermera and Baucau.

In 2015 the country's population growth rate stood at 1.8% per annum, one of the highest rates in Southeast Asia. However, the population growth rate and the total fertility rate (TFR) decreased significantly between 2005 and 2015, and so earlier, more dire projections of population growth and associated strain on natural resources and economic considerations are, in retrospect, overstated. However, the high birthrate means that Timor-Leste has one of the youngest populations in the world, with a dependency ratio of 82% (UNCDP 2018). The country's population is 30% urban based, and the rate of urbanization was 2.09% per year from 2010-2015. This has significant implications for

economic development in Timor-Leste, as the government faces the perennial challenge of improving the enabling conditions for job creation in the country. It also has significance in terms of future vulnerabilities to climate change, as economic well-being is directly related to adaptive capacity.

Poverty has historically been and continues to be a major challenge for Timor-Leste. Following international extreme poverty standards, about 30.3% of the population was estimated to live below the poverty line in 2014, but it should be noted that this compares favorably with the 47.2% estimated to be below the poverty line of US\$1.90 in 2007. However, it should be noted that the UN Committee for Development Policy has observed that “the Government is aware of the problems associated with poverty and has been implementing several measures to mitigate its consequences, especially on children and pregnant women. For example, feeding programs are implemented all over the country, especially through health centers and primary schools. Social security programs are being implemented for some vulnerable categories of the population such as elderly citizens as well as veterans of the independence war. Inequality in education, health and transport is being addressed through heavy and steady investment in schools, hospitals, and roads construction, especially in rural and remote areas” (UNCPD 2018:8). In 2014 Timor-Leste’s Human Development Index (HDI) was .595, positioning the country at 133 of 188 countries. Between 2000 and 2014 it increased from .468 to .595, an overall increase of 27.1% or annual increase of 1.73%

With respect to economic indicators, human development indicators, and access to essential goods and services, there is a clear rural-urban divide, with *sucos* near Dili having significantly higher living standards than those in less populated and remote areas (UNDP 2018a). Overall studies indicate that 14% of the urban population is affected by severe poverty, whereas 46% of the rural population is affected by severe poverty (UNDP 2018b). With respect to the NAP process, this means that Timor-Leste should identify adaptation options that 1) protect existing and future investments in improving rural livelihoods; and 2) seek to make investments in adaptation that have economic and social development co-benefits for rural communities.

Tara Bandu is a “Timorese customary rules that enforces peace and reconciliation through the power of public agreement” (Asia Foundation 2013) and generally involves some aspect of reducing or preventing community conflict, protecting the environment, managing natural resources, and improving community welfare. The use of *Tara Bandu* in the context of regulating natural resource extraction can be traced back to pre-colonial times when local chiefs held authority in Timor.



Figure 5: Tara Bandu Ceremony in Timor-Leste

However, shortly after invading Timor-Leste in 1975, the Indonesian occupiers outlawed *Tara Bandu* systems and asserted control over forest and marine resources. Since independence in 2002, *Tara Bandu* has experienced resurgence, as it is protected in Timor-Leste’s Constitution and is widely seen by the Timorese people as an important and legitimate way to

enhance traditional culture and mutual respect within society (Asia Foundation 2013). Communities across Timor-Leste have established new *Tara Bandu* resource management regimes that include

forest conservation areas, fishery no-take zones, bans on certain types of destructive fishing methods, and prohibitions on harvesting of certain species.

Tara Bandu has been incorporated into legal frameworks pertaining to natural resource management and in the management of marine protected areas. According to the Environmental Basic Law of Timor-Leste, *Tara Bandu* is defined as an integral custom of Timor-Leste's culture, which regulates man's relationship with his surrounding environment (Decree Law no. 26/2012). According to this law it is seen as a local custom that regulates the relationship between humans and the environment surrounding them. Article 8 of the Environmental Basic Law states that "*Tara Bandu* may be applied in accordance with the rituals instituted by local common law which are intended to conserve and promote the environment and the sustainable preservation and use of natural resources. This Traditional Law has been recognized by the Government of Timor-Leste as a local customary law for protecting and conserving the environment and use of natural resources in a sustainable manner. It is a common practice that local communities in Timor-Leste apply this traditional law to control the exploitation of the forests and oceans.

Tara Bandu represents an important entry point for strengthening engagement with and involvement of local communities in resilience building efforts. As the NAP process evolves, it will work through *Tara Bandu* mechanisms that currently exist and will emerge in the future across Timor-Leste to encourage communities to plan and implement locally-appropriate climate change adaptation measures. This includes ecosystem-based adaptation measures that provide co-benefits in terms of sustainability of harvests and the provision of ecosystem services. In addition, *Tara Bandu* creates opportunities for the NAP process to contribute to peace building and reconciliation efforts at the local level by building community resilience.

3.6 Gender issues and context

An understanding of the gender context in Timor-Leste is an important building block for establishing an effective and inclusive NAP process. Gender equity and inclusion is one of the key principles of the country's NAP process, and through planning and implementation for the NAP the GoDRTL will work to advance gender equity goals that have been articulated in other strategies and policies. Since independence, gender equality has been emphasized as an important goal in national development. Timor-Leste's Constitution grants equal rights to both men and women, but disparities are evident, especially with respect to land ownership (UNDP 2018b). There is a relatively high proportion of women in the national parliament, armed forces, and police, but there is far less gender equity at the local level. This is evidenced by the fact that only 2% of Suco chief positions are held by women (Indeva 2018).

Timor-Leste's traditional cultural and social values are patriarchal, and this has a strong influence on the social construction of gender roles. This plays an important role in shaping the vulnerability of women in Timor-Leste. Typically, men are expected to be the primary income earners in the formal economy and are responsible for most decision-making at the household level. This means that men tend to have more access to cash resources and the cash economy. One study indicated that this lack of access to cash limits women's ability to make important investments in small businesses, which tends to increase their dependency on men.

A key root driver of the disadvantaged position of many women lies in the education system. According to the 2015 census, 31.9% of women in Timor-Leste have never been to school. Of those that have attended school, 50% have some primary education, 33% have some secondary education, and approximately 9% of women have more than secondary school education. These numbers represent an improvement since the previous era, the GoDRTL has engaged in rigorous efforts to improve access to and quality of education (UNDP 2018b).

In addition, gender-based violence has been a serious problem in Timor-Leste, and nearly 40% of women over the age of 15 reports having experienced physical violence (Indeva 2018). Therefore, as member state to the UN, the GoDRTL is struggling to achieve gender equality and the empowerment of the women and girls in Timor-Leste by formulating a National Action Plan (2016-2020) for the implementation of UN Security Council Resolution 1325 (2000) on Women, Peace and Security. The Ministry of Interior is a leading agency for the implementation of this National Gender Action Plan. This National Action plan adopts four pillars such as Participation, Prevention, Protection and Peace building. The prevention and protection pillars include sexual, physical and psychological violence and abuse. One of the critical actions for protection of women and girls for 2016-2020 is promoting the gender sensitivity of the formal justice system through the implementation of gender-sensitive laws, the equal and gender-sensitive interpretation of laws and regulations. The Action Plan also addresses integrating modules on gender in training manuals of defense security and justice training institutions and strengthening public awareness on gender-sensitive conflict prevention through media. The current VIII constitutional government has established a Secretary of State for Gender Equality and Inclusion as government entity to deal with protecting and prevention of gender-based violence (GBV), including sexual violence, physical and other form of violence on women and girls.

With respect to climate change, the NDCC intends to establish a focal point on gender and climate change in response to the trajectory of the Conference of Parties (CoP) to the UNFCCC, including recent actions taken at COP25 in Madrid. Once this focal point is established, the NAP process will facilitate capacity building for the focal point, and subsequent efforts by the focal point to spearhead the mainstreaming of gender considerations into Timor-Leste's adaptation response.

3.7. Legacies of Colonization and Occupation

Timor-Leste gained its independence from Indonesia in 2002. During the quarter-century conflict for independence from Indonesia, there were at least 102,800 conflict related deaths (Mercer et al 2014). During this period crop production fell by up to two-thirds as crops were burnt to starve out guerillas (Molyneux et al 2012). The occupation ended violently, and after the referendum as the Indonesian forces retreated from Timor-Leste they executed operation "Clean Sweep" during which they reduced buildings and infrastructure to rubble and executed hundreds, if not thousands of Timorese (Mercer et al 2014). During this time more than three-quarters of the population was displaced, and 70% of the infrastructure was destroyed (26). In addition, throughout the country educational infrastructure was targeted, and nearly 90% of schools nationwide, including the Universitas Timor-Timur⁵, the only higher education institution at the time, was damaged or destroyed (GoDRTL 2014).

While overall Timor-Leste has made tremendous progress in rebuilding the country, the inherent fragility that exists after decades of struggle and national trauma has given rise to some episodes of instability, including a period of violence in 2006 when deep-seated tensions emerged, and again in February of 2008 when the President and Prime Minister of Timor-Leste were nearly assassinated in a coup attempt (Mercer et al 2014). Thus, this NAP incorporates perspectives and insights concerning reducing the risks of climate change-driven social unrest and insecurity, and one of the key guiding principles of this NAP is integrating climate change adaptation considerations into the nation-building and recovery process. Consideration of social conflict issues is very much aligning with one of the guiding principles applied for the current National Climate Change Policy of Timor-Leste which highlights that planning and implementation intervention of the Policy will embrace conflict sensitivity and promote long-term peace and prosperity (Democratic Republic of Timor-Leste, 2017).

⁵ After independence the name of the university was changed to Universidade Nacional Timor Lorosa'e.

Chapter 4. Rationale for Conducting Adaptation in Timor-Leste

4.1. Introduction

This section provides a general overview of the climate of Timor-Leste, data availability, observed changes and future projections. In addition, sectoral baselines and current and future vulnerabilities for six priority sectors is provided. The chapter aims to form the principle **evidence base** to support climate-smart decision-making processes in Timor-Leste. The information in this chapter is relevant to government and non-government stakeholders alike, and should contribute to policy formulation, adaptation project design, and strategic processes for businesses, non-governmental organizations, and development partners. It is envisaged that this chapter will be expanded over time as new data and information becomes available. The chapter provides an overview of projected changes for temperature, precipitation, sea surface temperatures and ocean chemistry, tropical cyclones, sea level rise, and patterns of inter-annual variability. The chapter also describes challenges with respect to data availability and recommendations for addressing them. The chapter also provides sectoral baselines for key sectors, including disaster risk management/disaster risk reduction, agriculture and food security, water and sanitation, health, coastal systems and marine resources, infrastructure, and transboundary climate change issues.

4.1.1. Key considerations to further enhance the NAP process. As in other chapters, there are a number of actions with respect to data and information that should be prioritized over the near-term (2020-2022 timeframe) to support further work on adaptation through the NAP process in Timor-Leste.

- Update this chapter as new information, including a CSIRO report on climate change in Timor-Leste, becomes available;
- Conduct a needs assessment covering data collection and information as well as human and institutional capacities to support research, data analysis, and other aspects of data and information management to support the NAP and allied processes in the future;
- Conduct research studies on the connection between climate shocks and stressors and forced relocation (short term) and resettlement (long term);
- Gather, organize, harmonize, and identify gaps in the historical data record;
- Improve and standardize geospatial data collection and coordinate this with the conduct of future vulnerability assessments to be conducted under the NAP process;
- Prioritize geographic areas to expand the country's monitoring network of hydro-meteorological stations to inform improved early warning systems and to begin to establish a comprehensive 30-year record of hydrometeorological data to facilitate improved downscaling of global projections in the future;
- Establish knowledge co-production arrangements between relevant government agencies and academic and research institutions to provide decision-relevant information to inform the NAP process;
- Develop uniform methodologies and conduct expanded vulnerability assessments for priority sectors, including a comprehensive study of climate risks to infrastructure;
- Establish points of contact with relevant national, provincial, and regional government authorities in Indonesia to facilitate cooperative arrangements to manage climate change adaptation along the transboundary (shared) watersheds and over common marine resources.

4.2 Climate context: general climate characteristics

The overall climate is classified as tropical savannah (Koppen-Geiger type "Aw"), with all areas in the country having a pronounced dry season. Timor-Leste is affected by the West Pacific Monsoon, which moves to mainland Asia during the southern hemisphere winter, and south to Australia in the southern hemisphere summer bringing a switch from very dry to very wet conditions and a change in the direction of the prevailing winds (GoDRTL 2016). This means that the wet season lasts from

approximately December to May, and the dry season lasts from approximately June to November, but there is some regional variability. In general, rainfall levels are highest in the south and decrease to the north, with some areas receiving little to no rainfall for eight months of the year (USAID 2017). July is the coolest month, whereas October is the warmest. The average difference between these two is about 2.5C.

4.2.1. Precipitation and Temperature. The country is divided into three different climate zones determined by precipitation and temperature characteristics (UNDP 2018b):

- North Coast Region. This area is characterized by annual average mean temperatures of more than 24C, annual rainfall of less than 1500mm, and a dry season lasting for around five months;
- Mountainous region. This area is characterized by average mean temperatures of less than 24C, annual rainfall over 1500mm, and a dry season lasting more than four months.
- South Coast region. This area is characterized by annual average mean temperatures of greater than 24C, average annual rainfall of approximately 2500mm, and a dry season lasting for only three months.

In addition, Barnet (2003) *cit.* GoTL (2014) indicated that the country is categorized into six agro-climate zones based on rainfall pattern. It is indicated that rainfall along the northern coast is very low (<1000 mm/annum), throughout the central and elevated areas is low to moderate (1500-2000 mm/annum) , and in high altitude areas mostly in the west of the country is relatively high as indicated in figure 6 below.

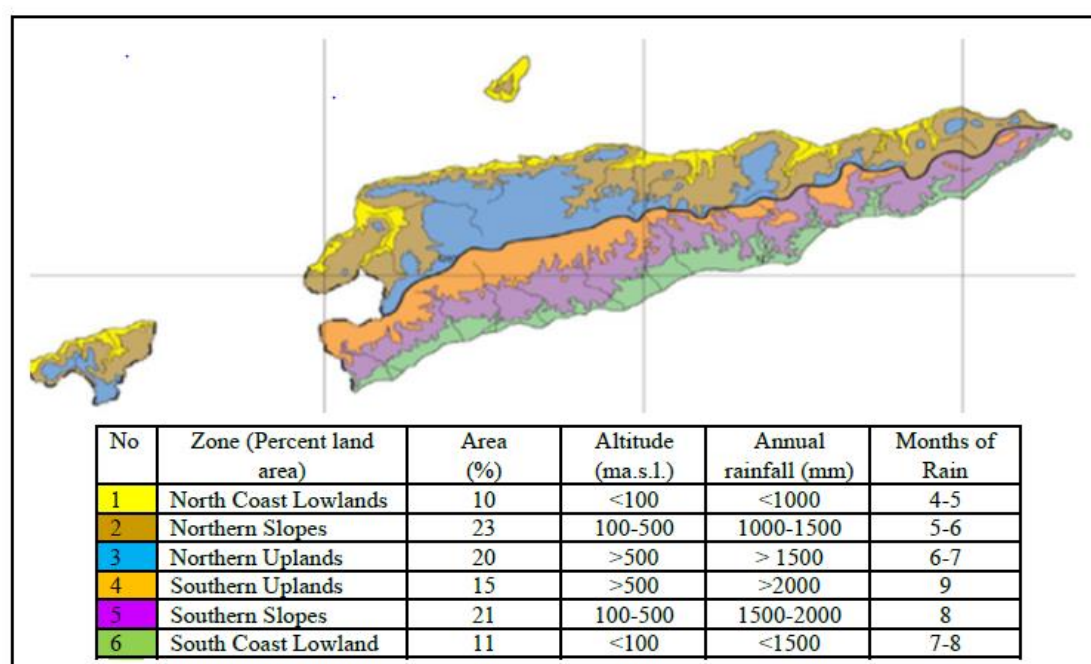


Figure 6: Agro-climatic zones of Timor-Leste

4.1.2. Interannual influences on climate variability. Timor-Leste is influenced by several cyclical oscillations. The most widely known is the El Niño Southern Oscillation (ENSO), though the country's climate is also influenced to some extent by the Indian Ocean Dipole (IOD), the Pacific Decadal Oscillation (PDO), and the Madden-Julian Oscillation (MJO). These phenomena influence the regional climate on intra-annual, inter-annual, and inter-decadal time scales and influence the total amount of precipitation received as well as water resource availability throughout the country. However, more research is needed in this area, as only the impact of ENSO has been studied with respect to Timor-Leste (World Bank 2018).

In all places, El Niño weather pattern cause overall drier conditions and reduced rainfall in the (December-March?) January-March wet season, with some places experiencing reduced rainfall in comparison to the amounts usually received in these months during non-El Niño years. El Niño years are usually associated with drought, and in general, the wet season is delayed by two to three months, with significant implications for agriculture, food crops planting and consequently food security. Due to decreased precipitation there is also reduced groundwater availability. According to official estimates, the 2015-16 El Niño-induced drought event affected approximately 350,000 people located mainly in the central highlands and eastern parts of the country (USAID 2017). In years following El Niño, rainfall can be higher than the annual average, which can lead to increased flooding. During La Niña conditions dry season rainfall tends to be above normal and the wet season starts earlier and finishes later. Above average rainfall can lead to more landslides and significant erosion mainly the topsoil

ENSO also affects ocean conditions; in El Niño years sea level can be as much as 20cm below the long-term average, while during the La Niña phase it can be 10-20cm above normal. During La Niña years wave heights tend to increase by 1-2.5m along the north coast and up to 3 meters along the south coast relative to normal conditions (Secretary of State for Environment 2010).

4.1.3. Tropical Cyclones. Tropical cyclones can affect Timor-Leste between November and April, but their effect tends to be relatively weak due to the country's proximity to the equator. Dili experiences on average eight tropical cyclones per decade, but their effect is weak. Among the most noticeable and damaging effects of tropical cyclones are storm surges, but there are no existing studies on the connection between cyclones and ocean surge dynamics in the seas surrounding Timor-Leste (Banda, Arafura, Savu, Timor). The danger from storm surges is higher during La Niña when sea levels are higher.

4.2 Climate Change Overview

The subsections below provide an overview of projections of future climate conditions for Timor-Leste. This information is derived from several sources, but almost all of the referenced sources draw on the 2015 report on Current and Future Climate of Timor-Leste, developed by the Commonwealth Scientific and Industrial Research Organization (CSIRO) (PACCSAPP 2015). A special subsection describes the product of downscaling experiments conducted to support the preparation of the Second National Communication to the UNFCCC, which is currently under development⁶.

4.2.1. Global and Regional Overview. According to the United States National Oceanic and Atmospheric Administration (NOAA) the 2018 average global temperature across land and ocean surface areas was 0.84°C above the 20th century average (NOAA, 2019). 2018 was the 4th warmest year in the 1880–2018 record and the 2nd warmest year on record without an El Niño present in the tropical Pacific Ocean. 2018 marked the 42nd consecutive year (since 1977) with global land and ocean temperatures above 20th century average and nine of the ten warmest years have occurred since 2005. The world's oceans have absorbed about 93% of the excess heat caused by greenhouse gas warming since the mid-20th century (Jewett and Romanou 2017) and in 2018 sea surface temperatures were 1.19°F (0.66°C) above the 20th century average (NOAA, 2019).

Increased ocean warming has resulted in a global sea level rise of 77mm above the 1993 average, which is the highest annual average in the satellite record (Lindsey 2018). Global average sea level rises at a rate of just over 3.1 mm per year due to a combination of melting glaciers and ice sheets and from the thermal expansion of seawater and the rate of sea level rise has doubled since 1993 compared to the 20th century average (Lindsey 2018). Oceans are absorbing about 25% of the carbon dioxide emitted to the atmosphere annually and as a result are becoming more acidic (Leong et al.

⁶ It should be noted that CSIRO has announced its intention to update this analysis in 2020 or 2021. When an update is available, this section will be updated as well.

2014). Increasing sea surface temperatures, rising sea levels, changing patterns of precipitation and winds, and ocean circulation are contributing to overall decline in oxygen concentrations in the oceans (Jewett and Romanou 2017).

4.2.2. Atmospheric temperatures. Sporadic meteorological data makes establishing accurate historical trends for Timor-Leste difficult, but the data that does exist suggests that average temperatures in the country have been increasing by .16C per decade since 1950. In the future annual mean temperatures and extremely high daily temperatures will continue to rise, regardless of future emissions scenarios. The temperature is projected to increase by .4-1.0C by 2030, which will be accompanied by an increase in the number of hot days and warm nights (MCIE 2016). By 2050 the increase in temperatures is expected to reach 1.25C-1.75C, with an increase in heat waves (USAID 2017).

4.2.3. Precipitation. Overall there has been an increase in average annual rainfall by 6.4mm per decade between 1901-2009, however rainfall trends have decreased in much of the country since 1990 (USAID 2017). In general, it is predicted that there will be a decrease in dry season rainfall and an increase in wet season rainfall, with extreme rainfall days occurring more frequently (MCIE 2016). Overall annual average rainfall may increase 4-10% by 2050 with an increase of up to 100-120mm in coastal areas, and 260-300mm in the mountains (USAID 2017).

4.2.4. Sea surface temperature and ocean chemistry. Based on the results of large-scale gridded sea surface temperature datasets (HadISST, SadSST2, ERSST and Kaplan Extended SST V2), there are indications of a gradual warming trend in sea surface temperatures since the 1970s (approximately .16C per decade on average with an increasing trend). Projections indicate that the annual average sea surface temperatures will continue to increase in the future. According to Sofian (2015), if the trend continues, the cumulative increase in average sea surface temperatures will reach between .6-.7C by 2030 and 1.2C by 2050. This cumulative increase could reach 1.6 to 1.8C by 2080, and 2.3C by 2100 (cited in UNDP 2018b).

Acidification of the ocean will continue to increase over the course of the 21st century driven by the uptake of carbon dioxide. As a result, aragonite saturation state will reach values below 3.5 by 2025, negatively impacting the development of corals (AMB and CSIRO 2011). Impacts on reefs are likely to be compounded by other stressors, including storm damage and fishing pressures, but the overall risk of coral bleaching is expected to increase (PACCSAPP 2015).

4.2.5. Tropical Cyclones. As noted above tropical cyclones have affected the country on multiple occasions, but overall losses and damage have been limited. Future projections suggest that there will be a decrease in the frequency of tropical cyclones impacting Timor-Leste, but an increase in intensity, meaning that wind speeds and precipitation from the cyclones that do occur will be greater, affecting larger areas (PACCSAP 2015).

4.2.6. Sea level rise (SLR). Sea level is expected to continue to rise. Based on satellite altimetry data, the rate of SLR is higher along the south coast than it is along the north coast. This is due to a number of local conditions, including wind patterns and ocean currents, which affect the local sea level. On average, the rate of SLR surrounding the country is around 5.5mm/year. Assuming that the rate is linear in the future, sea level in the region would increase by around 50mm by 2100, as most projections indicate that the rate of SLR will increase in the future.

4.2.7. Patterns of variability (ENSO and other oscillations). While it is certain that ENSO and other oscillations will continue to shape climate conditions in Timor-Leste into the future, there is little consensus on whether there will be a change in intensity or frequency of these events. This uncertainty is not specific to Timor-Leste; there is no global consensus on if and how ENSO and other oscillations will change in the future.

4.2.8. Projections and Downscaling Conducted in Support of Second National Communication. Global climate model (GCM) projections have been tailored to the geographic region encompassing the country of Timor-Leste using both dynamical and statistical downscaling techniques. Projections of future changes in atmospheric surface air temperatures and seasonal rainfall were obtained from 20 GCMs under four representative concentration pathways (RCP) (RCP2.6, RCP4.5, RCP6.0, and RCP8.5). For temperature the models predict that by 2081-2100 there will be a temperature increase of 0.3°C to 1.7°C in RCP2.6, 1.1°C to 2.6°C in RCP4.5, 1.4°C to 3.1°C in RCP6.0, 2.6°C to 4.8°C in RCP8.5 scenario (IPCC, 2013). The model means for the RCP8.5 Business-as-usual was +3.4°C. For rainfall, there is disagreement among models as to the sign of the change for the period 2006-2030 regardless of season. However, all of the RCP scenarios for the 2051-2075 time period predict a decrease in rainfall during the wet (DJF) and dry (JJA) seasons compared to a reference period. The sign of decrease of rainfall during the dry season may lead to possible increase on the drought-related impacts.

4.3. A note on data availability

It should be noted here that a significant limitation in terms of developing accurate past climatology and future projections of changing climatic conditions in Timor-Leste relates to the availability of relevant data. The NAP process will prioritize addressing these gaps in Timor-Leste's knowledge base. Identified limitations include:

- Lack of monitoring and observation of sea surface temperatures in Timor-Leste's territorial waters;
- Lack of previous studies on the relationship between cyclone activity and ocean surge dynamics around Timor-Leste (UNDP 2018b);
- Of the 12 daily-observed stations maintained by the Ministry of Public Works, Transport, and Communication, all have significant gaps which has meant that analyses relying on these data sets has relied on 10-year time slices, rather than 30-year climatology as recommended by the World Meteorological Organization (UNDP 2018b). This suggests that the data record that is available for the country may not adequately capture and characterize longer-term sources of inter-annual climatic variability (e.g. Pacific Decadal Oscillation).
- Lack of stream flow data in the country's rivers as data from the six hydrometric stations constructed in the 1980s has been lost (GoDRTL 2010); and
- In some cases, data records are spread across archives in Australia, Indonesia, Portugal, and Timor-Leste (Mercer et al 2014).

4.4. Sectoral baselines and current and future vulnerabilities

This section describes the changing climate in terms of potential impacts on several key sectors. Sectors have been selected based on an analysis of existing documents related to climate change adaptation (see Chapter 5). The overall impacts of climate change in Timor-Leste are likely to be quite significant in the absence of adaptation actions, with negative impacts on economic and social development prospects. A 2013 ADB study estimated that damage resulting from tropical windstorms, landslides, floods, earthquakes, and tsunamis may cost Timor-Leste 10% of its annual GDP by 2100, making it one of the worst hit countries in the Pacific region (UNDP 2018b). Information compiled for the INDC indicates that the last 10 years shows that climate-related hazards such as floods, droughts, storms, landslides and wildfires have caused major loss of human lives and livelihoods, the destruction of economic and social infrastructure, as well as environmental damage (MCIE 2016). This trajectory would almost certainly be exacerbated in the future without coordinated action to respond to climate hazards and their impacts.

4.4.1. Disaster Risk Management/Disaster Risk Reduction. Natural disasters have been a focal "sector" in most of Timor-Leste's climate change documents, and GoDRTL has been proactive in taking steps to improve disaster risk reduction and disaster risk management (DRR/DRM). However,

as noted above, due to years of conflict there is a lack of credible datasets in Timor-Leste regarding disasters and impacts (Mercer et al 2014). The country is one of the world's most vulnerable to natural disasters due to high risk of earthquakes, tsunamis, cyclones, and heavy rainfall. In 2011, the UN mission in Timor-Leste reported that the country had suffered 470 disaster events over the previous 10 years. The International Disaster Database (emdat.be) reports that between 1990 and 2014, floods were responsible for 71.4% of disasters, with droughts and storms each responsible for 14.3% of disasters recorded. During this period, flooding was responsible for all reported mortality. Although the country has medium exposure to hazards, due to high levels of sensitivity and a lack of adaptive capacity, Timor-Leste is ranked as the 7th most disaster-prone country in the world (UNCDP 2018). Many of the sectoral impacts of climate change described below could be considered natural disasters.

The National Directorate for Disaster Risk Management (NDDRM), which is responsible for developing policy and plans based on the four phases of the disaster cycle, is currently finalizing a new national policy for disaster risk management which will integrate the Sendai Framework as well as climate change considerations. As the NAP process evolves, it will be important to establish and maintain close coordination with the NDDRM and the new Policy.

4.4.2. Agriculture and Food Security. As noted in Chapter 2, this sector is extremely important in Timor-Leste as approximately 80% of the population is dependent on agriculture for their livelihoods. Overall, the agriculture sector is dominated mainly by smallholders and to some degree subsistence farming. In general, yields for all agricultural products are very low, and less than 10% of farmers utilize fertilizer. Chemical fertilizers have historically not been widely available, but in 2010 the GoDRTL began to support the use of chemical fertilizers on rice as part of a national strategy to boost yields and reduce rice imports (Molyneux et al 2012). The use of poor-yielding local varieties is another contributing factor to low yields (ibid), as are geographic conditions such as poor soil, steep slopes, and high rainfall variability (ibid). Indeed, traditional farming techniques have not changed much since the early 20th century, and shifting cultivation and bush fallow rotations are still used widely, particularly in the hills. Yields for major staples (rice and maize) are lower than in neighboring countries with similar agro-economies. Yields of other nutritious crops such as fruit, vegetables, beans and other pulses that provide for additional essential dietary quality are also low, as well as the yields of roots and tubers crops, which are an important coping mechanism, to the rural poor during the lean season (World Bank 2019). Post-harvest grain losses are also estimated to be as high as 30%, which has a negative impact on food security (Molyneux 2012).

In terms of future conditions, climate models show that Timor-Leste will experience major increases in both temperature and rainfall, which could have significant implications for livelihoods and food security (World Bank 2019). Increased variability and more frequent/severe ENSO events could have significant impacts on agricultural production. Government records indicate that maize and rice production fell by 40% and 57% respectively during the 2016 El Niño (USAID 2017); if ENSO events become more frequent and/or intense, disruptions to agricultural productivity and availability of food supply will likely increase in lockstep. In addition, given that 80% of crop production is reliant on rainfall, changes in precipitation patterns will likely impact on small-scale farmers. These farmers tend to raise one crop a year, making them very vulnerable to crop failures (USAID 2017). In the future, increasing cropping intensity will be more difficult without additional supporting irrigation infrastructures, as potential areas for agricultural and food cropping become more and more limited. Moreover, Timor-Leste's most valuable cash crop is coffee, which is highly sensitive to changes in precipitation pattern (frequency and distribution) and increases in temperature.

Climate change will also impact international food commodity prices. Simulation models suggest that inflation-adjusted prices of the three most important staple grains in the world—wheat, rice and maize—would increase between 21-105% by 2050. Although high commodity prices may benefit producers, substantially higher food prices may increase food insecurity and poverty not only for the urban poor but also for rural people, many of whom are net food buyers (World Bank 2019)

Gender Considerations in the Agricultural Sector. Women are heavily involved in the agriculture sector, but they are generally engaged in different activities than men. This may create or shape differential vulnerabilities for men and women both directly and indirectly. For example, with respect to maize, men tend to be responsible for irrigation and tending to crops as they grow, whereas women are responsible for selection and preparation of seeds, planting, harvesting, storage, processing, and marketing. With respect to coffee, women tend to do the washing and drying of coffee beans, whereas men are responsible for the preparation and planting of seeds, pest control, and grinding (Indeva 2018). In addition, female farmers have less access to hired labor and arming tools, and have limited involvement in cash crop production and participation in farmer groups (World Bank 2019).

4.4.3. Water and Sanitation. Timor-Leste has historically had ample freshwater resources. Freshwater resources of Timor-Leste comprise both surface water and groundwater. There are 28 major river basins in Timor-Leste, and small amounts of water are stored in one major lake (Iralalaro) in the east, and a number of small lakes, mainly in the southern part of the country. Groundwater resources are contained in a variety of aquifers, covering about 50% of the country (GoDRTL 2010).

However, vulnerability to water insecurity is considerable due to the high level of dependence of the population on ecosystem services as the basis for their livelihoods (World Bank 2018). The physical conditions in Timor-Leste combined with inadequate infrastructure investments and capacity to manage water resources services has resulted in a low level of water management efficiency and effectiveness, high levels of catchment degradation and high vulnerability to climate change (World Bank 2018). Projected changes in rainfall patterns and saltwater intrusion are likely to compound these issues, putting more pressure on groundwater resources, which could lead to a decline in both quality and quantity (USAID 2017).

At the national level, total rainfall is likely to increase, and rainfall and heat wave events will likely increase in intensity. However, impacts on water resources are not well understood at the local level. Furthermore, using existing information to design climate resilient water infrastructure and to inform water sector planning and policymaking still requires improvements in terms of technical capacity (World Bank 2018). Increased temperature and evaporation are likely to negatively impact the country's river systems (USAID 2017). Climate change is predicted to have a negative impact on water management because of the projected increase in rainfall intensity and variability as well as because of sea-level rise (World Bank 2018). Extreme weather events such as flooding and other natural disasters often compromise the quality of potable water sources, leading to outbreaks of waterborne diseases (MoH and WHO 2018).

In general, the impacts on water resources, their availability and use need to be better understood so that investments in water infrastructure and service provision can provide users with greater levels of certainty that supply will be consistent and reliable (World Bank 2018).

Gender Considerations in the Water and Sanitation Sector. In rural areas, communities rely on women and girls to collect water for the whole households. Difficulties associated with water availability tend to fall disproportionately on the shoulders of women. For example, the distance to water sources is a significant issue, as for almost 40% of the population the source of water is 30 minutes or more away. In many cases, women and girls can spend up to three hours per



Figure 7: Rural girls are collecting water far from their homes

day collecting water. In addition, a lack of access to sanitation and hygiene facilities in schools is a major reason for girls dropping out of school when they reach puberty (Indevia 2018).

4.4.4. Health. The most common health risks posed by climate change in Timor-Leste include vector-borne diseases such as malaria and dengue fever, heat-related mortality, undernutrition, diarrheal diseases, and disruption to healthcare services due to extreme weather events (MoH and WHO 2018). More variable and extreme humidity and temperatures have been linked to heat stress and more severe respiratory infections, such as pneumonia and upper respiratory tract infections (MoH and WHO 2018). Public health is also indirectly impacted by climate change processes due to direct impact on other sectors. For example, changing environmental conditions can lead to an increased risk of crop failure and livestock mortality in the agricultural sector, which can undermine food security and increase rates of malnutrition. Currently in Timor-Leste, it is estimated that 70 children under the age of 5 die every day because of diarrheal illnesses caused by poor water and sanitation

Gender Considerations in the Health Sector. Though much progress has been made on improving women's health over the past decades, overall indicators suggest that in general women's health remains poor, particularly in rural areas and amongst poorer women. Women face many barriers in accessing health care information and services, including long travel times to health facilities, poor roads and transport, and cultural norms discouraging them from leaving home to seek healthcare (Indevia 2018).

4.4.5. Coastal Systems and Marine Resources. Approximately 66% of the population lives in coastal areas and lowlands below 500m, and the natural resources available in the coastal zone are vital for the economy of coastal populations. At the same time, the rapidly growing population combined with the level of urban development and exploitation of natural resources is putting increasing pressure on coastal ecosystems (UNDP 2018b). Damage to mangrove forests has accelerated the impacts of climate change on coastal landscapes (USAID 2017).

A series of studies conducted between 2012-2016 (PIFSC 2017) provides essential baseline fisheries and marine resource information to inform ecosystem-based management of the nearshore waters of Timor-Leste. Since there were no previous studies, it is impossible to draw conclusions about trends and trajectories with respect to nearshore ecosystems and resources. However, the data collected from Timor-Leste's waters, when compared to other research sites around the Pacific and Indian Oceans, suggests areas of concern and warrants long-term monitoring. Several indicators of reef and ecosystem health were of concern compared to other sites, including carbonate accretion rates, reef seawater temperatures, pH, and aragonite saturation state, suggesting that ocean acidification impacts are part of a suite of threats currently facing the health of Timor-Leste's reefs (PIFSC 2017).

4.4.6. Infrastructure. Infrastructure is another priority sector in Timor-Leste's strategies and policies with respect to climate change (see Chapter 5). The infrastructure in Timor-Leste has been ranked (2013) as the 6th most vulnerable in the world by Maplecroft's Hazard Risk Index (Cook et al 2019). Flash floods, destructive winds and landslides frequently threaten the infrastructure in the country, and as noted in previous sections, increasing trends with respect to each of these hazards will intensify the impacts on infrastructure in the future. This baseline vulnerability is exacerbated by the fact that the violence of 1999 drastically affected the infrastructure in Timor-Leste. Between 50-90% of the houses in each of the country's 442 sucos at the time were burned down. Adaptation is seen as essential in protecting investments that the GoDRTL has made and will continue to make in the future. For example, the National Program for Village Development (Programa Nasional Dezenvolvimentu Suku) began in June 2012 with investments of over US\$300M over eight years, including investments in rural infrastructure. However, to date there has been no comprehensive study on the potential impacts of climate change on infrastructure (Indevia 2018).

An assessment of the impact of climate-induced hydrometeorological hazards on Timor-Leste under both baseline and climate change scenarios was conducted to support the design of the recently-approved GCF project⁷. The study utilized existing national-scale hazard maps and detailed socio-economic data on hazard receptors (including people, property, agriculture and infrastructure such as roads, bridges and water supply) to show that under climate change there will be an increase in the number of areas and key infrastructure affected for all hazards. In most cases, at least a doubling of hazard-affected areas in percentage terms is expected. On average, the increase in impact of each hazard between the baseline and climate change scenarios nationally is 26.3%, 21%, 55.4%, and 55.8% for landslides, floods, and drought risk respectively. The economic losses that could occur under climate change range from US\$203 million, US\$37 million, US\$10 million, and US\$12.5 million, respectively. These losses will impose significant additional financial burdens on the government and affected populations. At the same time, the frequency and intensity of climate extremes and disasters will necessitate additional infrastructure and maintenance measures while also increasing the demand for additional protective features to be embedded in the design of new construction. These effects, in combination, will considerably increase the cost of construction, operations and maintenance of rural infrastructure.

Table 2. Potential increase in hazard occurrence and economic losses due to climate change (source: GCF 109)

Hazard	Increased Impact (%)	Potential Economic Losses
Landslides	26.3	US\$203 million
Flooding	21	US\$37 million
Erosion	55.4	US\$10 million
Drought	55.8	US\$12.5 million

Currently the design of infrastructure and construction standards is not climate resilient and there is limited investment in operations and maintenance. The immediate implications of this could result in the nearterm failure of infrastructure services.

With respect to infrastructure, it should also be noted that in rural areas infrastructure expenditures are decentralized and managed at the local level, financed through decentralized mechanisms of municipal and village level public finance. Floods, landslides and drought all affect rural infrastructure, and therefore impacts of intensified extreme events on critical rural infrastructure will lead to damage and degradation of assets such as water supply and drainage structures, embankments and river protections, and community-level feeder/access roads and bridges. These damages can leave rural populations without basic services and often in full isolation. Impacts include reduction in water yields due to droughts, contamination of unprotected water sources, flooding of communities living areas due to inadequate flood infrastructure defenses. In addition, the ability of municipal planning officials, engineers and decision makers to identify areas that are critically vulnerable to climate hazards is lacking.

4.4.7. Transboundary Climate Change Issues. Timor-Leste and Indonesia share marine, riverine and terrestrial natural resources and ecosystems, especially those located in the border area. There are 10 water catchment areas that cross the border between Indonesia and Timor-Leste, including the Tono Watershed area, which plays an important role for local livelihoods in both Indonesia (upstream) and Timor-Leste (downstream). The Talau-Loes basin is another catchment area, which Talau river originates upstream in Indonesia, and the Loes catchment covers the mid- and downstream areas in Timor-Leste. However, the natural resources and ecosystems in the Tono water catchment transboundary areas have been very much affected by floods and droughts which require appropriate cross border management approach in dealing with climate change adaptation and environmental

⁷ Safeguarding rural communities and their physical and economic assets from climate-induced disasters in Timor-Leste

conservation between two countries (Taena et al 2016). In this context, the NAP can play an important role for addressing climate change impacts in the area of transboundary catchment sites. Given that this NAP calls for the application of ecosystem-based adaptation measures, as well as sectoral strategies that call for integrated water resource management (IWRM) and whole-basin approaches, the evolving NAP process should explore innovative approaches to coordinate adaptation plans and actions in these areas with Indonesia, including data sharing arrangements, coordinated management plans, and other measures . This may also include the development of a joint-implementation project for GCF financing that could serve as a model for countries in similar situations around the world.

Chapter 5. National Adaptation Plan Alignment with Existing Strategic, Legal, and Regulatory Frameworks

5.1. Introduction.

This chapter describes the regulatory and institutional frameworks and arrangements that are relevant to the formulation and implementation of the NAP. The chapter describes the steps Timor-Leste has already taken in developing its response to climate change, as well as additional strategies, plans, and policies that are directly and indirectly related to formulating a comprehensive NAP. The chapter provides brief information on the National Adaptation Programme of Action, the Initial and Second National Communications to the UNFCCC, the Nationally Determined Contribution, the Green Climate Fund Country Program, and the Health National Adaptation Plan. The chapter also describes non-climate change policies and plans of relevance to the NAP process and entry points, as well as additional political and administrative processes and trajectories, including decentralization, so that the NAP process can be aligned with these trajectories. Lastly, the chapter describes a number of challenges, gaps, and obstacles with respect to alignment with the existing strategic, legal and regulatory framework. Recommendations for overcoming these in the short term are presented in the subsection below, and medium- to long-term options are presented in Chapter 7.

5.1.1. Key considerations to enhance the NAP process. Recommendations for near-term (2020-2022) actions to strengthen the NAP process using the GCF NAP Readiness funding (to be acquired) include:

- Develop and disseminate awareness-raising materials for national line agency staff as well as a range of subnational stakeholders with respect to the NAP process, the impacts of climate change, and the need for adaptation;
- Conduct consultations in all 13 municipalities to raise awareness and engage a range of subnational stakeholders in the NAP process, building on the five municipal consultations that were conducted to support the NAPA;
- Establish a coordination mechanism between the implementation of the National Adaptation Plan and a Health National Adaptation Plan;
- Establish clear linkages between adaptation under the NAP and mitigation efforts under the Nationally Determined contribution (NDC) in accessing support through the GCF;
- Create procedures for updating the Green Climate Fund Country Program based on additional information and priorities that emerge from the NAP process and
- Establish a coordination mechanism between the implementation of the National Adaptation Plan with relevant line ministries.

5.2. Existing progress on climate change and related environmental issues.

Timor-Leste has a demonstrated commitment to addressing environmental and climate change issues and has fully engaged with international frameworks governing these issues. Some major milestones for Timor-Leste include:

- 2003: Acceded to United Nations Convention to Combat Desertification
- 2006: Ratified the United Nations Framework Convention on Climate Change and established a focal point for the UNFCCC
- 2006: Ratified the United Nations Convention to Combat Desertification
- 2006: Ratified the United Nations Convention on Biological Diversity and became a party to the United Nations Convention on Biodiversity in 2007
- 2008: Ratified the Kyoto Protocol
- 2011: Submission of National Adaptation Programme of Action
- 2014: Submission of First National Communication to the UNFCCC
- 2015: Ratification of the Agenda for Sustainable Development and adoption of Sustainable Development Goals

- 2016: Submission of Intended Nationally Determined Contribution to the Paris Agreement
- 2017: Ratified the Paris Agreement
- 2020: Submission of Second National Communication to the UNFCCC

In addition, the Government is currently developing the national climate change policy with the aims of ensuring better policy guidance for climate change integration into development efforts, improved access to multilateral and bilateral sources of climate finance. The draft National Climate Change Policy is expected to be approved in 2021.

5.3 Climate Change Plans and Policies

5.3.1. *National Adaptation Programme of Action (NAPA)*. The NAPA was developed under the Ministry of Economy and Development and under the supervision of the State Secretariat for Environment in 2010 and submitted to the UNFCCC in 2011. The NAPA was aligned with the SDP 2011-2030, which identified climate change as one of the greatest challenges facing Timor-Leste. The NAPA was the result of a 2-year participatory process focusing on addressing the most immediate climate-related risks. Formulation of the NAPA was based on the work of six sector working groups (food security, water, health, disasters, biodiversity, and infrastructure). These working groups identified the likely vulnerabilities and impacts of climate change on their individual sectors and developed and prioritized potential actions to address the impacts. Members were drawn from government agencies, universities, national and international NGOs, donor agencies, the private sector, and youth. Preparation of the NAPA also involved consultations in five municipalities that were considered representative of Timor-Leste's environmental and climatic conditions, although time and financial constraints limited engagement in additional municipalities (GoDRTL 2011 – TL NAPA). It should be noted that stakeholders involved in the NAPA process acknowledge that future studies should include nationwide consultations, a lesson that has been incorporated in this NAP (Mercer et al 2014).

The NAPA included a list of priority projects that were originally estimated to require US\$21.3 million in investments. However, the total financing that was eventually mobilized to support the investments outlined in the NAPA was in excess of US\$32 million (Barbosa 2016). These measures are summarized in Chapter 6.

5.3.2. *Initial National Communication Under the UNFCCC (INC)*. The process to prepare the INC began in 2011, and the document was submitted to the UNFCCC in 2014. The development of the INC involved a wide range of stakeholders, including representatives from local government institutions, academic institutions, private sector stakeholders, and non-governmental organizations. It was prepared in accordance with the UNFCCC's reporting guidelines on national communications. The day-to-day work on preparing the INC was conducted in collaboration with six thematic working groups comprising a variety of stakeholders. One of these thematic groups focused on vulnerability and adaptation.

The INC includes future projections based on scenarios from both the 4th and 5th Assessment Reports (AR4 and AR5) of the Intergovernmental Panel on Climate Change (IPCC). The INC also has the results of a vulnerability assessment that was conducted in approximately 60 sucos around the country. This is followed by vulnerability profiles for priority sectors, including agriculture, water resources, health, and coastal and marine resources. The INC includes a number of generalized recommendations for adaptation, which are included in Chapter 6.

5.3.3. *Intended Nationally Determined Contribution (NDC)*. The Paris Agreement establishes a collective commitment by the Parties to the UNFCCC to take action to limit the increase in global average temperatures to well below 2C above pre-industrial levels and to pursue further efforts to limit the increase to 1.5C. The Paris Agreement established a series of five-year cycles to increase ambition through Nationally Determined Contributions that would grow more ambitious over time for

both mitigation and adaptation. The GoDRTL's first INDC was submitted to the UNFCCC in 2016 and details the government's commitments to fulfilling the goals of the Paris Agreement. It includes priorities for both mitigation and adaptation, with food security, water resources, natural disasters, forestry, biodiversity, livestock production, infrastructure, and coastal ecosystem resilience being identified as priority sectors for adaptation. The INDC notes that the institutions and regulations that have been put in place by the GoDRTL are a starting point for putting the country on a climate resilient development pathway, but acknowledges that cooperation and assistance from the international community will be required to achieve the goals outlined in the INDC. In the INDC the GoDRTL commits the mainstreaming of climate change adaptation in the action plans of all sectors to work jointly towards the targets outlined in national policies. The INDC also notes that the NAP will guide medium- and long-term adaptation priorities. Importantly, the INDC outlines a number of adaptation measures. These have been incorporated into the synthesis of adaptation priorities included in Chapter 6.

These priorities provide general directions that have been incorporated into the specific actions that are covered by the priority actions/programmes of this initial NAP, and over the period from 2020 to 2022, they will be incorporated into the financing, and monitoring and evaluation sections of an expanded NAP..

5.3.4. Second National Communication to the UNFCCC (SNC). The GoDRTL is currently in the process of formulating its Second National Communication to the UNFCCC. To support the formulation of the SNC, the government has completed a number of studies to ensure that this report contains the most recent data and information available. This includes a vulnerability assessment, which is described more fully in Chapter 6, and an updated Trend and Scenario Analysis. This updated analysis features new downscaled projections of temperature and precipitation, as well as analysis based on these projections. The downscaling of projections is based on the latest round of global projections, which were developed for the Fifth Assessment Report (AR5) to the Intergovernmental Panel on Climate Change (IPCC). This represents a significant advance over the projections used for the Initial National Communication, which were based on the Fourth Assessment Report (AR4) to the IPCC. These new projections are incorporated into this NAP (see chapter 4) and inform the priorities and actions described herein. This new analysis is consistent with the expectation that Timor-Leste will update the information in its historical climate and future climate change scenarios when submitting its SNC.

5.3.5. Health National Adaptation Plan (HNAP). The HNAP was produced by the Ministry of Health and is currently being finalized. The HNAP provides some baseline information on health indicators and describes the primary threats to health associated with changing climate and environmental conditions. It also outlines priorities for addressing identified gaps based on the World Health Organization's Operational Framework for Building Climate Resilient Health Systems. The HNAP includes linkages to this NAP, explaining that sectoral adaptation plans are required to strengthen the NAP process and increase the adaptive capacity of vulnerable sectors. The HNAP has been developed to ensure that the management of health risks of climate change are integrated into the overall NAP process, including the assessment of risks, and identifying, prioritizing, and implementing adaptation options. The HNAP acknowledges the need for intersectoral coordination since some environmental health issues are not within the control of MoH.

The HNAP provides the overall strategic direction for strengthening health systems to protect health from climate change. It identifies and addresses medium- and long-term adaptation needs, including upstream drivers of health risks, taking into consideration the physical, social, and biological determinants of health. It is envisaged that the HNAP will facilitate increased access to climate adaptation finance by identifying entry points in the health sector.

5.3.6. Green Climate Fund Country Program. The GCF country program was completed in 2019 and serves as a roadmap to guide Timor-Leste's engagement with the GCF, within the UNFCCC and Paris Agreement financial mechanism. Timor-Leste is a member of two classifications of

countries that the GCF prioritizes support to: least developed countries (LDCs) and small island developing states (SIDS). With respect to facilitating engagement with the Fund, GoDRTL is currently working to establish a National Designated Authority, which would serve as the point of contact between the GoDRTL and the Fund, and which would coordinate all activities related to the Fund in Timor-Leste. The NDA will be established under the Secretary of State for Environment and is to be supervised by a Director General. The NDA will be supported by technical staff who will act as the secretariat for all GCF-related matters. In addition, the GoDRTL is planning to establish a Special Committee for Climate Finance (SCCF), which will work to facilitate the flow of international climate finance into the country to support adaptation and mitigation investments. As the NAP process evolves, the GCF Country Program will be updated as additional information and priorities emerge.

Annual Action Plan of Secretariat of State for Environment (2020). The main focus of the annual action plan for the Secretariat of State for Environment is environmental protection and conservation, biodiversity, climate change and international cooperation in the area of environmental protection and climate change. Pollution control and waste management has been seen as one of the key priorities for the Secretariat of State for Environment, especially implementation of Zero-Plastic Policy and finalization of the current Climate Change Policy draft. In addition, the Secretariat of state for Environment is going to coordinate formulation of a national policy on environmental education. Further, the National Directorate for Climate Change (NDCC) under this Secretariat deals with the continuation of undertaking Integrated Vulnerability Assessment up to 35% of 442 villages in order to identify and collect information on climate change vulnerability being faced by the communities, sectors and ecosystem and identifying adaptation options to increase resilience.

5.4 Other relevant Documents and Policies

This section describes additional policies, strategies, and plans that are relevant to the NAP process. In the 2020-2022 period, the NAP steering and technical guidance mechanisms (see Chapter 2) will establish clear linkages with each of these.

5.4.1. National Strategic Development Plan (2011-2030). The SDP is a keystone document that informs a wide range of other strategies, policies, and plans. The SDP focuses on three core pillars: 1) social capital; 2) infrastructure development; 3) economic development. The SDP acknowledges that climate change presents serious environmental and political challenges for Timor-Leste from threats such as rising seas, increased clouding, forest fires, and food shortages. The NAP process shall be aligned as closely as possible with the SDP and its future successors, and specific areas of alignment to the SDP 2011-2030 are highlighted in Chapter 2 of this NAP.

5.4.2. Integration of Climate Change Adaptation and the Sustainable Development Goals. Timor-Leste has developed a roadmap for the implementation of the 2030 Agenda and the Sustainable Development Goals (GoDRTL ND). To guide the country's efforts to meet the SDGs, a Working Group was established in 2015 to identify ways in which the SDGs and the 2030 agenda could be harmonized with the SDP 2011-2030. This working group identified synergies and entry points and concluded that the SDP is largely aligned with the SDG 13: Climate Action. As the NAP process progresses, its steering mechanism will ensure proper coordination with the country's efforts to implement the SDGs.

5.4.3. National Disaster Risk Management Policy 2019-2023 (DRAFT). The NDRMP supports the SDP 2011-2030 and provides guidance and direction for improving disaster risk management and disaster risk reduction in Timor-Leste for the next five years. The Policy is currently in the process of being approved by the Government and is expected to go into effect in 2020. As is widely acknowledged, there are broad overlaps between DRR/DRM and climate change adaptation, and thus the NDRMP provides a number of entry points to exploit synergies between the

two areas in Timor-Leste. The priorities and actions described in this NAP are harmonized with the priorities in the NDRMP. This includes alignment with the objectives of the NDRMP:

- Promoting and strengthening risk assessment, research, and preparedness;
- Improving national disaster risk management governance and collaboration;
- Building capacity, understanding, and communication of DRR/DRM; and
- Providing targeted investment and effective DRM program implementation

5.4.4. Timor-Leste Water Sector Assessment and Roadmap 2018. This sectoral assessment and roadmap were prepared by the World Bank in response to a request from the General Directorate for Water Supply and Sanitation. The document highlights key priority areas in the sector as well as potential investment options needed to achieve the goals set out in the SDP 2011-30. These priorities include:

- Formulating a national strategy of the development and management of water resources. This would include studies of water availability and demand under a range of demand and climate scenarios conducted at the national scale with regional downscaling to priority areas.
- Monitoring and early warning systems to reduce the vulnerability of communities to climate-driven events that have an impact on water management, such as drought and flooding.
- Integrated basin development pilot activities for catchment management and water resources protection. This includes making water resources more resilient to climate change by establishing institutional structures at the sub-basin level accompanied by strengthened local government services.

Each of these priority actions provide entry points for coordinating the NAP process with Timor-Leste's needs with respect to improved water resources management and service delivery.

5.4.5. National Water Resource Management Policy (draft). The GoDRTL, through the Ministry of Public Work, has formulated its National Water Resource Management Policy, which is awaiting approval by the Council of Ministers. This Policy defines responsibilities, objectives and strategies of the government to manage water resources in the country. This policy will guide the government of Timor-Leste to achieve some targets identified under the SDP 2011-2030. The draft Policy considers the importance of climate change adaptation related to water resource management, including construction of proper infrastructure for the protection of water resources, enhance the government's strategies and actions for responding to droughts, establishing or enhancing water collection and water storage system and water resource management that can mitigate the scarcity of water resulting from climate change.

5.4.6. Environmental Basic Law (Environmental Framework Law 26/2012). This law sets out the principles and rules governing environmental conservation and protection, the sustainable use of natural resources and environmental management from an overall and integrated perspective, which protects the fundamental rights of the citizens of Timor-Leste. The Law mandates that the State "implement all measures necessary for climate change adaptation and mitigation in terms of reducing greenhouse gas emissions into the atmosphere and/or their removal by sinks and minimizing the negative effects of the impacts of climate change on biophysical and socioeconomic systems". It also requires that the government must protect, conserve, and improve the quality and quantity of surface and groundwater and promote the sustainable use of water resources through the adoption of integrated water resources management.

5.4.7. National Biodiversity Strategy and Action Plan 2011-2020. The NBSAP is Timor-Leste's guiding framework to conserve its biodiversity and serves as a safeguard in achieving the country's development agenda in the next two decades. One of the guiding principles of the NBSAP is that Timor-Leste will take steps to adapt to, and be resilient to, long-term climate change. However, the Plan acknowledges that it is difficult to predict the impact of climate change on biodiversity resources (e.g. coral reefs) as there is not sufficient data on ecosystems, species composition, and other biological indicators and characteristics.

5.4.8. Ministry of Agriculture and Fisheries Strategic Plan 2014-2020. This document includes climate change considerations and is evidence that the agriculture sector is taking the challenges of climate change seriously. The strategy acknowledges that climate change is leading to extreme weather events and is creating changes in geographic production patterns, as well as causing deterioration to the natural resources base due to water scarcity and rising temperatures. The strategy includes strategic and specific objectives which are consistent with the priorities and actions included in the NAP, including:

- Enhance the contribution of agricultural research to sustainable agricultural productivity, food security and reduced poverty and malnutrition. This specific objective highlights the importance of publicly funded research in generating new technologies, practices, and strategies for traditional and emerging crops or enterprises. This research will include climate change considerations and analysis.
- Develop capacity for improved decision-making in the planning and budgeting process by providing accurate and up-to-date climate information and analysis. This strategic objective notes that improved climate information will be a key input into the planning of adaptation strategies in the future. It also includes a focus on identification of climate impacts, vulnerability and coping measures, improved climate forecasts, and improving the capacity of individuals to integrate climate change issues into the planning process.

The strategy also recommends that MAF mainstream climate change impacts its planning and priorities.

5.4.9. Gender equity and inclusion frameworks. Though the GoDRTL currently has no stand-alone national gender strategy or policy, there are other policies and plans related to gender considerations that are relevant to the NAP process and climate change adaptation and implementation in Timor-Leste. These include:

- National Action Plan on United Nations Security Council Resolution on Women, Peace and Security 2016-2020. This plan aims to increase and strengthen the active participation and leadership of Timorese women in the peace and state-building efforts of the nation. It is built around four pillars: 1) *Participation*; 2) *Prevention*; 3) *Protection*; and 4) *Peacebuilding*. The plan proposes concrete actions to review and improve policies, laws, and programs for enhancing women's active and meaningful participation in all aspects of state-building. The plan describes specific activities to advance its objectives, at least three of which provide direct entry points for harmonization with the NAP process:
 - Activity 1.2.3: Ensure that the perspectives of women and minority/marginalized groups contribute to the planning, writing, and implementation of legislation, policies, and programs. The participatory nature of the NAP process will strengthen this activity, and conversely implementation of the NAP will build on participatory structures created for the implementation of this activity.
 - Activity 4.1.1: Conduct monitoring of basic infrastructure development to provide benefits to communities, particularly women. The NAP process for climate change will advance climate-smart planning processes for planning of infrastructure and other investments which will be sensitive to the gendered impacts of climate change, and which will help to ensure equitable distribution of benefits from these investments.
 - Activity 4.1.2: Socialize and disseminate gender-sensitive mechanisms for natural disasters so that communities understand how to provide immediate response if natural disasters occur. The NAP for climate change's focus on understanding gendered impacts of climate change and their drivers so that these can be addressed through concrete actions at all levels of government is in alignment with this activity.

5.4.10. Five Year Action Plan (2019-2023) of National Directorate for Road, Bridge and Flood Control under the Ministry of Public Works. In order to achieve the target of the National

Strategic Development Plan (2011-2030) on infrastructure, the Ministry of Public Work, primarily through the National Directorate for Roads, Bridges and Flood Control has formulated its five year investment plan for upgrading, rehabilitation and maintenance of national, urban and municipal roads and bridges. The document does not clearly mention related climate change adaptation measures for the road and bridge; however the plan would address the negative impacts of floods and landslides on roads and bridges.

5.5. Political Processes, Trends, Trajectories, and Considerations

5.5.1. Decentralization. The GoDRTL is currently deliberating a draft law on decentralization which would increase the power and responsibilities of the municipalities in overall governance, including processes of prioritization, planning, budgeting, implementation, and monitoring of development processes. The broader process of decentralization to which the GoDRTL has committed itself involves three phases:

- Deconcentration (2016-2018). This phase involves strengthening of municipal administrative units, providing them with regulations, human resource, financial allocations, and other resources in preparation for their increased responsibilities;
- Institutional Decentralization (2018-2020). During this phase ministries will transfer additional functions and resources to the municipalities, including management of larger budgets. Municipalities will have greater discretion over local expenditures, and elected municipal councils will be established; and
- Territorial Decentralization (from 2020 onwards). This phase will include local elections to form the municipal councils, which will be headed by a mayor.

This ongoing process of decentralization has significant bearing on many aspects of the NAP process in Timor-Leste. These decentralization initiatives will be followed by other improvements, including a move towards program-based budgeting and more participatory and consultative planning processes. In addition, administrative decentralization will be accompanied by fiscal decentralization policies. The decentralization process will also prioritize private sector engagement at the municipal level for economic development, job creation, vocational training, and delivery of public services including education, health, water, sanitation, agriculture, irrigation, and construction and maintenance of local infrastructure (including a stronger role for public-private partnerships). All these initiatives create unique entry points for incorporating climate change adaptation considerations into day-to-day processes of governance, and the NAP process will guide this mainstreaming at the municipal level.

5.6. Identified barriers, gaps, and obstacles within policy and institutional Landscape

Although the GoDRTL has made great strides in terms of establishing an enabling environment for building resilience and adaptive capacity in the country, additional steps must be taken to ensure that the NAP process is effectively implemented and that future iterations of the NAP can continue to strengthen the country and its people in the face of changing environmental conditions. This section briefly describes some gaps, barriers, and obstacles that have become apparent over the course of implanting policies and projects for climate change adaptation.

- Low levels of awareness with respect to climate change physical processes and the need for adaptation. Virtually all sources agree that knowledge is lacking among government officials about climate change impacts and the types of policies and actions needed to adapt to changing climate and environmental conditions, as well as how to reduce greenhouse gas emissions. This lack of understanding holds true across all 13 municipalities. This issue requires a comprehensive approach to raising awareness about climate change physical processes, impacts, and adaptation across all sectors of the population, as well as effective capacity building for government and non-government stakeholders involved in various aspects of Timor-Leste's adaptation response.

- Communication and coordination across line ministries at the national level with respect to climate change adaptation is lacking, and there are no clearly defined and formalized channels of communication on this issue (UNISDR 2014). The NAPA notes that technical constraints combined with the fragmentation of responsibilities for climate change, natural resources, and disaster risk reduction pose challenges for effective implementation of adaptation measures. Related to this, the absence of specific legal frameworks and laws defining the responsibilities of individual line ministries and municipal administration offices in terms of disaster risk reduction and climate change adaptation has been seen as a key factor limiting the effectiveness of the first National Disaster Risk Management Policy (currently in draft stage).
- Significant gaps in data records as well as observation and monitoring networks. The HNAP observes weaknesses with respect to public health and disaster related data collection and analysis, hindering the assessment of risk and vulnerability at different levels. Surveillance with respect to diseases is rudimentary, and in general there is a lack of research, research capacity, and research support infrastructure for the health sector and other priority sectors. In addition, there is a general lack of data sharing across departments and ministries;
- Further capacity and human resources are needed at the municipal level in order to provide support to communities in the form of technical knowledge to identify hazards and vulnerabilities (UNISDR 2014);
- Low levels of public expenditure on climate change activities;
- Lack of specialized technical capacities needed for planning and implementation, and lack of stand-alone capacity building programs;
- Weak/non-existent national-level monitoring and evaluation for progress on resilience building and adaptation to climate change.

Each of these weaknesses will be addressed over the near term (2020-2022) through the GCF NAP Readiness support or is addressed in the priority adaptation programmes and actions described in Chapter 7 of this NAP.

Chapter 6. Summary of Results of Impact, Risk, and Vulnerability Assessments

6.1 Introduction

Among the most important components of the National Adaptation Plan is a rigorous assessment of risks and vulnerabilities at the national (sectoral) and subnational (generally geographic) levels. Vulnerability and risk assessments help to establish the evidence base to inform and prioritize adaptation measures. As the NAP process in Timor-Leste evolves and expands over the near-term (2020-2022), additional vulnerability and risk assessments will be conducted. This chapter provides a baseline for future vulnerability and risk assessments by compiling the results from previously conducted vulnerability and risk assessments, and identifies additional gaps that should be covered by future assessments. Comprehensive climate risk and vulnerability assessments have been conducted only for a few sectors thus far (e.g. for coastal systems,⁸ coral reef ecosystems⁹). Additional assessments will be conducted to fulfill NAP requirements.

6.1.1. Key considerations to improve the NAP process. As noted above, a key priority over the short term will be to conduct additional risk and vulnerability assessments to inform the future versions of the NAP and improve its overall evidence base. Recommended actions over the short term include:

⁸ UNDP. 2018b. National Coastal Vulnerability Assessment and Designing of Integrated Coastal Management and Adaptation Strategic Plan for Timor-Leste: Coastal Vulnerability Assessment Report. UNDP. 161pp.

⁹ PIFSC. 2017. Interdisciplinary baseline ecosystem assessment surveys to inform ecosystem-based management planning in Timor-Leste: Final Report. NOAA Pacific Islands Fisheries Science Center, PIFSC Special Publication, SP-17-02, 234p. Available at: <https://repository.library.noaa.gov/view/noaa/14793>.

- Establishment of a centralized database of vulnerability and risk assessments (including a national registry of suco-level vulnerability assessments) as well as climate change adaptation (and climate change adaptation aligned) projects conducted by development partners, NGOs, local communities, and other stakeholders. This database should be maintained by NDCC;
- Establish routine methodologies to monitor and subsequently conduct vulnerability/risk assessments for key sectors at the national level (e.g. agriculture, health, coastal and marine resources, infrastructure, water and sanitation, disaster risk reduction);
- Standardize and conduct training on suco-level vulnerability assessment methodology and provide technical and financial assistance so that suco development committees can conduct their own vulnerability assessments;
- Establish a mechanism for consolidating the results of suco vulnerability assessments and efficiently incorporating them into the NAP process and the priorities that emerge from the NAP process, and also for incorporating them into suco development programs and investment budgets; and
- Formalize a rigorous process for moving from sectoral and subnational vulnerability and risk assessments to the identification of national adaptation priorities for the NAP.

6.2 Summary of Vulnerability Assessment Results

There has been a wide range of vulnerability assessments conducted in Timor-Leste over the years. Recently, efforts to scale-up vulnerability assessments to the national and sectoral level, as well as efforts to use standardized methodologies have increased. This section focuses primarily on several larger scale vulnerability assessments that are relevant to the sectors outlined above, and their findings. The GoDRTL has decided that this first NAP shall be based on available analyses of risk and vulnerability (particularly those conducted for the Initial National Communication and Second National Communication to the UNFCCC). More detailed vulnerability and risk assessments will take place in parallel to the implementation of the first NAP.

6.2.1. Integrated vulnerability assessments (IVA) at the village level. Integrated Vulnerability Assessment (IVA) activities have taken place in 32 villages across all 13 municipalities of the country. NDCC has been undertaking IVAs since 2018, covering 32 villages with an eventual target of 158 villages out of a total of 450 villages in Timor-Leste. The main objective of these assessments is to gather information and data on climate change impacts through the communities' observations and experiences while identifying vulnerable livelihood assets as well as identifying focus areas for adaptation action. This assessment utilizes a framework that was designed by the University of South Pacific (USP). The core indicator for the assessment are livelihood assets of the community which is closer to the capacity to adapt to the impacts of climate change as well as reflecting level of vulnerability toward exposure and sensitivity. The preliminary report of this IVA result for 32 villages indicates that the most important impacts of climate change at the village level include the Human Security Objectives (HSO) of environment and water security are the most vulnerable HSO. Factors associated with environmental degradation are droughts, floods, landslides, strong winds and others have significantly affected the lives and livelihoods of the communities and their natural resources, including damaging infrastructure, affecting water resources, human health and food security. Most of the villagers in the assessment areas indicated that water shortage is the main issue facing the villages. The vulnerability assessments also indicate that floods and landslides have affected roads and infrastructure during the rainy season, and that the communities have limited capacity to adapt to these negative impacts of climate change. These impacts lead to food insecurity, unsustainability within the local economy, and environmental and natural resource degradation. For example, the villages of Mau-Nuno, Larisula, Aitutu and Lalawa are currently facing natural resources and infrastructure degradation, while Lisadila, Mahakidan, Leolima, Maubisse, Talimoro and Madabeno villages are currently facing natural resources degradation.

6.2.2. Second National Communication vulnerability assessment. A vulnerability assessment has been conducted to support the Second National Communication to the UNFCCC. This VA builds on the work that was conducted for the Initial National Communication by digging deeper into the driving causes of vulnerability to determine what makes different social groups vulnerable to climate change impacts. This VA combines top-down analysis of biophysical drivers of vulnerability and a bottom-up analysis of socio-economic factors of vulnerability, addressing processes at multiple scales. Fieldwork for this assessment was conducted in three different agro-ecological zones with a sectoral focus on agriculture, water resources, and infrastructure. Some key points from the VA are:

- In all areas it was recognized that there has been increasing frequency and intensity of extreme weather events, and that longer dry seasons are leading to more pervasive droughts.
- All communities reported that the impacts of these changing environmental conditions are affecting the poor to a greater degree; key factors include a lack of access to more resilient building materials, lack of access to alternative income and livelihood diversification strategies
- During the vulnerability assessment it was also observed that some people have been forced to sell assets, including livestock. This suggests that changing environmental conditions may be leading to a gradual diminution of personally-held wealth and capital, undermining the ability of poor rural residents to climb out of poverty. In contrast, those that have diversified

sources of income (e.g. civil servants) tend to be less severely affected by changing environmental conditions.

6.2.3. Health Vulnerability and Adaptation Assessment. The Ministry of Health, with support from the World Health Organization, has conducted a health vulnerability and adaptation assessment for Timor-Leste, which is part of the broader process of developing a Health National Adaptation Plan (HNAP). The assessment was conducted according to WHO's guidelines on "Protecting Health from Climate Change—Vulnerability and Adaptation Assessment" and included four steps: 1) framing and scoping; 2) vulnerability assessment; 3) impact assessment; and 4) adaptation assessment. The assessment reached the following conclusions:

- Under high-emissions scenarios, heat-related mortality among elderly residents are projected to increase significantly (from a baseline of zero deaths between 1961-1990);
- Improved research capabilities to examine the linkages between climate/weather-related phenomena and health impacts and disease incidence are needed;
- Surveillance and early warning systems for disease vectors should be improved, and data sharing between different agencies to inform these systems should be improved;
- There is a need to mainstream climate change into new policies and programs related to climate-sensitive diseases and risks, including mainstreaming of both CCA and DRR/DRM considerations into the Timor-Leste National Health Sector Strategic Plan 2011-2030 during the mid-term review and four-year comprehensive evaluation processes;
- There is a need to enhance the capacities within MoH and among other stakeholders to address the health risks of climate change, including general awareness-raising activities and improving access to finance for adaptation activities;
- The assessment also concludes that higher temperatures and longer heat waves are expected to increase the incidence of heat-related diseases. However, municipality and village level vulnerability assessments have not been undertaken (MoH and WHO 2018).

The programs and activities described in Chapter 7 of this NAP incorporate the recommendations of this health sector vulnerability assessment, and will improve the overall resilience of the health sector and the ability of health sector professionals and systems to improve service delivery amidst changing environmental conditions driven by global warming.

6.2.4. National Coastal Vulnerability Assessment. In 2017 the GoDRTL, with support from UNDP, conducted a nationwide assessment of coastal vulnerability in 121 sucos situated in 11 different municipalities (two of Timor-Leste's 13 municipalities are landlocked) as part of the "Building Shoreline Resilience of Timor-Leste to Protect Local Communities and their Livelihoods" project, funded by the Global Environmental Facility. Using a modified version of the Coastal Vulnerability Index methodology developed by the United States Geological Survey (USGS), the study examined the role of socio-economic factors, infrastructure, and ecosystem services in shaping vulnerabilities in the coastal zones. 16 of the sucos were classified as having "very high vulnerability", with 40 additional sucos classified at the "high vulnerability" level. 40 of these 56 sucos are located on the southern coast. Key findings from this assessment include:

- A key vulnerability in many areas is the fact that roads are often constructed too close to the coastline and are currently affected by severe coastal erosion;
- In many coastal areas, out-migration to urban centers lowers the overall resilience of coastal communities and leaves behind particularly vulnerable people, including children, the elderly, and poor women as the economically more productive population moves to places such as Dili.
- All coastal communities report an increase in strong winds and waves, which has affected fishing productivity as most fisherfolk use small boats, which are more vulnerable under heavy wind and wave conditions. Coastal communities also report that fish stock is declining, and this is blamed both on coral reef degradation and illegal fishing by outside (to some extent overfishing, the use of unregulated fishing methods as well)

Chapter 7. Priority Adaptation Programs for Timor-Leste

7.1 Introduction

This chapter presents the adaptation priorities for Timor-Leste's initial NAP. These priorities have been compiled from the existing strategies and plans related to climate change adaptation that were described in Chapter 5, including the NAPA, NDC, INC, HNAP, and the GCF Country Program. The priorities were validated at the initial NAP stakeholder consultation workshop conducted in Dili in February 2020. The priority actions have been categorized according to sector (infrastructure, biodiversity and ecosystem adaptation, health sector, agriculture sector, water sector, disaster risk reduction, and tourism). In addition, capacity-building at individual, systemic and institutional levels across sectors were also identified as a priority area. Completing a national climate change policy is also a priority, and this is well underway. .

7.1.1. Key considerations to improve the NAP process. Over the near-term (2020-2022) there are a number of tasks to facilitate the implementation of these priorities. These early steps can be supported by a GCF Readiness grant and/or other support from development partners. These steps include:

- Build capacities within NDCC to coordinate the implementation of priorities;
- Further validate the identified priorities with the designated lead agencies;
- Disaggregate priorities into actionable steps and develop draft work plans;
- Identify existing programs and expenditures within priority sector agencies which could serve as entry points for the identified priorities and work plans;
- Identify sources of technical support among development partner community to implement the identified priorities, as per work plan;
- Establish monitoring and evaluation frameworks and detailed implementation arrangements for each priority;
- Develop cost estimates for implementation of priorities; and
- Identify internal and external sources of financing to support implementation.

7.2 Priority Adaptation Programs

The priority adaptation programmes for **physical investments** are presented in table 3. The adaptation priorities are grouped into policies, projects and programmes, and a national support programme to manage the NAP process going forward. Physical investments are priorities, which involve building or construction ("hard projects"). In most cases, these priorities will require external financing from development partners, supplemented with financing from domestic sources. Also, in most cases these investments will require public funds through grants or loans.

Table 3. Priority adaptation programmes by sector showing the source and lead agencies (detailed activities under each are given in the annex 1).

Sector and program	Source	Lead Agencies
I. Infrastructure Adaptation Priorities		
Program 1: Identification of Infrastructure Vulnerabilities	NCCP	Responsible Ministry of/for Environment; MoPW, Responsible MUPD and UNTL
Program 2: Establish Institutional and Human Capacities	NCCP, NAPA	MoPW, UNTL and Responsible Ministry of/for Environment
Program 3: Improve regulatory framework for climate-smart and climate-proof infrastructure	NAPA, GCF Country Program, NCCP	MoPW and Responsible Ministry of/for Environment
Program 4: Climate-proofed infrastructure development	GCF Country Program	MoPW and Responsible Ministry of/for Environment
II. Biodiversity and Ecosystem Adaptation Priorities		
Program 1: Build human and institutional capacities for Ecosystem-Based Adaptation	NCCP	MAF, Responsible Ministry of/for Natural Resources; Forestry; Responsible Ministry of/for Environment; Higher Education and UNTL
Program 2: Incorporate Ecosystem-Based Adaptation into Planning and Regulatory Frameworks	NDC, NCCP	MAF, Responsible Ministry of/for Environment and UNTL
III. Health Sector Adaptation Priorities		
Program 1: Integrate Climate Change Considerations into Health Sector Planning and Regulatory Frameworks	NDC, DCCP	MoH; UNTL; Responsible Ministry of/for Environment
Program 2: Improve Health Sector Capacities for Managing Climate Risks	NDC, NC, NAPA, NCCP	MoH, Responsible Ministry of/for Environment
IV. Agriculture Sector Adaptation Priorities		
Program 1: Improve Research and Knowledge Management Capacities to Support Climate-Smart Agriculture and Resilient Land Management	NCCP	MAF, UNTL and MoE
Program 2: Incorporate Climate Change into Agriculture Sector Planning and Management Practices	NAPA, NCCP and GCF country Program	MAF, MoH and Responsible Ministry of/for Environment
Program 3: Mainstream Climate Change Considerations into Agriculture Sector Regulatory Frameworks	NCCP	Responsible Ministry of/for Forestry, MAF; Responsible Ministry of/for Environment
Program 4: Support Private Sector	NCCP	MAF, MoH and Responsible Ministry

and MSME Climate-Smart Agriculture and Aqua/Mariculture		of/for Environment
Program 5: Promote Climate-Smart Livestock Practices	NCCP	MAF; MoE and UNTL
Program 6: Implement Community-Centric Climate-Smart Agriculture and Resilient Land Management Program	NAPA, GCF Country Program, NDC, NCCP	MAF, Responsible Ministry of/for forestry; Responsible Ministry of/for Environment
V. Water Sector Adaptation Priorities		
Program 1: Incorporate Climate Resilience into Water Sector Planning and Regulatory Frameworks	GCF Country Program/NDC/NAPA, NCCP	Responsible Ministry of/for Forestry/MAF and UNTL; Responsible Ministry of/for Environment, Responsible Ministry for Water Resource Management and UNTL
Program 2: Implement Climate-Smart Water Management Among Large (institutional/municipal users)	INC, NDC, NCCP	UNTL, MAF, Responsible ministry of/for Environment; Responsible Ministry of/for Water resource management
Program 3: Empower Communities to Utilize Climate-Smart Water Management Techniques	NCCP	Responsible Ministry for Water Resource Mgt and Responsible Ministry of/for Environment
Program 4: Build New/Retrofit Existing Water Infrastructure for Climate Resilience	GCF Country Program/NDC, NCCP	MoPW, Responsible Ministry for Water and Sanitation; Responsible Ministry of/for Environment
VI. DRR Adaptation Priorities		
Program 1: Enhance community-level integration of DRR and CCA	NAPA, GCF Country Program	Responsible Ministry of/for Environment, SSCP/DRR
Program 2: Strengthen National Capacities for Climate Change Responsive Disaster Risk Reduction and disaster risk management	NDC, INC	MAF, Responsible Ministry of/for Environment, SSCP/DRR, UNTL and MoE
VII. Tourism Sector Adaptation Priorities		
Program 1: Supporting Climate-Resilient Tourism Resources in Timor-Leste	NCCP	Responsible Ministry of/for Tourism; Responsible Ministry of/for Environment
Program 2: Strengthening the Market for Climate-Resilient Nature-Based Tourism.	GCF Country Program, NDC, NCCP	Responsible Ministry of/for Tourism; Responsible Ministry of/for Environment, MAF, MoE and UNTL

The activities under each program as given in above Table 3 include a range of activities from concrete adaptation investments to research, capacity-building and regulatory formulation/reformulation and harmonization of the existing ones. The concrete adaptation investments have been extracted and presented according to policies and projects as per Table 4 below.

Table 4. Priority policies and concrete activities (physical investments) extracted from Table 3, and arranged by system to show a timeline for planned implementation.

I. Policies	Timeline	Lead Agencies:
1. Timor-Leste is in the final stages of preparing a National Climate Change Policy. This policy will define objectives and a vision for addressing climate change and will provide the necessary mandate for the NAP.	2020	Secretariat of State for Environment (SSE)/ NDCC
2. Several issues will be integrated into Tarabandu (customary rules) including: water conservation, water and land use management, and climate risk reduction	2-3 years	SSE, MAF, MoPW, SSCP
II, Adaptation Priorities Projects	Timeline	Government of Timor-Leste and lead International and National agencies
A. Strengthening the capacity of national, local institutions and communities in managing climate risks (floods, drought, landslides)		MoPW; MAF and Responsible Ministry of/for Environment
1. Improve physical infrastructure and natural vegetation methods to prevent landslides in hill sites, roads and river banks that are made vulnerable by climate change	3-5 years	MoPW, Responsible Ministry of/for Environment and MAF
2. Review existing laws, regulation and standards to enhance climate change resilience of critical infrastructure	3-4 years	MoPW and MTC
3. Enhancing Early Warning Systems to build greater resilience to hydro and meteorological hazards in SIDS (<i>taking a regional approach, in prep, part of the GCF Country Programme, with UNEP and the Government of Timor-Leste</i>)	5-6 years	MTC, MAF and Responsible Ministry of/for Environment
B. Addressing the needs of indigenous and vulnerable communities and groups		Responsible Ministry of/for Environment and MAF
4. Reduce the vulnerability of farmers and pastoralists to increased drought and flood events	5-10 years	MAF
5. Improve institutional and community (including vulnerable groups such as women and children) capacity to prepare for and respond to climate change-induced natural disasters	2-5 years	SSCP/DRR and Responsible Ministry of/for Environment
6. Integrate climate risk information into traditional disaster risk reduction and management	3-5 years	SSCP/ DRR and Responsible Ministry of/for Environment

7. Integrate water conservation, water use management, and climate risk reduction approaches into <i>Tarabandu</i> (customary rules – <i>also included under policies</i>)	5-10 years	MAF, MoPW and Responsible Ministry for Environment
C. Using ecosystem-based DRR in coastal areas and coral reefs		
8. Maintain mangrove plantations and promote awareness to protect coastal ecosystems from impacts of sea level rise	3-6 years	MAF, MoPW and Responsible Ministry for Environment
D. Improving water resources management under climate change		
9. Build climate-proof and environmentally sustainable infrastructure to protect water resources , including enhancing water harvesting storage tanks and irrigation farm ponds, distribution and management systems, particularly in drought-prone areas	5-10 years	MoPW and MAF
10. Create and enhance water harvesting, water distribution and management systems to avoid water shortage due to climate change	5-10 years	MoPW and MAF, Responsible Ministry for Environment
11. Develop integrated agroforestry and watershed management to reflect impacts of climate change on agriculture and forestry systems	3-5 years	MAF
12. Control quantity of water used by industry, and water pollution control standardization including coffee processing waste management in climate change context	5-10 years	MoPW, MAF, Responsible Ministry for Environment
13. Design a water management system that includes assessment of demand projections and sustainable supply systems disaggregated by end use, and existing status of the water sources and supply systems	5-10 years	MoPW
14. Implement integrated water resource management approaches to protect and rehabilitate watersheds critical for sustainable water supply for agriculture and domestic purposes	4-10 years	MoPW, MAF
15. Enhance government and community strategies to respond to drought exacerbated by climate change	3-5 years	MoPW
16. Promote water conservation, protection of springs and recharge of the ground water sources including strong linkages between up-stream and down-stream communities	3-6	MoPW, MAF and Responsible Ministry of/for Environment
E. Promoting sustainable land management under climate change		
17. Implement integrated sustainable land management which promote climate resilient practices such as fixed/permanent agriculture, reduced burning, reduced erosion, and increased soil fertility	5-10 years	MAF

18. Reduce climate vulnerability of forests through reforestation degraded lands and provide a sustainable source of fuel wood	2-4 years	MAF
19. Adapt to climate change and enable sustainable land management through productive rural communities in Timor-Leste	3-5 years	MAF, Responsible Ministry of/for Environment
20. Reduce climate vulnerability in the agricultural sector through promotion of sustainable and conservation agriculture with minimal negative impact on the environment, and avoiding agricultural activities in climate-risk prone areas	5-10 years	MAF
F. Improving public health services to deal with climate related public health issues		
21. Develop a health database and data management system which includes climate sensitive health risk and vulnerability information to facilitate effective, targeted and efficient delivery of health services	2-5 years	MoH
22. Establish surveillance for health early warning systems and response mechanisms for climate-related health risks	3-4 years	MoH
G. Building climate-resilient livelihoods		
23. Develop alternative livelihood options to enhance community resilience through fisheries and marine ecosystem-based bio-physical resources	3-5 years	MAF, Responsible Ministry of/for Environment
III. NAP National Support Programme		
Support to the NAP process in Timor-Leste, proposal to the GCF NAP Readiness Support window (see below)	2-3 years	Responsible Ministry of/for Environment

The Support to the NAP process in Timor-Leste, proposal to the GCF NAP Readiness window

Building on the continuous, progressive, and iterative nature of the NAP process, support is being mobilized from the Green Climate Fund (GCF) readiness window for the formulation of NAPs to support the “national NAP support programme – NSP” under the NDCC. This version contains several recommendations for strengthening the human and institutional capacities as well as for improving Timor-Leste’s knowledge management infrastructure to support climate change adaptation. These recommendations should be incorporated into the funding proposal to the GCF to support the ongoing activities of the NAP process in Timor-Leste under the NSP.

As part of the GCF NAP Readiness project, next steps will include development of implementation plans for each of these priority actions. These implementation plans will include specific steps to achieve the priority actions. These steps then can be linked to a monitoring and evaluation framework and budget plan, which identifies sources of financing for implementation. Here is envisaged that the Special Committee for Climate Finance (see Chapter 2), will have a strong role to play in coordinating financial support for the priorities.

The adaptation cycle will be applied to each of the key sectors under the NSP upon receipt of the GCF NAP readiness funding, hopefully between end 2020 and 2022 (the adaptation cycle includes (i) research and systematic observation; (ii) governance and institutional arrangements; (iii) analysis and

assessment; (iv) plan development; (v) implementation strategy; (vi) implementation; (vii) monitoring and evaluation; (viii) reporting; (ix) update and revision of the plans).

Detailed vulnerability assessments will be synthesized along the following sectors (where necessary, additional vulnerability and risk assessments will be conducted to fill knowledge gaps in key geographic areas):

1. **Infrastructure** priority programs include (i) identification of infrastructure vulnerabilities, (ii) establishing institutional and human capacities, (iii) improving regulatory framework for climate-smart and climate-proof infrastructure, and (iv) climate-proofed infrastructure design and development.
2. **Biodiversity and ecosystem** adaptation priorities programs include (i) building human and institutional capacities for ecosystem-based adaptation and (ii) incorporating ecosystem-based adaptation into planning and regulatory frameworks.
3. **Health sector** adaptation priority programs include (i) integrating climate change considerations into health sector planning and regulatory frameworks and (ii) Improving health sector capacities for managing climate risks.
4. **Agriculture sector** adaptation priority programs include (i) improving research and knowledge management capacities to support climate-smart agriculture and resilient land management, (ii) incorporating climate change into agriculture sector research planning and management practices, (iii) mainstreaming climate change considerations into agriculture sector regulatory frameworks, (iv) supporting private sector and Micro-, Small-, and Medium-sized Enterprises (MSME) climate-smart agriculture and aqua/mariculture, (v) promote climate-smart livestock practices, and (vi) implementing community-centric climate-smart agriculture and resilient land management programs (vii) mainstreaming climate change considerations into agriculture - food crops - handling o new of varieties, as well as pest and disease management.
5. **Water sector** adaptation priority programs includes (i) incorporating climate resilience into water sector planning and regulatory frameworks, (ii) implementing climate-smart water management among large-scale users, (iii) empowering communities to utilize climate-smart water management techniques, and (iv) building new/retrofit existing water infrastructure for climate resilience.
6. **Disaster risk reduction** adaptation priority programs include (i) enhancing community-level integration of DRR and CCA and (ii) strengthening national capacities for climate change responsive disaster risk reduction and disaster risk management.
7. **Tourism sector** adaptation priority programs include (i) supporting climate-resilient tourism resources in Timor-Leste and (ii) strengthening the market for climate-resilient nature-based tourism.

In addition to this NSP to be funded by the GCF NAP support, the following will also be addressed:

- Formalized institutional arrangements will be established;
- Finalization of administrative arrangements and the legal basis for the NAP *including on data*;
- Development of a centralized data archive system to support the work on NAPs, building on data collected for specific sectoral assessments and projects (this will include a data policy);
- A “theory of change” that maps Timor-Leste’s long-term adaptation goals at national and subnational levels and identified clear pathways for reaching these goals will be developed through a fully participatory process. This theory of change will also include mapping behavior change pathways in priority sectors to encourage people, organizations, and institutions to adopt climate resilient development pathways;
- Developing cost estimates of prioritized adaptation options;
- Development of a comprehensive financing plan to support implementation of the NAP;
- Formulation of a monitoring, evaluation, reporting and learning (MERL) framework;

Additional activities on Human Capacity Development, Institutional Strengthening, Regulatory Modifications and Research

Given the need to build capacity, improve data and information basis for adaptation, and conduct new research on climate vulnerabilities and risk while implementing concrete adaptation measures, each project and programme will also include activities to build institutional and human capacity, update regulations as well as research components. Annex 1 shows Table 3 expanded to show the following categories for activities under each priority program:

- **Human capacity development.** These are priorities that involve training or capacity development for individuals both within the government and among non-government stakeholders (e.g. private sector, NGOs, CSOs, FBOs, etc.). Some of these priorities may be supported by domestically sourced funds. In other cases, development partners will support these relatively low-cost, high impact investments.
- **Institutional strengthening.** This refers to priorities that involve improving institutional competencies and other aspects of governance. This category is primarily “soft” measures that can be supported by development partners through grants and technical assistance.
- **Regulatory modifications.** This category refers to priorities that involve modification and harmonization or enhancement of sectoral and/or subnational policy, regulatory, or legal frameworks. These priorities may be implemented by sectoral adaptation teams (see chapter 2) with technical support from development partners coordinated through the NDCC.
- **Research.** This identifies priorities that involve research, collating available data and information as well as the associated capacities to produce, process, and utilize data and information. These priorities may be supported by development partners, but there is also a role here for innovative partnerships between domestic institutions (including government agencies such as NDCC and academic institutions such as the National University of Timor-Lorosa) and international agencies and academic/research institutions in developed countries.

Chapter 8: NAP Implementation Considerations

This chapter describes implementation considerations for the NAP. The chapter comprises two sections. The first section proposes interim implementation arrangements to guide the NAP process until a formal mandate and permanent institutional arrangements can be established. The second section of the chapter presents an implementation plan for the NAP including near- (2020-2022), medium- (2022-2025), and long-term (2025-2030) actions and objectives. Additional details are provided for the short-term actions.

8.1 NAP Interim Implementation Arrangements

8.1.1. High-Level Decision-Making Body

According to section 116 of the Constitution of Timor-Leste, the powers and responsibilities of the Council of Ministers are relevant to the NAP process. These include: a) to define the guidelines of government policies as well as those for implementation, and f) to approve plans. In addition, Section 105 of the Constitution stipulates that the Council of Ministers shall be convened and chaired by the Prime Minister. The Council of Ministers is the highest decision-making authority in addressing implementation of national adaptation priorities as well as mainstreaming climate change adaptation into sectoral policies and plans. Therefore, the Council of Ministers will delegate, as per its Organic Law, to the responsible Ministry for the Environment to oversee the development and implementation of NAP. A regulatory body shall be created to steer and enforce the leading role of NAP at all level, across government institutions.

Specific roles and responsibilities of Ministry in-charge shall include:

- Provide overall policy guidance with respect to NAP implementation and facilitate high-level decision-making in determining appropriate implementation actions by various sectors and ministries;
- Provide policy direction on how to mainstream climate change adaptation into sectoral and local policies, plans, programs, and activities;
- Ensure adequate budget allocation for climate change adaptation actions identified in the NAP;
- Draft and submit to Council of Ministers' approval Decree Law/Government Decree to legally empower line agencies to incorporate guidance and recommendations from the NAP into their planning and budgeting processes, and to implement the priorities described in the NAP.
- Sign a Ministerial dispatch on details and specific regulations to direct and enforce NAP implementation

8.1.2. High-Level Operational Body

The Secretary of State for the Environment (SSE) under the minister of Economic Affairs is responsible for all climate change related issues, including overseeing formulation and implementation of the NAP. The SSE is mandated by the Council of Ministers through the guidance of the Ministry of Economic Affairs to coordinate the implementation of the NAP at the policy level. The SSE will act as the interim high-level operational body for guiding NAP implementation. The SSE takes responsibility for implementation of the NAP at policy level, including programs and actions as well as monitoring and evaluation, with technical support from the National Directorate for Climate Change, within the Secretariat of State for Environment. The SSE will brief the Council of Ministers on the state of the

implementation of the NAP and seek guidance and direction from the Council. Specific roles and responsibilities during the interim period shall include:

- Lead and provide strong coordination for the effective implementation of the NAP priorities;
- Formulate Decree Law/Government Decree to legally empower line agencies to incorporate guidance and recommendations from the NAP into their planning and budgeting processes, and to implement the priorities described in the NAP. This Decree Law/Government Decree will then be approved by the Council of Ministers;
- Establish a high-level inter-agency coordination mechanism to steer the formulation of successive full NAP processes and guide NAP implementation;
- Undertake performance review of the status of implementation of the NAP at the political level;
- Be accountable to the Council of Ministers on the progress of NAP implementation.

8.1.3. Technical Coordinating Body/Interim Secretariat

The National Directorate for Climate Change will act as the interim technical coordinating body and secretariat to coordinate the implementation of the NAP over the short term. The NDCC will be supported by the Climate Change Working Group (CCWG) under the NDCC with membership from all related ministries, agencies, NGOs, FBOs, academic institutions, private sector representatives and other relevant stakeholders. The CCWG will be the primary mechanism for coordination and consultation with stakeholders in implementing the NAP priorities undertaken by government entities, agencies, civil society, and private sector actors. The CCWG was first officially recognized by the GoDRTL in January 2017 by a Ministerial Decree. The CCWG will meet regularly every three months and will convene more frequently on an ad-hoc basis if necessary. Specific roles and responsibilities during the interim period shall include:

- Coordinate and provide technical guidance for NAP implementation with line ministries and other relevant agencies and organizations;
- Provide technical inputs for the proposed Decree Law/Government Decree to legally empower line agencies to incorporate guidance and recommendations from the NAP into their planning and budgeting processes and to implement the priorities described in the NAP;
- Undertake performance review of the status of implementation of the NAP at the technical level;
- Provide information on climate finance and facilitate international climate finance and technical support for implementation of the NAP;
- Monitor and evaluate the implementation, as well as the activities of all sectors and avoid duplication of efforts;
- Spearhead the identification of linkages between the NAP and the NDC;
- Advance new initiative and proposals designed to implement NAP priorities with development partners; and
- Coordinate with the Ministry of Finance to register, facilitate and ensure transparency of financial support from outside with respect to climate change adaptation.

8.1.4. Other relevant information

In addition to the roles and responsibilities outlined in the previous sections, the Secretariat of State for Environment is responsible for mobilizing funding from international sources and will ensure, in strict coordination with the Ministry of Finance, the release of funds from international organizations for approved adaptation priorities. The Ministry of Finance will also be responsible for mobilizing funding from both domestic and as well as international sources for the implementation of NAP priorities.

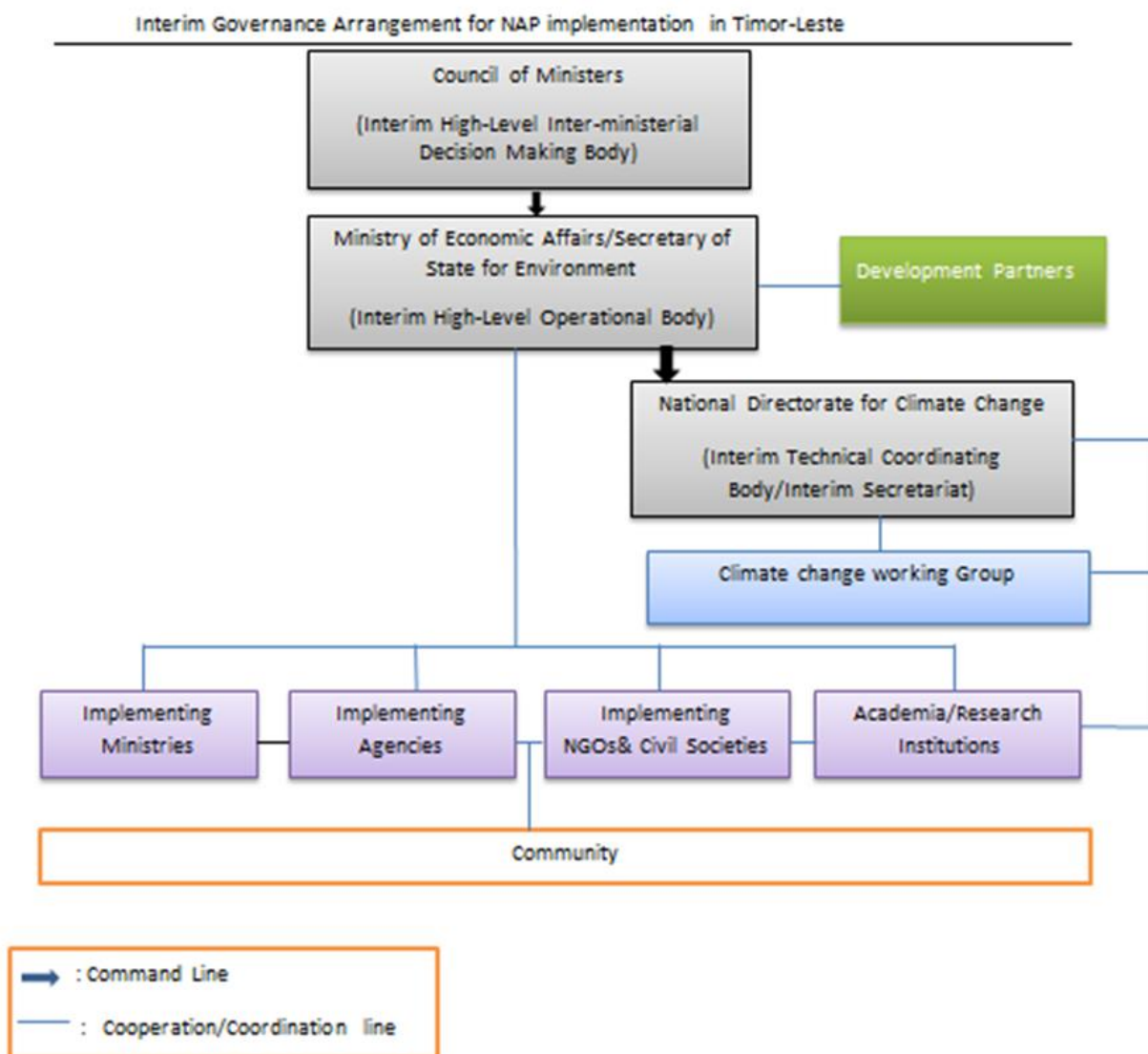


Figure 8: Interim implementation arrangements for NAP

8.2. NAP implementation plan

The implementation plan for the NAP is divided into three timeframes: near-term (2020-2022), medium-term (2023-2025), and long-term (2026-2030). Table 5 describes these three phases along with thematic areas and key outcomes.

Table 5. Summary of short, medium, and long-term NAP objectives

	Short-term	Medium-term	Long-term
Timeframe	2020-2022	2023-2025	2026-2030
Themes	<ul style="list-style-type: none"> • Submission of at least 2 full project proposals to the GCF for the implementation of the NAP • Implementation of funded GCF project¹⁰ • Submission of GCF NAP Readiness Proposal for the Timor-Leste NAP process: Activities to include strengthening evidence base, institutional/administrative arrangements, and human capacities for adaptation and resilience building 	<ul style="list-style-type: none"> • Mainstreaming adaptation and resilience building • Submission of 3 full project proposals to the GCF for the implementation of the NAP • Implementation of funded GCF project 	<ul style="list-style-type: none"> • Ensuring a resilient future for Timor-Leste • Submission of at least 2 full project proposals to the GCF for the implementation of the NAP • Implementation of funded GCF project
Key Outcomes	<ul style="list-style-type: none"> • Some adaptation priorities addressed • Strengthened evidence base including improved human capacities and technical infrastructure for gathering and processing data and producing relevant information to support adaptation. Methodologies to conduct sectoral and subnational vulnerability/risk assessments established, finalized IVA and utilized • Strengthened legal and institutional arrangement for NAP coordination and implementation, including formal mandate to support NAP processes, permanent steering and technical coordination 	<ul style="list-style-type: none"> • Some adaptation priorities addressed • Continue with legal arrangement, permanent legal and institutional arrangements formalized and ratified to support adaptation at national and subnational levels, including clear roles and responsibilities for national, municipal and suco levels • Established capacity within national line agencies for incorporating climate change adaptation into sector planning and budgeting • Monitoring framework with sectoral and subnational targets established to track progress towards low carbon, climate resilient development trajectory • Sectoral and subnational adaptation actions prioritized and cost, with comprehensive financing plan 	<ul style="list-style-type: none"> • Some adaptation priorities addressed • Full incorporation of adaptation and resilience into national development, sectoral, and subnational planning processes • Implementation of low carbon, climate resilient development trajectory • All public sector investments are resilient to potential impacts of climate change • Sectoral and subnational regulatory frameworks incentivize and encourage private sector adaptation

¹⁰ GCF Proposal Number FP109: Safeguarding rural communities and their physical and economic assets from climate induced disasters in Timor-Leste | United Nations Development Programme (UNDP) | B.23/10 23 July 2019.

	mechanisms, and vertical coordination arrangements <ul style="list-style-type: none"> • Fully realized stakeholder engagement and ownership over NAP process from national leadership to the most marginalized segments of the Timorese population 	<ul style="list-style-type: none"> • Climate change programs established in tertiary education and professional development programs • Research program established to support evidence-based decision-making processes 	
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8.2.1. Near-term (2020-2022)

The implementation plan for Timor-Leste’s NAP responds to the LEG Guideline’s vision that the NAP “encompasses all the arrangements necessary to develop the knowledge to support decision-making and required capacity building to facilitate all actions that are needed for a strategic country-owned adaptation planning process” (14). Hence the first phase of the National Adaptation Plan works to build a solid foundation for sustained action to address climate change, in parallel to some priority adaptation projects being implemented. The first phase consists of actions to strengthen the evidence base for informed decision-making processes as well as strengthening institutional arrangements and human capacities for adaptation planning. Identified needs from the initial stocktaking for the NAP have been consolidated into three interlinked short-term programs comprising 48 actions as detailed in table 6. The short-term implementation plan also includes timelines for completing the actions and lead agencies. The three short-term programs cover the following areas:

- Data, Methodologies, and Information
- Institutional and Legal Foundation
- Stakeholder Engagement and Ownership

Capacity development needs are also addressed in the near-term implementation plan and are linked with each of the three programs. Capacity development actions will be designed to support the actions in the other three categories.

It is expected that financial support for the actions described in the near-term implementation plan will come from the GCF NAP Readiness and general GCF Readiness funds, supplemented by other sources of national and international support.

8.2.2. Medium-term (2023-2025)

Over the medium term the NAP process will focus on deeper integration of climate change adaptation considerations into governance at national and subnational levels. A key outcome over the medium term is that climate change adaptation will be integrated into national and subnational development and sectoral planning processes, and that the requisite capacities to support this will continue to be developed. During this phase the NAP process will also concentrate on identifying and implementing behavior change pathways that move towards a low-carbon and climate-resilient development trajectory. The NAP process will identify and establish enabling conditions for behavior change for government agencies, private sector actors, and individuals. In addition, sectoral and subnational adaptation actions will be prioritized and costed, with a comprehensive financing plan for implementation developed. It is also expected that financing for adaptation activities will be significantly scaled up during this period.

Key work areas and results will include:

- Established capacities and procedures for incorporating climate change into sectoral planning and budgeting processes. This will be supported by sector-specific guidance, targets, and indicators for mainstreaming climate change into planning and budgeting. Budgeting processes will ensure the appropriate levels of financial resources are available to support implementation. This will lead to increased public expenditures on climate change adaptation and resilience building measures that also advance other development priorities.
- Established capacities and procedures for incorporating climate change into municipal and suco-level planning processes
- Mechanism established to channel national and donor-provided support to municipalities and sucos to support adaptation priorities
- Establish firm linkages between new NDC commitments and NAP priority actions. NDC commitments have clear implementation pathways through NAP process
- Establish incentives to encourage behavioral shift towards resilient and low carbon development trajectory
- Conduct legal and regulatory reviews to identify entry points and needed changes in sectoral and subnational frameworks
- Continue to incorporate climate change considerations into tertiary education and professional development programs to ensure that specialized training program on Climate Adaptation clauses are included in their curriculum to create a **cadre** of climate change technical specialists
- Continue to support knowledge co-production between government agencies and academic institutions and expand research capabilities at UNTL research program. In the meantime efforts will be extended to expand international research partnerships on climate change and adaptation.
- Climate proofing investments. This includes establishing guidelines and improving technical capacity at all phases of the project cycle for developing climate resilient infrastructure, WASH, etc.
- Identify appropriate entry points and indicators to encourage and track transition to climate resilient development pathway.
- Establish a comprehensive financing plan that provides adequate resources to support strictly identified and cost sectoral priorities.

8.2.3. Long-term (2026-2030)

The NAP also includes general direction for the long-term (2026-2030). Key outcomes over this period are that climate change adaptation and resilience building will be fully integrated into the next cycle of

strategic development planning at the national level (2031-2050) and also that climate change aspects will be fully integrated into national, sectoral, and subnational budgets. It is expected that additional detail will be added with respect the long-term vision for the NAP process once the institutional and administrative arrangements are finalized over the short-term and once full buy-in and ownership on the part of all stakeholders is achieved.

Table 6. Near-Term Programs of the NAP

Short-Term Program 1: Strengthened evidence base including improved human capacities and technical infrastructure for gathering and processing data and producing relevant information to support adaptation				
Output	Specific action	Capacity development needs	Timeframe	Responsible agency(ies)
1.1. Improve Monitoring Network	1.1.1. Prioritize geographic areas to expand network of hydrometeorological monitoring stations	Improve capacity to maintain monitoring stations	2020-2022	NDCC, Ministry of Public Works, Transport and Communication and MAP
	1.1.2. Establish network for monitoring sea surface temperatures in Timor-Leste's territorial waters	Improve technical capacity to record data uniformly and regularly on observations from network	2021-2022	NDCC
	1.1.3. Rebuild and expand network of hydrometric stations to monitor streamflow	Improve capacity to disseminate data to appropriate end-users	2021-2022	NDCC, Meteorology Services, MAP and Secretary State of Civil Protection
	1.1.4. Improve geospatial data collection		2020-2022	NDCC and Meteorology Services
1.2. Conduct Vulnerability and Risk Assessments	1.2.1. Develop uniform methodology for sectoral vulnerability/risk assessments	Train sectoral/subnational personnel to conduct vulnerability/risk assessments	2020-2021	NDCC, CCWG
	1.2.2. Conduct priority sector vulnerability/risk assessments	Build basic mapping and enumeration skills at subnational levels	2021-2022	Sector teams
	1.2.3. Develop baseline maps for community-led vulnerability/risk assessments		2020-2021	NDCC
	1.2.4. Develop methodology and guidance for community-led suco vulnerability/risk assessment		2021	
	1.2.5. Conduct pilot suco-level vulnerability/risk assessments		2022	
1.3. Improve data and information management to support NAP processes	1.3.1. Establish centralized database for data and information including physical processes, vulnerabilities/risks, and adaptation and resilience building projects	Strengthen staff capacities to manage, process, and analyze data	2021	NDCC
	1.3.2. Create NAP internet portal	Build capacity and establish procedures to maintain web resources	2021-2022	NDCC
	1.3.3. Establish data management protocols including storage, formats, quality control and gap filling standards and procedures	Build capacity to transform data into useful decision-support information	2021-2022	NDCC
	1.3.4. Compile all relevant data from disparate sources, homogenize formats,		2021-2022	NDCC

	identify and fill gaps			
	1.3.5. Identify and address decision-support information needs for priority sector agencies and municipalities		2021-2022	NDCC, sector focal points
1.4. Establish research program to support NAP process	1.4.1. Identify research priorities and establish partnership with University of Timor-Lorosae (UNTL) and international universities. Develop research protocols for foreign scholars	Improve capacities to develop co-production of knowledge research projects	2020-2022	NDCC, UNTL
	1.4.2. Initiate research and documentation program to identify entry points and synergies for locally-led adaptation and local <i>Tara Bandu</i> cultural practices and formulate action plan for integration	Build capacities at UNTL to manage research program and function as “boundary agency”	2021-2022	NDCC, UNTL, Ministry of Tourism, Arts, and Culture
	1.4.3. Establish and implement research and monitoring framework to track observed and potential future impacts of climate change on women. Identify sex-disaggregated indicators of vulnerability for incorporation into NAP processes	Improve capacities to identify and implement monitoring frameworks disaggregated by gender and other relevant social-economic/cultural/demographic variables	2021-2022	NDCC, UNTL and Sec State for Women and Gender Inclusion
	1.4.4. Conduct research on the nexus of climate change adaptation, peace building, and conflict resolution in Timor-Leste and identify specific actions for NAP process		2021-2022	NDCC, UNTL

Short-Term Program 2: Strengthened legal and institutional arrangements for NAP coordination and implementation, including formal mandate to support NAP processes, permanent steering and technical coordination mechanisms, and vertical coordination arrangements.				
Output	Specific Action	Capacity development needs	Timeframe	Responsible agency(ies)
2.1. Formulate and ratify mandate for NAP process	2.1.1. Identify specific provisions (including sectoral and vertical coordination mechanism) for legal mandate through consultative processes	Develop appropriate information resources for members of high-level and technical committees	2020-2021	NDCC, CCWG
	2.1.2. Write draft legal instrument and disseminate for peer review and consultation		2021	NDCC and CCWG
	2.1.3. Council of Ministers approves legal mandate		2021-2022	Council of Ministers
	2.1.4. Disseminate legal arrangements and raise awareness among stakeholders		2022	NDCC
	2.1.5. Nominate, inaugurate, and convene		2022	NDCC

	members for permanent steering mechanism			
2.2. Conduct sectoral assessments to identify and implement adaptation priorities	2.2.1. Appoint sectoral focal points and climate change task forces in priority sectors	Improve knowledge and capacity on mainstreaming gender and social equity considerations into climate change processes	2021-2022	NDCC, priority sector teams
	2.2.2. Establish capacity building and technical support program to upskill sectoral teams	Build understanding of climate change issues among sector and subnational government officials	2021-2022	NDCC, priority sector teams
	2.2.3. Establish sectoral knowledge bases including relevant data, information, best practices, tools, etc. to facilitate mainstreaming	Build capacities to analyze risk and vulnerability assessments	2021-2022	NDCC, priority sector teams
	2.2.4. Analyze sectoral vulnerability/risk assessments and lead collaborative process to identify priority actions	Build capacities to develop project concepts	2022	Priority sector teams
	2.2.5. Incorporate priority actions into second NAP and updated adaptation communication to the Paris Agreement		2022	NDCC
	2.2.6. Submit project proposals to GCF and other funding sources to Implement adaptation priorities	Build capacities to implement successful adaptation projects (integrated into relevant development activities)	2020- 2030	NDCC, priority sector teams, local government, communities, and all other relevant actors
2.3. Strengthen vertical coordination and subnational mainstreaming in alignment with Timor-Leste's decentralization trajectory	2.3.1. Map entry points for NAP-relevant governance processes (e.g. planning, budgeting, technical support, knowledge management) at municipal and suco levels to determine relevant stakeholders and administrative process to engage with	Improve knowledge and capacity on mainstreaming gender and social equity considerations into climate change processes	2020-2021	NDCC
	2.3.2. Strengthen coordination between national line agencies and municipal counterparts with respect to adaptation and resilience building processes	Improve understanding and awareness of climate change at subnational levels	2021-2022	Sector agencies, municipalities
	2.3.3. Designate financial and technical support for task force operations and initial adaptation activities at municipal levels			NDCC, MoF
	2.3.4. Establish and capacitate municipal-level climate change tasks forces that build on existing municipal structures (e.g. health, disaster risk management,		2021-2022	NDCC, Municipal governments

	agriculture).			
	2.3.5. Task forces develop workplans and technical support needs		2021-2022	
2.4. Develop monitoring, evaluation, reporting, and learning framework for NAP process	2.4.1 Identify indicative physical indicators to track climate change physical processes in Timor-Leste and establish monitoring procedures	Build M&E technical skills in NDCC	2021	NDCC
	2.4.2 Identify appropriate socio-economic indicators of vulnerability (e.g. sensitivity, adaptive capacity, resilience index) and establish procedures for obtaining data from relevant agencies		2021	NDC
	2.4.3. Review other relevant M&E frameworks (DRR, SDG, sectoral) to identify entry points for harmonization		2021	NDCC
	2.4.4. Develop mechanism for tagging and tracking government expenditures related to NAP priorities		2021-2022	MOF, NDCC
	2.4.5. Finalize and implement MERL framework for NAP process		2022	NDCC

Short-Term Program 3: Fully realized stakeholder engagement and ownership over NAP process from national leadership to the most marginalized segments of the Timorese population				
Output	Specific Action	Capacity development needs	Timeframe	Responsible agency(ies)
3.1. Increase public awareness of climate change and encourage behavior shift pathways	3.1.1. Develop NAP public awareness campaign (Resilient Timor-Leste!) communication strategy informed by stakeholder mapping, including media outreach (3.2.1).	Build awareness and capacity among media professionals to identify and report accurately on climate change-relevant issues	2020-2021	NDCC
	3.1.2. Identify entry points and incorporate climate change into primary and secondary education curricula. Develop support resources for education professionals	Improve knowledge of educational professionals with respect to climate change	2021-2022	NDCC, MoE
	3.1.3. Develop public service messaging campaign with print media/radio/television stories and messages targeted at specific stakeholder groups	Improve NDCC capacity to conduct media and public outreach	2021-2022	NDCC
3.2. Enhance stakeholder	3.2.1. Conduct stakeholder mapping exercise to identify key stakeholders,	Improve capacities to conduct inclusive stakeholder outreach	2021-2022	NDCC + Relevant focal points

engagement in NAP processes	priorities, and roles in building adaptive capacity and resilience	Build awareness and capacity among stakeholder advisory committee Increase capacity among NDCC and other stakeholders to identify entry points for the private sector in adaptation processes		
	3.2.2. Establish stakeholder advisory committee and communications protocols to advise and provide inputs for NAP processes. Ensure representation of potentially marginalized and disproportionately vulnerable groups		2021-2022	NDCC+ Relevant focal points
	3.2.3. Establish private sector outreach mechanism through Chamber of Commerce and Industry and conduct engagement events		2021-2022	NDCC, CCI+ Relevant focal points
3.3. Increase ownership and foster NAP champions among elected and appointed government officials	3.3.1. Establish information and outreach program to Parliamentarians to provide relevant data and information on climate change impacts in Timor-Leste	Improve capacity in NDCC to conduct outreach to elected officials	2020-2022	NDCC+ Relevant focal points
	3.3.2. Conduct consultations in all 13 municipalities to raise awareness and engage a range of subnational stakeholder in the NAP process		2020-2021	NDCC+ Relevant focal points
	3.3.3. Develop municipality-specific information products and general vulnerability profiles to highlight relevance of climate change to subnational stakeholders		2020-2021	NDCC+ Relevant focal points
	3.3.4. Develop sector specific presentations and information materials to encourage buy-in among priority agency leadership		2020-2022	NDCC+ Relevant focal points

Chapter 9. Conclusion and Next Steps for Advancing Timor-Leste's National Adaptation Plan Process

9.1 Introduction

This first NAP document has laid the foundation for Timor-Leste's medium- to long-term adaptation programme by outlining the national circumstances and by recommending institutional arrangements and a coordination mechanism for iterative NAP formulation and implementation. The first NAP provides a robust list of adaptation priorities based on multi-stakeholder consultative process, building on best available science and knowledge on adaptation in Timor-Leste, and provide a baseline analysis of observed and projected changes in the physical processes driving climate, and has described expected impacts on priority sectors to the extent possible with the data and information that is available currently in Timor-Leste. The NAP goes on to summarize climate risks and vulnerabilities that have been documented through various assessments and analysis that have been conducted to date. Based on these vulnerabilities, the initial NAP compiles adaptation priorities that have already been identified through various strategies, plans, and policies, and compiles them into adaptation programs that can guide immediate action in Timor-Leste. This NAP also provides comprehensive recommendations for strengthening the NAP process over the near-term (2020-2022) to cover the period of the GCF NAP Readiness support. The NAP represents the culmination of research and consultations on the part of the National Directorate for Climate Change, and an auspicious first step in formulating a unified vision for climate change adaptation for the country.

This section briefly describes the next steps in the NAP process for the GoDRTL. The Government had an original goal of completing this first NAP and submitting it to the UNFCCC prior to the end of 2020. Upon final validation and formal approval of this document, this goal will have been accomplished. The GoDRTL has already developed a roadmap and timeline for completing its updated NAP, as shown in figure 9 below. By following the next steps described in the following section, it is expected that GoDRTL will be able to achieve its goal of having an updated NAP by 2022. It is also expected that the GoDRTL will incorporate the following recommendations, and those more detailed recommendations at the beginning of each chapter, into a funding proposal to the Green Climate Fund's NAP Readiness facility.

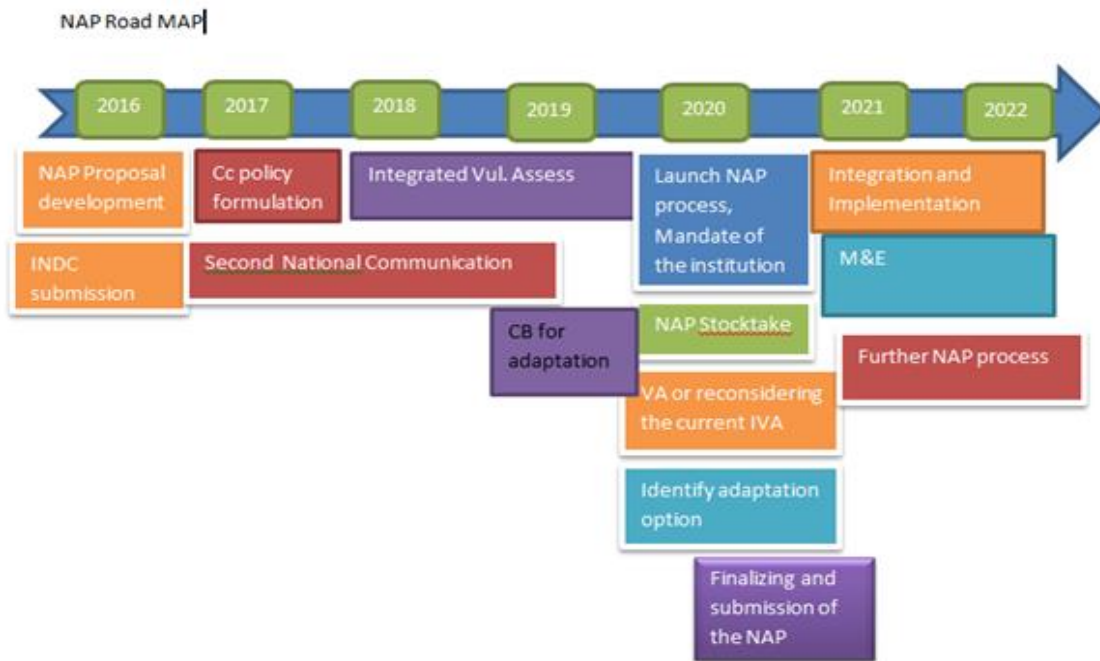


Figure 9: Timor-Leste NAP Roadmap

9.2 Next Steps

The first NAP is an excellent first step towards establishing a coherent and effective adaptation programme for Timor-Leste. Upon ratification of this NAP, over the next 24 months, the NDCC shall take the lead in completing the following steps to enhance the NAP:

Formalizing institutional arrangements, establishing a formal legal mandate, and ensuring buy-in and ownership on the part of line agency stakeholders. This can be achieved largely through the support of GCF Readiness grants and by following the recommendations found in Chapter 2 of this document. This step will likely require significant technical support and human capacity development, but there are support mechanisms, tools, and other useful resources widely available.

Complete sectoral Impact chain analysis and vulnerability/risk assessments. Improved sectoral risk and vulnerability assessments will provide evidence-based linkages between the physical processes of climate change to direct and indirect impacts on people, places and things. Integrated vulnerability assessments should be continued in rural areas, and special attention should be given to the country's 14 priority watersheds. This evidence-based impact chain analysis will include inclusive stakeholder consultations to describe the drivers of vulnerability, including the characteristics of the most vulnerable groups that leave them susceptible and sensitive to changing climate and environmental conditions.

Stocktaking of progress and updating prioritized adaptation actions. NDCC shall first coordinate a stocktaking exercise to gauge progress on the priorities and programs that have been compiled in Chapter 7 of this document. Subsequently, based on the impact chain analysis and extensive stakeholder consultations, the NAP process will generate adaptation options for the identified vulnerabilities to supplement the existing priorities that have previously been identified. This will include projects, but also actions to integrate climate change adaptation considerations into day-to-day processes of governance.

Options will be prioritized utilizing best available good practice methodologies (e.g. cost-effectiveness analysis, multi-criteria analysis). Some project concept notes may be developed for this part of the NAP.

Communication strategy. With support from GCF or another development partner, NDCC shall develop a communications strategy for engaging stakeholders in the broader and further formulation and implementation of the NAP. The communications strategy will detail steps for engaging a wide range of stakeholders in all stages of the NAP process, and also for disseminating results of the NAP. This communication strategy will include provisions for effective communication and engagement with vulnerable and marginalized groups.

Costing and Financing Plan. Based on the revised adaptation priorities and programs, NDCC will coordinate the estimation of costs for the priority actions, as well as cost-benefit analyses, cost effective analyses, and other approaches where applicable. NDCC will also work with the Special Committee for Climate Finance to identify funding sources, including domestic sources, private sector possibilities, and international financiers to provide grants and loans to support the priorities. This information will be compiled into a costing and financing plan for the NAP, which is expected to be completed by the end of 2022.

Monitoring, Evaluation, and Learning Framework. The monitoring and evaluation framework will include SMART indicators for determining progress during the first NAP process. This section will also describe mechanisms for capturing lessons learned to be incorporated into subsequent versions of the NAP.

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Annex 1. Full details to Table 3 of the body of the NAP with activities by type under each program

I. Infrastructure Adaptation Priorities	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Identification of Infrastructure Vulnerabilities								
Identify and map all and the appropriate and effective climate proofing measures that have been practiced in the country and in the region.	NCCP					X		Responsible Ministry for Environment
Develop a Climate Risk Zone Map disaggregated by key climate risks to guide the infrastructure development projects	NCCP				X	X		Responsible Ministry for Infrastructure/UNTL and Environment
Identify the most climate vulnerable communities and the underlying factors contributing to their vulnerability and recommend appropriate infrastructure development priorities such as access to water, irrigation canals, roads, health facilities among others to help enhance community resilience	NCCP					X		Responsible Ministry for Infrastructure , MAP and Environment
Program 2: Establish Institutional and Human Capacities	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Promote climate resilience and climate proofing approaches in small, medium, and large scale infrastructure	NCCP			X	X			Responsible Ministry for Infrastructure + Environment
Commission a comprehensive Cost-Benefit Analysis to assess the costs and benefits of integrating climate resilient options into infrastructure development designs	NCCP					X		UNTL/Responsible Ministry for Infrastructure and MoF

Support the ambitious national poverty reduction target in relation to the expected increased storm intensity at sea by improving the capacity to forecast and adapt offshore oil and gas infrastructure to withstand strong storms and waves	NAPA			X				Responsible Ministry for Infrastructure and MoF and ANPM
Develop the capacity of technical teams responsible for designing, approving, commissioning and implementing infrastructure development projects in the government as well as private sector to integrate climate resilience and environmentally friendly options into their work	NCCP		X					Responsible Ministry for Environment *Relevant line Ministers
Program 3: Improve regulatory framework for climate-smart and climate-proof infrastructure	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Integrate climate resilience into the existing monitoring and evaluation templates used by the government authorities such as Ministry of Public Works, Transport and Communication	NCCP			X	X			Responsible Ministries for Infrastructure
Integrate climate resilience aspects into the Environmental Impact Assessment (EIA) regulations and introduce provisions to make the EIA mandatory for all infrastructure development activities	NCCP				X			Responsible Ministry for Environment and Infrastructure
Improve regulations, standards and compliance for climate-resilient infrastructure, and Review existing laws, regulation and standards to enhance climate change resilience of critical infrastructure	NAPA, GCF Country Program				X			Responsible Ministry for Infrastructure and Relevant line ministries
Program 4: Climate-proofed infrastructure development	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency

Improve physical infrastructure and natural vegetation methods to prevent landslides in hill sides, roads, and river banks that are made vulnerable by climate change	GCF Country Program	X	X	X	X			Responsible Ministry for Infrastructure and MAP (DG for Forestry)
II. Biodiversity and Ecosystem Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Build human and institutional capacities for Ecosystem-Based Adaptation								
Prepare a climate risk and climate sensitive land use, biodiversity and natural resource management plan.	NCCP			X	X			Ministry of Agriculture and Fisheries and Environment
Explore and map the potential of different natural resources such as stones and minerals, forest land, oil and gas and prepare an analysis of potential versus climate risk of each of these key natural resources.	NCCP					X		Responsible Ministry for Natural Resources and ANPM
Decide on the country appropriate level and approach of ecosystem management options such as integrated watershed management, landscape level, ecosystem-based approach and implement the ecosystem management approach for sound management of natural resources and biodiversity.	NCCP			X	X			Responsible Ministry for Forestry and Environment
Support research on the cost-benefit analysis, identification of climate change related problems facing different ecosystems and socio-economic benefits of sustainable natural resource management.	NCCP					X		UNTL/Responsible Ministry for Higher Education * Relevant line ministry
Identify biodiversity in different terrestrial and marine ecosystems which are at risk from climate change related impacts	NCCP					X		Responsible Ministry for Environment and MAP DG Forestry and DG Fisheries
Program 2: Incorporate Ecosystem-Based Adaptation into Planning and	Source	Physical Invest-	Human Capacity Developme	Institutional Strengthening	Regulatory Modificati	Research	Timeline (years 1-5)	Lead Agency

Regulatory Frameworks		ment	nt		ons			
Including ecosystem management in national planning	NDC			X	X			Responsible Ministry for Forestry and Natural Resources and Environment
Develop and prioritize natural resource management measures in alignment with the priorities set by sectorial ministries for forests, grazing land, mines, stone quarries, water resources and hydropower resources.	NCCP				X			Responsible Ministry for Forestry and Natural Resources and Environment
Promote sustainable natural resource management measures including the ones that ensure welfare of the local communities.	NCCP		X					Environment + Relevant line ministries
III. Health Sector Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	time line	lead agency
Program 1: Integrate Climate Change Considerations into Health Sector Planning and Regulatory Frameworks								
Reviewing all existing guidelines, standard operating procedures to consider climate change and its adverse effects	NDC				X			Ministry of Health + Environment
Review all existing guidelines and Standard Operating Procedures (SOPs) considering climate change and its adverse effects	NCCP				X			Ministry of Health + Environment
Support preparation of “Health Risk and Preparedness Map” in relation to different climate risks, magnitude of existing and potential health risks due to each type of climate risk and existing and planned public health service delivery capacity at the national, sub-national and local levels.	NCCP			X		X		Ministry of Health supported by UNTL + Environment

In close collaboration with national and sub-national health service delivery units and Comprehensive Primary Health Care system which includes Family Health and SISCA, establish surveillance and response mechanisms to deal with climate related public health issues	NCCP	X		X	X			Ministry of Health + Environment
Coordinate with the Ministry of Health to integrate climate change adaptation and mitigation in health sector policies including WASH priorities.	NCCP			X	X			Responsible Ministry for Environment
Establishing a health cluster in order to prepare for and respond to emergency events and disasters	NDC			X				Ministry of Health and Environment/NDCC
Program 2: Improve Health Sector Capacities for Managing Climate Risks	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Integrated disease surveillance and early warning systems	NDC	X		X				Ministry of Health
Mainstreaming and implementation of climate change into the Comprehensive Primary health Care System	NC			X	X			Ministry of Health
Enhance the capacity of the health sector and communities to anticipate and respond to changes in distribution of endemic and epidemic climate-sensitive diseases, and reduce the vulnerability to infection of population in areas at risk from expansion of climate-related diseases	NAPA		X	X				Ministry of Health and Environment
Create awareness among the health service providers at all levels on the different types of health risks associated with different types of climate risks and the different coping and adaptation measures so that these coping strategies could be communicated to the vulnerable populations.	NCCP		X					Ministry of Health and Environment

Prepare the health workers, institutions, and communities on the prevention and response mechanisms to be adopted related to different diseases and health challenges exacerbated by climate change.	NCCP		X	X				Ministry of Health
Support the development of health database and data management systems which includes climate sensitive health risk and vulnerability information to facilitate effective, targeted and efficient delivery of health services	NCCP	X		X				Ministry of Health
Advocate establishing specialized public health service units well equipped and well trained to respond to health issues during climate induced disasters.	NCCP		X	X				Ministry of Health
IV. Agriculture Sector Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Improve Research and Knowledge Management Capacities to Support Climate-Smart Agriculture and Resilient Land Management								
Map all the climate smart agricultural practices existing in Timor-Leste and identify the best practices that have contributed in climate change adaptation.	NCCP					X		Ministry of Agriculture and Fisheries
Support MAF in conducting research to identify the tree species which contribute to enhanced carbon sequestration, better water retention capacities and better erosion reduction/ slope stabilizing capacity.	NCCP					X		MAF and UNTL/Faculty of Agriculture, Ministry of Education
Collaborate with Ministry of Agriculture and Fisheries and other partners to identify and classify the crops as food crops, high value crops, cash crops and multi-purpose crops/plants and map them.	NCCP			X		X		UNTL/ Ministry of Education/Ministry of Agriculture

Conduct assessments to identify vulnerability and resistance of the major crops to different climate risks and an action plan to safeguard the agricultural land and production.	NCCP					X		Ministry of Agriculture and Fisheries/UNTL-Ministry of Education
Promote research and development of climate resistant varieties such as drought resistant, water tolerant, fast growing, etc.	NCCP					X		Ministry of Agriculture and Fisheries and UNTL
Launch studies on economic valuation, cost-benefit analysis and loss and damage to assess the existing ecosystem services and programmes to enhance the ecosystem further.	NCCP					X		UNTL/Ministry of Education and Ministry in-charge of Economy and Development
Support assessments and mapping of the occurrences of adverse impacts of climate change on the productivity and health of livestock such as diseases, reduced milk production, lowered birth rates, increased pest attack and reduced body mass of the livestock and poultry because of increases in temperature, drought, and/or flooding.	NCCP					X		Ministry of Agriculture and Fisheries and UNTL
Collaborate with National Directorate on Fisheries and produce a Fisheries Viability Map for fresh water and marine aquaculture practices.	NCCP				X			Ministry of Agriculture and Fisheries
Identify and adopt appropriate technologies that are low cost, user friendly, high impact and less damaging to the environment.	NCCP		X			X		MAF and UNTL/Ministry of Education
Program 2: Incorporate Climate Change into Agriculture Sector Planning and Management Practices	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Collaborate with agencies such as the National Directorate for Meteorology and Geophysics, ALGIS, the National Directorate for Disaster Risk Management to promote well-informed agricultural practices by	NCCP		X	X	X			Ministry of Agriculture and Fisheries and Environment

utilizing weather forecast information, early warning systems, hazard mapping, disease occurrence among others.								
Facilitate national level, local level and trans-boundary dialogue to explore the solutions to adapt to and combat the negative impacts of climate change on the health and productivity of livestock.	NCCP			X				Ministry of Agriculture and Ministry of Health
Collaborate with the Ministry of Agriculture and Fisheries on the protection and conservation of coastal ecosystems from sea level rise and other related climate change impacts, especially mangroves and coral reefs.	NCCP and GCF country Program	X	X (awareness raising)	X				Responsible Ministry for Environment and Ministry of Agriculture and Fisheries
Assign a Climate Focal Point and build the capacity of the Climate Focal Point in the MAF to ensure that the plans, programmes and initiatives consider climate resilience in all forms of agricultural practices and programmes.	NCCP		X	X				Ministry of Agriculture and Fisheries and Environment
Collaborate with Ministry of Public works, Transport and Communication's to promote alternative fuel options such as biomass based sustainable energy and reduced dependence on the fuel wood.	NCCP				X			Responsible Ministry for environment
Improve planning and legal framework for the promotion of sustainable and balanced food for livestock production	NAPA			X	X			Ministry of Agriculture and Fisheries
Develop integrated agroforestry and watershed management	GCF Country Program, NDC			X	X			Ministry of Agriculture and fisheries and Environment
Program 3: Mainstream Climate Change Considerations into Agriculture Sector Regulatory Frameworks	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Collaborate with MAF in developing standards for sustainable forest harvesting	NCCP				X			Responsible Ministry for Forestry/MAF and

procedures.								Environment
Ensure that the climate change adaptation interventions are well integrated into the coastal and mangroves rehabilitation and protection policy instruments.	NCCP			X	X			Ministry of Agriculture and Fisheries and Environment
Collaborate with MAF to introduce provisions to discourage burning pastures and forests and shifting cultivation practices.	NCCP				X			Responsible Ministry for Environment
Program 4: Support Private Sector and MSME Climate-Smart Agriculture and Aqua/Mariculture	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Promote research on different types of aquaculture techniques and technologies.	NCCP				X			Ministry of Agriculture and Fisheries
Advocate for sustainable harvest of fish and promote sustainable fishing techniques.	NCCP		X		X			Ministry of Agriculture and Fisheries and Environment
Promote research and an information management system related to different types of fish that live in different ecological regions in the sea and terrestrial water bodies in Timor-Leste and their corresponding maximum sustainable yields	NCCP				X			Ministry of Agriculture and Fisheries and UNTL
Explore the potential of developing recreational fisheries as one of the options for eco-tourism.	NCCP					X		Ministry of Agriculture and Fisheries and Tourism
Promote aquaculture research centers in different municipalities to test and disseminate local breeds and biotypes and newly adapted types fresh water fish..	NCCP				X			Ministry of Agriculture and Fisheries and Environment
Develop Fisheries and Marine Ecosystem based bio-physical resources as one of the alternative livelihood options to help communities become more resilient.	NCCP	X	X	X				Ministry of Agriculture and Fisheries

Support in diversifying agricultural products leading to improved food security conditions and also the nutrition status of the community members.	NCCP		X					Ministry of Agriculture and Fisheries and Ministry of Health
Connect water resource strategies with the aquaculture development strategies to further develop local fisheries.	NCCP		X	X	X			Ministry of Agriculture and Fisheries and Ministry of Infrastructure
Identify the aquaculture techniques that could promote and adapt best practices of the existing traditional knowledge	NCCP				X			Ministry of Agriculture and Fisheries
Promote government's initiative of "increasing investment and introducing low cost and productive, agro-ecological and resilient agricultural practices" (reference)	NCCP			X				Ministry of Agriculture and Fisheries
Program 5: Promote Climate-Smart Livestock Practices	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Support research and studies to explore the livestock breeding programs which can adapt better to the climate risks and have better resistance to diseases and pest triggered by climate change.	NCCP					X		Ministry of Agriculture and fisheries and UNTL and other universities
Coordinate with the sectorial ministry and partners to document local knowledge and best practices of adapting to challenges on livestock disease and pest emanating from climate risks.	NCCP			X				Ministry of Agriculture and Fisheries
Support research and development of the existing and alternative feeds, including production of fodder and feeding techniques, breeding techniques and livestock management techniques that consider the adverse impact of climate change.	NCCP					X		Ministry of Agriculture and Fisheries

Program 6: Implement Community-Centric Climate-Smart Agriculture and Resilient Land Management Program	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Implement integrated sustainable land management practices, which promotes fixed/permanent agriculture with pilot demonstrations field and education and awareness raising, reduced crop burning, reduced erosion, and improved soil fertility.	GCF Country Program, NDC	X	X	X	X			Ministry of Agriculture and Fisheries/Responsible Ministry for forestry
Collaborate with MAF to promote afforestation and reforestation programmes in the most disaster-prone and degraded areas	NCCP		X	X	X			Forestry Directorate/Ministry of Agriculture and Fisheries, Environment, Ministry for DRR(Secretary State of Civil Protection)
Support MAF in developing guidelines for community-based forest resource management to promote forest resources based sustainable small enterprises.	NCCP				X			Forestry Directorate/Ministry of Agriculture and Fisheries and Environment
Promote community-based and integrated watershed management approach to contribute towards co-benefits of sustainable agricultural options.	NCCP		X		X			Forestry/Ministry of Agriculture and Fisheries and Environment
Work closely with the local community leaders and elders to integrate climate resilient agriculture aspects into Tarabandu or other local customary laws	NCCP		X		X			Responsible Ministry for Environment and Agriculture
Promote and invest in education and training of the community level agriculture extension workers on the climate smart agriculture techniques, conservation agriculture, climate resilience, and climate change adaptation measures.	NCCP		X					Ministry of Agriculture and Fisheries and Environment
Help establish community service centers to share the experiences and to create community self-help mechanisms.	NCCP			X				Ministry of Agriculture and Fisheries and Environment

Promote establishment of Agriculture Support and Information Centres within the Agriculture Stations at the sub-national level for the farmers to access information, tools, and equipment for climate smart agriculture.	NCCP		X	X				Ministry of Agriculture and Fisheries
Reduce the vulnerability of farmers and pastoralists to increased drought and flood events	NAPA	X	X	X	X	X		Ministry of Agriculture and Fisheries
V. Water Sector Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Incorporate Climate Resilience into Water Sector Planning and Regulatory Frameworks								
Develop integrated agroforestry and watershed management, including integrated water resource management approaches	GCF Country Program/ NDC/NAPA		X	X	X			Responsible Ministry for Forestry/MAF and UNTL
Identify appropriate approaches to promote and adopt Payment for Ecosystem Services (PES) approaches	NCCP		X	X	X	X		Responsible Ministry for Forestry/MAF, UNTL and Environment
Enhancing government and community strategies to respond to drought	NDC		X	X	X			Responsible Ministries for Environment, water and forestry
Identify the water sources and categorize the capacity of these water sources along with the threats to these water sources from different climate risks.	NCCP					X		Responsible ministry for water resource management and UNTL
Program 2: Implement Climate-Smart Water Management Among Large (institutional/municipal users)	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Research and development of technologies more adaptive to climate change, particularly for key sectors (i.e. agriculture, water resource and coastal/marine)	INC				X			UNTL/MAF/Responsible ministry for Environment

Improved control of water quality (NDC)	NDC	X		X	X			Responsible Ministry for Water resource management
Improvement of water management including developing and utilization of rainfall harvesting technologies particularly in high prone drought areas	INC	X		X	X			Responsible Ministry for Water Resource Mgt + Ministry incharge of infrastructure
Protection and rehabilitation of rainfall catchment areas should be accelerated to ensure sustainable water supply. Priority should be given to watersheds that supply water for agriculture and domestic purposes	INC	X		X	X			Responsible Ministry for Water Resource Mgt+ Ministry incharge of infrastructure and MAP
Collaborate with the National Directorate for Pollution Control and Environmental Impacts to prevent pollution or environmental degradation of the water sources.	NCCP			X	X			Responsible Ministry for Water Resource Mgt
Collaborate with other entities to assess demand projection and sustainable supply systems disaggregated by end use, and existing status of the water sources and supply systems.	NCCP			X		X		Responsible Ministry for Water Resource Mgt + Ministry incharge of infrastructure
Program 3: Empower Communities to Utilize Climate-Smart Water Management Techniques	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Create new or strengthen existing Water Management Groups at the community level.	NCCP		X	X				Responsible Ministry for Water Resource Mgt + Ministry incharge of infrastructure
Integrate water conservation, water use management, and climate risk reduction approaches into Tarabandu.	NCCP		X	X				Responsible Ministry for Water Resource Mgt+ Ministry incharge of infrastructure and MAP
Promote water conservation, protection of springs and recharge of the ground water sources through an integrated watershed management approach in collaboration with key stakeholders.	NCCP		X	X	X			Responsible Ministry for Water Resource Mgt+ Ministry incharge of infrastructure

Disseminate knowledge about proper water management and usage techniques, especially for the dry season.	NCCP		X					Responsible Ministry for Water Resource Mgt + MAP
Build strong linkages between up-stream and down-stream communities (i.e. Watershed Committees) to ensure equitable and adequate water sources are available to downstream communities too.	NCCP			X				Responsible Ministry for Water Resource Mgt and responsible ministry for forestry
Program 4: Build New/Retrofit Existing Water Infrastructure for Climate Resilience	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Build climate proof and environmentally sustainable infrastructure to protect water resources, including enhancing water harvesting, distribution and management systems	GCF Country Program/ NDC	X						Ministry of Public Works/Resp Ministry for Water
Promote techniques of conserving water such as water storage tanks, water harvesting, and irrigation farm ponds among others to collect and store water during wet season and use during dry season.	NCCP	X	X					Ministry of Public Works/Resp Ministry for Water + MAP
VI. DRR Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Enhance community-level integration of DRR and CCA								
Improve institutional and community (including vulnerable groups such as women and children) capacity to prepare for and respond to climate change-induced natural disasters	NAPA		X	X				Responsible Ministry for DRR
Enhance government and community strategies to respond to drought exacerbated by climate change	GCF Country Program			X	X			Responsible Ministry for Environment/DRR (Secretary State of Civil Protection)

Program 2: Strengthen National Capacities for Climate Change Responsive Disaster Risk Reduction and disaster risk management	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Improving early warning systems for disasters	NDC	X	X	X				Responsible Ministry for DRR (Secretary State of Civil Protection) and Meteorology Services
Integrated climate risk information into traditional disaster risk reduction and management	NDC		X	X	X			Responsible Ministry for DRR (Secretary State of Civil Protection) and Environment
Strengthening the capacity of national and local institutions as well as communities in managing climate risks through the development of effective climate information systems (improving skills for climate forecasting) including the development of early warning systems and decision support system tools for policy makers	INC		X	X				Responsible Ministry for DRR (Secretary State of Civil Protection) and Environment
Research and development of technologies more adaptive to climate change, particularly for key sectors (i.e. agriculture, water resource and coastal/marine)	INC					X		UNTL and Ministry of Education
VII. Tourism Sector Adaptation Priorities	Source	Project	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Program 1: Supporting Climate-Resilient Tourism Resources in Timor-Leste								
Support assessments to find out the potential climate change stress and loss and damage potential on the tourism sector and the tourism sector on the natural resources.	NCCP					X		Responsible Ministry for Tourism and Environment

Introduce fees to utilize ecosystem based tourism hotspots as one of the options to generate income stream contributing towards the Climate Fund/Trust Fund to support better management and sustainable development of the area.	NCCP				X			Responsible Ministry for Tourism and Environment
Work with the National Directorate for Pollution Control and Environmental Impacts to ensure that any potentially damaging tourism enterprise, conducts a full-scale EIA and mitigates all the negative impacts on the environment	NCCP			X	X			Responsible Ministry for Environment
Identify areas that are biodiversity hotspots or the areas that are or could be vulnerable to over-exploitation by the tourism sector and introduce zonation and prohibition mechanisms.	NCCP			X	X	X		Responsible Ministry for Environment + MAF(DG Forestry and DG Fisheries)
Program 2: Strengthening the Market for Climate-Resilient Nature-Based Tourism.	Source	Physical Investment	Human Capacity Development	Institutional Strengthening	Regulatory Modifications	Research	Timeline (years 1-5)	Lead Agency
Promote eco-tourism with adequate environmental management aspects integrated into the eco-tourism approach. (NCCP)	NCCP		X	X	X			Responsible Ministry for Tourism and Environment
Help the Tourism sector identify and integrate climate resilience measures to reduce the adverse impacts in the sector.	NCCP		X	X		X		Responsible Ministry for Environment, UNTL and Ministry of Education
Identify the potential environmentally friendly tourism promotional aspects such as biodiversity hotspots, wilderness, water-based sports and introduce adaptation strategies that can be linked to biodiversity and natural resource protection to enhance sustainable tourism development.	NCCP					X		Responsible Ministry for Environment\ and Tourism

Identify and promote tourism aspects that have low degrading impact on the nature yet can contribute significantly to the local and rural livelihood, such as wilderness photography, home-stay options, etc.	NCCP		X	X		X		Responsible Ministry for Tourism and Environment
Document and map knowledge, know-how and capacity of the tourism stakeholders that can be adopted to the Timorese context, which would enhance the adaptive capacity of the tourism sector to climate stress.	NCCP		X			X		Responsible Ministry for Tourism
Making conscious and consistent efforts to promote sustainable and conservation agriculture with minimal negative impact on the environment, and to avoid the agricultural activities in the climate risk prone areas to minimize the loss and damage in the agricultural sector.	NCCP		X	X	X			Ministry of Agriculture and Fisheries
Reforest degraded lands and provide a sustainable alternative fuel wood source to areas with high vulnerability	GCF Country Program , NDC	X						Forestry Directorate/Ministry of Agriculture and Fisheries