

PAPUA NEW GUINEA NATIONAL ADAPTATION PLAN





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FOREWORD



Dear fellow Papua New Guineans and Partners in Development, Papua New Guinea remains one of the most vulnerable countries in the Pacific region to climate change impacts. Papua New Guinea, along with other Small Island Developing States (SIDS) in the region, has contributed little to nothing toward global warming, however, has been left to face this onslaught of climate-related calamities. As climate change unfolds, adverse impacts on the populations and rural communities will intensify and development achievements to date across all sectors will be hindered.

The risks associated with climate change are likely to compromise Papua New Guinea's ability to meet and sustain its national development objectives. These include development goals such as the United Nations Sustainable Development Goals (SDGs) and SDG 13, which explicitly articulates the global commitment to combatting climate change adversities threatening our resolve to attain economic growth and prosperity.

The need for the National Adaptation Plan (NAP) became profound as the intensity, frequency, and magnitude of climate change impacts, as a result of increasing global temperatures, reduces the effectiveness and limits the success of traditional coping strategies in overcoming adversities. The National Adaptation Plan is a way forward for Papua New Guinea to cope with climate change that is intended to enhance adaptive capacities, increase resilience, and reduce the level of vulnerability to the adverse effects of climate change, felt by our people.

We need to rise to the challenge brought about by climate change. I expect all stakeholders, including our development partners, key sector agencies, the private sector and non-government organisations (NGOs), to collaboratively work with the Climate Change and Development Authority (CCDA) to execute effective adaptation actions. Developing a National Adaptation Plan is good but implementing the programs and activities inherent in the National Adaptation Plan is even better.

The Marape-Rosso Government is committed to provide the leadership and political direction to ensure that we translate the noble intentions underpinning the National Adaptation Plan into tangible results on the ground. The Government recognises that sea level rise, fast deteriorating critical infrastructure, food and water insecurity, malaria and vector-borne diseases, amongst other climate change issues, are happening in our rural and urban communities. Ultimately, our objective is to alleviate the plight of our people facing these emerging threats.

In pursuing climate change adaptation action, we need to coordinate and strengthen our network and liaison with all relevant sector agencies. The adaptation actions we are contemplating will have to be institutionalised and implemented through the policies of those relevant sectors. There needs to be a clear demarcation of functional responsibilities that are costed and adequately resourced, both at the national and especially at the sub-national level.

Adaptation to climate change through the implementation of Papua New Guinea's National Adaptation Plan, therefore, requires a whole of Government approach to promoting the Government's development agenda of effectively and systematically "leaving no place or person behind". Tangible adaptation measures will require funds from both internal and external sources.

As the Minister responsible for Environment, Conservation and Climate Change, I remain committed to fully implementing this evolving National Adaptation Plan. With an iterative approach to climate change adaptation adopted in our resourcing, budgeting, and planning that undergoes regular updates, this National Adaptation Plan starts our country's journey to mainstreaming climate change adaptation and considering climate change in all facets of government and the lives of our people.

Finally, I wish to acknowledge the continued support and dedication of the United Nations Development Programme, UNDP, as our Delivery Partner and all other stakeholders for this historic achievement for the country.

Thank you all.

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Hon. Simo Kilepa, MP
Minister for Environment, Conservation and Climate Change

MANAGING DIRECTOR'S MESSAGE



Climate Change continues to negatively impact Papua New Guinea affecting the country's growth trajectory and socio-economic opportunities. More than 80% of the population of PNG lives in rural areas, and more than 70% of households are dependent on subsistence agriculture – which accounts for nearly 30% of the GDP. As a result, most of PNG's population is vulnerable to climate variability and change. For over a decade, building resilience to climate change has featured in national dialogues and political commitments. The PNG government and its partners have committed to mainstreaming climate actions in their planning and delivery process.

This is the first National Climate Change Adaptation Plan for Papua New Guinea and we are one of the few countries in the region to have developed a National Adaptation Plan (NAP). The plan was developed through an extensive consultation process over two years involving all stakeholders both at the National and Sub-national levels. The NAP was also developed through an open, inclusive, gender-responsive and transparent process ensuring at the outset that it is country-driven and in alignment with PNG's higher-order policy documents including Vision 2050, the Medium-Term Development Plan III, the enhanced Nationally Determined Contributions (NDC), United Nations Sustainable Development Goals, to name a few.

The NAP provides a clear vision for adaptation and identifies priorities to be addressed in partnership with sector agencies, academic institutions, development partners, and private sector entities over the next five years, and beyond. It looks at addressing the nine priority areas for adaptation identified in the country's Nationally Determined Contributions (NDC) and National Communications to UNFCCC.

This document functions as a strategic high-level action plan for adaptation. It builds upon the existing policy and planning landscape, shifting development planning processes towards a pathway of 'climate-resilience'.

The implementation of the NAP will encourage the collective effort from all stakeholders. Week-long capacity development training for PNG's NAP had been carried out in the Highlands, Southern, Momase, and New Guinea Islands, paving the way for mainstreaming and upscaling climate change adaptation in sectoral and provincial plans.

The accurate prediction of the magnitude of these climate-related impacts is challenging because of the uncertainty of climate projections. No amount or degree of sophistication can precisely predict when and where it is likely to impact. It is therefore important for us to develop appropriate strategies to enhance our adaptive capacities, increase resilience and reduce the level of vulnerability of our people.

The NAP will further climate actions in the country particularly in its adaptive capacities all the while building its resilience. Its implementation will aim to reduce vulnerability to climate change's impacts and integrate adaptation into all levels of development planning.

All in all, the GoPNG through Climate Change and Development Authority as a National Designated Authority (NDA) will work closely with all stakeholders to ensure the National Adaptation Plan is carried out successfully.

Thank you,

A handwritten signature in blue ink, appearing to be 'W. Lakain', written over a dotted line.

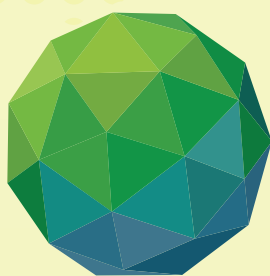
Mr. William Lakain
Acting Managing Director

ACKNOWLEDGEMENT

The development of Papua New Guinea's National Adaptation Plan (NAP) was led by the Adaptation and Projects Division of the Climate Change and Development Authority (CCDA) under the Ministry of Environment, Conservation and Climate Change. The Green Climate Fund (GCF) funded the NAP planning process through the Advancing Papua New Guinea's National Adaptation Plan Project and implemented by the United Nations Development Programme (UNDP) in collaboration with stakeholders to develop Papua New Guinea's NAP.

The CCDA, on behalf of the Government of Papua New Guinea, would like to thank our key partners and stakeholders for their valued financial support, technical inputs and guidance over the last two years. In particular, CCDA would like to thank the Green Climate Fund (GCF), the United Nations Development Programme (UNDP), GEF-UNEP-UNDP NAP-Global Support Programme (NAP-GSP), the USAID Climate Ready Project, the University of Papua New Guinea (UPNG) Centre for Climate Change and Sustainable Development (CCCSD), and Climate Law Policy (CLP) in the development of the NAP. Alongside those supporting the development of the NAP, CCDA would like to acknowledge the valuable assistance, input, insights, and feedback from sector agencies of government such as the National Department of Health, Department of Agriculture and Livestock, Department of Transport, Department of Works, Department of Provincial and Local Level Government, Department of Finance, State Solicitors Office, the Department of National Planning and Monitoring and the Provincial Administrations, amongst others, and the development partners, private sector and non-government organisations, including the National Agricultural Research Institute (NARI) and Global Green Growth Institute (GGGI) for their support and input.

The NAP will go a long way in enhancing the adaptive capacity, increasing resilience and reducing the vulnerability of our people.



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EXECUTIVE SUMMARY

Papua New Guinea is experiencing increased climate variability through changes in temperature and precipitation, increased intensity of tropical storms, increased coastal erosion and saline intrusion and inundation caused by sea-level rise. Papua New Guinea is particularly vulnerable to the climate change impacts posed to ecosystems, agriculture, health, transport, infrastructure, livelihoods, and economy, with climate change threatening the lives and safety of Papua New Guinea's population. Climate change has already begun to cause considerable impact in Papua New Guinea, triggering climate-related hazards, such as heatwaves, landslides, storms, and floods, alongside slow-onset impacts of increased disease and droughts. These impacts have caused substantial damage and affected the daily lives and livelihoods of the nation. Climate change is also likely to hinder progress in poverty alleviation and sustainable development goals (SDGs), compounding development challenges and disproportionately affecting the poorest groups in the country.

Therefore, for over a decade, building resilience to climate change has featured in Papua New Guinea's national dialogue and political commitments. Aside from developing domestic climate change policy, Papua New Guinea has committed to international frameworks on climate change as part of global commitments, including the United Nations Framework on Climate Change Convention (UNFCCC). Under the UNFCCC process, Papua New Guinea's first National Adaptation Plan (NAP) provides a strategic framework to support country-driven efforts to effectively mainstream adaptation to climate-induced risks within sectoral planning processes. The NAP takes a phased approach to implementation that considers the institutional frameworks and the NAP priority sectors. Sectoral climate change adaptation priority areas outline Papua New Guinea's climate change adaptation priorities for expected climate impacts and adaptation targets, focusing on four priority sectors for the first phase: agriculture, health, transport, and infrastructure.

Cross-cutting strategies also aim to enable the effective and sustained implementation of climate change adaptation strategies and measures by addressing policy, institutional, coordination and technical barriers across sectors and levels of government with a whole-of-society approach. By defining a series of strategic actions under cross-cutting and sectoral areas that seek to facilitate the operationalisation and implementation of the NAP and guide the country's efforts to achieve Papua New Guinea's adaptation targets by 2030 through a gender-responsive and whole-of-society approach. The NAP establishes an implementation framework concerning financing, governance and coordination, and monitoring and reporting arrangements required to enable the operationalisation of the NAP and its cross-cutting strategies and sectoral actions. The implementation framework includes a roadmap to guide the implementation of the NAP and track progress in the period 2022-2030, including indicative timelines, targets, and indicators. Papua New Guinea's NAP also includes a stepwise and self-guided tool, the Sectoral Planning Guidelines for climate change adaptation, and a Financing and Implementation Guidance to facilitate the design and implementation of identified/prioritised climate change adaptation measures through mainstreaming adaptation and development of sectoral climate change adaptation plans. The guidelines aim to enable decision-making in priority sectors when identifying and prioritising climate change adaptation options to address critical sectoral climate change impacts, build synergies across sectors, and promote a gender-responsive and inclusive approach. Overall, during the 2022- 2030 period, the NAP will:

- i) Strengthen institutional capacities and the ability to effectively mainstream climate change adaptation and disaster risk reduction;
- ii) Build resilience at the national, subnational and sectoral levels through information and awareness-raising, education and capacity building and the provision of early warning systems, and;
- iii) Facilitate resource mobilisation and foster public and private investments in climate change adaptation in priority areas.

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Acronyms

ATWC	Adaptation Technical Working Committee
ATWG	Adaptation Technical Working Group
BUR	Biennial Update Report
CACC	Central Agencies Coordination Committee
CCA	Climate change adaptation
CCDA	Climate Change Development Authority
CCMA	Climate Change (Management) Act
CEPA	Conservation and Environment Protection Authority
CIF	Climate Investment Funds
CMIP6	Coupled Model Inter-comparison Projects – 6th Phase
CRGGTF	Climate Resilience and Green Growth Trust Fund
CSOs	Civil society organizations
DAL	Department of Agriculture and Livestock
DCDYR	Department for Community Development, Youth and Religion
DHERST	Department of Higher Education, Research, Science and Technology
DNPM	Department of National Planning and Monitoring
DoE	Department of Education
DoF	Department of Finance
DoT	Department of Transport
DoWH	Department of Works and Highways
DPLLG	Department of Provincial and Local Level Government
EbA	Ecosystem-based adaptation
ENSO	El Niño Southern Oscillation
EWS	Early Warning Systems
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
LDPP	Lands Division of Physical Planning
LLINs	Long-lasting insecticidal nets
LLG	Local-level governments
M&E	Monitoring and Evaluation
MIEs	Multilateral Implementing Entities
MPAs	Marine protected areas
MTDP III	Medium Term Development Plan III (2018-2022)
NAP	National Adaptation Plan
NARI	National Agricultural Research Institute
NCCB	National Climate Change Board
NCDC	National Capital District Commission
NCCDMP	National Climate Compatible Development Management Policy 2014
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NDC	National Disaster Centre
NDoH	National Department of Health
NDRRF	National Disaster Risk Reduction Framework 2017-2030
NEC	National Executive Council
NFA	National Fisheries Authority
NGOs	Non-governmental organizations
NWS	National Weather Service
OLPLLG	Organic Law on Provincial and Local Level Governments
PA	Provincial Authority
PHAs	Provincial Health Authority
PCCCs	Provincial Climate Change Committees
PDC	Provincial Disaster Committees
PFM	Public Financial Management
PIP	Public Investment Program
PNG	Papua New Guinea
PNGFA	Papua New Guinea Forest Authority
PNG IMR	Papua New Guinea Institute of Medical Research
SDGs	Sustainable Development Goals
SIDS	Small Island Development State
SIP	Service Improvement Program
SNC	Second National Communication
SSP	Shared Socioeconomic Pathway
StaRS	National Strategy for Responsible Sustainable Development for Papua New Guinea
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

1. INTRODUCTION

Papua New Guinea's diverse socio and economic circumstances, geophysical and geomorphic conditions, tropical climate, and biological diversity have resulted in social systems and unique terrestrial, coastal and marine ecosystems that are highly vulnerable to climate-induced hazards. Climate change has already begun to cause considerable impact in Papua New Guinea. Papua New Guinea is experiencing increased climate variability through changes in temperature and precipitation, increased coastal erosion, saline intrusion and inundation caused by sea-level rise and a greater intensity of tropical storms. These changes have triggered climate-related hazards such as heatwaves, landslides, storms, floods, and slow-onset impacts of increased disease and droughts. For example, around 2.2 million people throughout many thousands of small villages are subject to heavy rainfall and drought weather extremes in Papua New Guinea's highland areas. While in Papua New Guinea's coastal regions and the many low-lying coral atolls, nearly 500,000 people throughout 2,000 coastal villages are vulnerable to weather extremes and flooding. Climate change is likely to compound Papua New Guinea's development challenges and slow the progress in poverty reduction. Projections show that Papua New Guinea will be highly vulnerable to frequent inland flooding, coastal flooding, inland frost and droughts, landslides, coastal erosion and inundation, soil salinisation, and coral reef degradation. These risks are likely to result from the climate change impacts of increased air and sea surface temperatures, increases in the intensity and frequency of days of extreme heat, extreme rainfall, the incidence of drought, ocean acidification, sea level rise and coastal inundation.

Papua New Guinea has a geomorphically diverse and mountainous landscape that includes 5,152 kilometres of coastline and 40,000 square kilometres of coral reef. The diverse terrain and tropical climate have resulted in a unique diversity of terrestrial, coastal, and marine ecosystems, including rainforest lowlands, grasslands, savannahs, freshwater swamps, montane rainforest, and alpine grassland as well as deltaic floodplains (Government of Papua New Guinea, 2020). Papua New Guinea is home to the world's third-largest rainforest, covering 77.8 per cent of the total land area and over thirty-six million hectares of Papua New Guinea. Characterised by high levels of endemism and diversity, Papua New Guinea's forests are relatively intact. These forests are home to 298 species of mammals, 813 bird species, 335 reptile species, 352 amphibian species, 314 species of freshwater fish and over 150,000 species of insects. Papua New Guinea's marine ecosystems are also recognised globally for their high level of marine biodiversity, with approximately 2,800 fish species and 10 per cent of the world's total diversity of fish species. The country is one of the four members of the Coral Triangle, a regional initiative protecting 76 per cent of the world's coral species. Papua New Guinea has six of the world's seven marine turtle species and over 37 per cent of the world's coral reef fish. With approximately 2.4 million square kilometres of fishery zones, Papua New Guinea holds the South Pacific's largest fisheries area (Government of Papua New Guinea, 2020). This marine diversity enhances the resilience of the livelihoods of over 100 million people in the South Pacific region (ADB, 2016). These ecosystems are critical to Papua New Guinea's resilience to climate change. The conservation, restoration, and sustainable management of natural resources are essential to reducing the vulnerability of these terrestrial, marine, and coastal ecosystems to protect their biodiversity integrity and the human societies and livelihoods that depend upon them. Yet, the life-supporting biodiversity and systems of fisheries and coastal, marine, and terrestrial ecosystems are likely to be hugely impacted by climate change. Papua New Guinea's diverse terrestrial, coastal and marine ecosystems are susceptible to climate change impacts of drought and heatwaves, tropical cyclones and storm surges, king tides, sea level rise, floods and landslides, erosion and sedimentation, ocean acidification and coral bleaching.

Ocean acidification, coral bleaching, storm surges, king tides, tropical cyclones, erosion and sedimentation, and sea-level rise affect Papua New Guinea's fisheries and coastal and marine ecosystems. While terrestrial ecosystems and biodiversity are likely to undergo physical changes to terrestrial zones, declines in terrestrial biodiversity, the introduction and outbreaks of diseases and pests, and species invasion. These impacts are expected to affect agricultural yields, damage coral reefs, and further the penetration of malaria and other diseases into higher altitudes in the highlands, with significant adverse implications for water supply, health, food security and livelihoods. The human impact of these is also likely to be severe given that Papua New Guinea's economy is founded on climate-sensitive sectors such as agriculture, fisheries, and forests, which collectively contribute to approximately a fifth of the country's GDP but provide for the livelihoods of the majority of the population. Of Papua New Guinea's population of 8.9 million, about 88 per cent live in rural areas and rely on the natural resource

base or agricultural livelihoods (Government of Papua New Guinea, 2020). With approximately 97 per cent of land held under the customary land tenure system and the remaining 3 per cent of land being state-owned, much of the rural-based population follows traditional village structures and customary land management. More than 80 per cent of the population depends on subsistence farming and natural resource extraction for their livelihoods (Government of Papua New Guinea, 2020). At the same time, between 50,000 and 70,000 Papua New Guineans in coastal areas rely directly on coral reefs for their livelihoods, shelter, and the economic activities they contribute through fisheries and ecotourism (Government of Papua New Guinea, 2014). Therefore, climate change impacts in Papua New Guinea are expected to have broader implications on poverty, inequality, and disaster vulnerability, resulting in climate-induced migration, exacerbating gender inequality, and reducing access to food, clean water, and services such as health. Climate change impacts have already greatly affected some portions of the population more than others. Rural-spread people rely heavily on natural resources for their livelihoods (including marine resources).

Papua New Guinea is among the top 10 countries where poor populations are at the most significant risk of disasters under a severe climate change scenario (UNESCAP 2021). Almost half of Papua New Guinea's population are youth, with 40 per cent under 15 years of age (Government of Papua New Guinea, 2020), highlighting the importance of future planning for climate change adaptation. Climate change threatens Papua New Guinea's progress on development goals, hindering socio-economic opportunities and hindering progress in poverty alleviation and sustainable development goals (SDGs), compounding development challenges and disproportionately affecting the poorest groups in the country. Climate change is also likely to risk Papua New Guinea's sustainable development and climate-compatible economic growth as defined in its Vision 2050 and Medium-Term Development Plan (MTDP) III/IV. Many projected climate changes will disproportionately affect the poorest groups in Papua New Guinea. Socio-economic vulnerabilities challenge Papua New Guinea's adaptive capacity and resilience, with crucial development indicators placing Papua New Guinea's ranking at 155 (out of 189) on the Human Development Index¹ (UNDP, 2022). This ranking indicates the crucial challenges posed for Papua New Guinea's rural-resource base. The country's population is sparsely spread throughout a varied and challenging terrain that poses limited access to infrastructure and services. Poorer farmers and communities, for example, are least able to afford local water storage, irrigation infrastructure, and technologies for adaptation (World Bank, 2021). Rising sea levels will force many coastal communities to relocate. Many have already been displaced by the inundation of coastal areas of islands as atolls are submerged alongside storms and other climate change events. These displacements weigh on the national budget via housing and services in areas where climate migrants are relocated (Government of Papua New Guinea, 2020). Resettlement of climate refugees will often be costly and exacerbates or raises the risk of conflict. At the same time, climate change exacerbates pre-existing inequalities or imbalances, such as age, ethnicity, disability, socioeconomic status, or gender inequities, in that climate change disparately affects women (UNFCCC, 2020).

The health sector is expected to see changes in vector ecology with increasing water-borne and vector-borne diseases (particularly mosquitoes transmitting malaria and dengue). Alongside this, common health problems are likely to be amplified with an increase in mental health issues, injuries, and fatalities resulting from extreme and severe weather are likely to occur increasingly. At the same time, poor hygiene and sanitation due to water quality impacts and environmental degradation are likely to be exacerbated, along with the increased incidence of impaired nutrition (malnutrition and diarrheal diseases) due to food insecurity. The transport and infrastructure sectors are likely to be impacted by the depreciation of critical infrastructure (such as road networks and bridges), the increasing cost burden on the transport system, and disruptions in the adequate functioning of infrastructure and services. Climate change is also expected to impact the agricultural sector by reducing agricultural (crop and livestock) productivity and seeing the introduction and outbreak of pests and diseases, leading to greater incidences of food insecurity. Building resilience to climate change has therefore featured in the national dialogue and political commitments for over a decade. Recognised as an acute challenge for Papua New Guinea, the government and partners have committed to mainstreaming climate action in their planning and budgeting.

¹See Human Development Index: <https://hdr.undp.org/en/countries/profiles/PNG>

Under the UNFCCC process, Papua New Guinea's first National Adaptation Plan (NAP) provides a strategic framework to support country-driven efforts to effectively mainstream adaptation to climate-induced risks within sectoral planning processes.

Papua New Guinea's NAP sets a path for climate change adaptation action to be implemented from 2022 to 2030. The Papua New Guinea NAP 2022-2030 takes a phased approach to implementation that considers the institutional frameworks in place and NAP priority sectors. The NAP ensures climate change risks are integrated within key national and sectoral policies, along with a resource and financing framework to undertake climate change adaptation in the medium to long term. Papua New Guinea's first NAP 2022-2030² has been conceived as a strategic and operational framework to enable Papua New Guinea's Climate Change and Development Authority (CCDA) and other government Departments and Authorities to lead climate change adaptation efforts to advance effective adaptation planning and action sustainably. Papua New Guinea's NAP is underpinned by core goals and principles of integral human development defined in the country's National Constitution, including equality and participation, national sovereignty and self-reliance, and Papua New Guinean ways. The NAP is also aligned with the Sustainable Development Goals, with climate-resilient development considered key to the broader sustainable agenda, providing opportunities to streamline efforts to achieve the SDGs. The NAP, therefore, provides a strengthened mechanism for coordination for multi-sectoral adaptation planning and implementation at the provincial and national levels to overcome gaps in coordination, awareness, and information on climate change. The NAP is country-driven, gender-sensitive, participatory, and fully transparent in building capacities for adapting to climate change. Intended as a continuous and iterative process, NAP adaptation planning has been built on past experiences, current observations and advice, and future scientific projections to create robust adaptation plans and programs.

The development of the NAP and the objectives, outcomes, and outputs of the Advancing Papua New Guinea's Nation Adaptation Plan project, which supported the development of the NAP, have included linking the implementation and development of Nationally Determined Contribution (NDC) adaptation elements with the NAP. These linkages strengthen adaptation action and promote policy coherence and clarity on national priorities. The NAP sets out priority areas according to Papua New Guinea's key vulnerabilities to climate change with the greatest need for adaptation. Priority areas outline Papua New Guinea's sectors for the NAP's first phase according to expected climate impacts and the adaptation targets defined on adaptation in the Revised Enhanced Nationally Determined Contribution (NDC) 2020 to the UNFCCC. These focus on four priority sectors for the first phase: agriculture, health, transport, and infrastructure. Cross-cutting strategies also aim to enable the effective and sustained implementation of climate change adaptation strategies and measures by addressing policy, institutional, coordination and technical barriers across sectors and levels of government with a whole-of-society approach.

This NAP has six sections: Section 1: Provides an overview of Papua New Guinea's national context and biophysical and socio-economic vulnerabilities; Section 2: outlines Papua New Guinea's climate conditions, both current and projected, and vulnerabilities to climate change; Section 3: details Papua New Guinea's institutional and policy apparatus for action on climate change; Section 4: presents the National Adaptation Planning process and approach; Section 5: outlines the National Adaptation Plan priorities and phased approach, and; Section 6: details the Implementation Framework and resource mobilisation for achieving the NAP. The accompanying Annexes: Annex 1: Sectoral Planning Guidelines for Climate Change Adaptation and Annex 2: NAP Financing and Resourcing Framework, provide further guidance for implementing the NAP.

²The NAP, 2022-2030, will be reviewed within five years in conjunction with the NDC review, with necessary aspects of the NAP updated accordingly.

2. CLIMATE CHANGE CONTEXT

Papua New Guinea has a monsoonal climate characterised by high temperatures and humidity throughout the year. Temperatures are relatively steady across the country, with mean monthly temperature varying from 24.13°C to 25.65°C and maximum temperatures of 29.85°C to 31.77° for 1991-2020 (World Bank, 2021). Two monsoon seasons are recognised: the northwest monsoon, which occurs from December to March, and the southwest monsoon, which occurs from May to October. The climate in this part of the Pacific is governed by various factors, such as the movement of the South Pacific Convergence Zone (SPCZ).

Papua New Guinea is home to one of the wettest climates in the world, and annual rainfall in many areas of the country exceeds 2,500 mm, with the heaviest events occurring in the highlands (World Bank, 2021). Precipitation takes place all year round, typically in the range of 200–400 mm/month. Areas in the country with a more pronounced wet and dry season include Markham Valley, Bulolo Valley, Maprik—Angoram area, Eastern highlands, and the coastal regions near Cape Vogel, Port Moresby, and Daru (World Bank, 2021). However, these seasons are considerably different in Port Moresby, where about 78 per cent of the average annual rainfall comes in the wet season (CSIRO, 2015).

Papua New Guinea has a wet season from November to April and a dry season from May to October. Year-to-year variability in precipitation and climate in Papua New Guinea is influenced by the El Niño-Southern Oscillation (ENSO). El Niño conditions in the southeast Pacific bring drought conditions to Papua New Guinea, especially in the drier areas of the country (World Bank, 2021). Equally, the cool phase of ENSO (La Niña) may cause extreme precipitation, flooding, and landslides (Kuleshov et al., 2019).

Table 1 provides an overview of Papua New Guinea’s current climate context during 1991-2020, derived from historical data and observed trends.

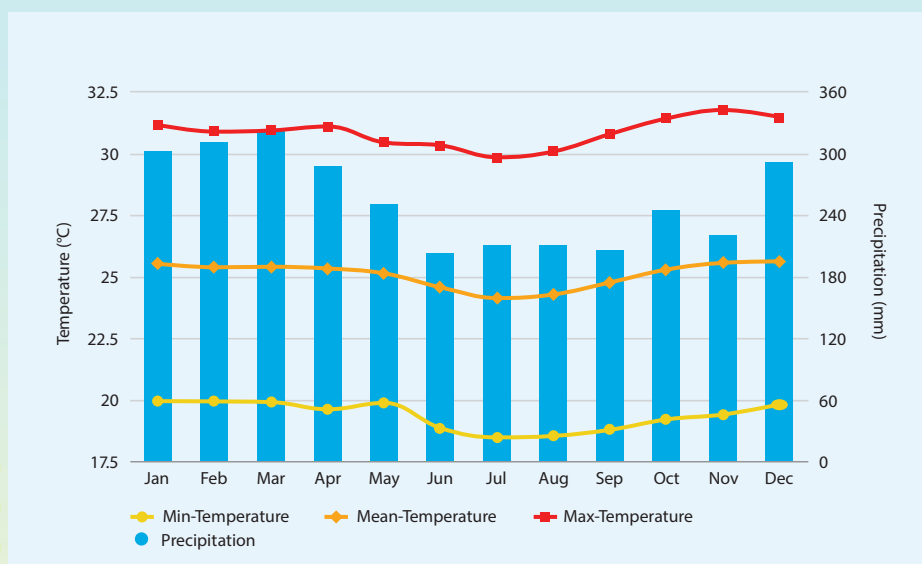


Figure 1 Average monthly mean, max, and minimum temperatures and precipitation in Papua New Guinea 1991-2020.

Source: World Bank 2021a

Climate	
Climate description:	Hot, humid tropical climate which is experienced all year round. Two distinctive seasons: wet (Dec – Mar) and dry (Jun – Sep)
Average Monthly Rainfall:	250-350 mm
Average Monthly Temperature	26 - 28°C
Humidity:	70% – 90%
Observed trends	
Temperature	Warming trends observed for both maximum and minimum temperatures across the regions with higher increases in the night-time temperatures (1970–2009).
Rainfall	An increase in rainfall was observed in all regions during the wet season since 1950 except the Northern region which had significant decreases. However, a significant increase in rainfall during the dry season was observed in the Northern region during the same period.

Table 1 Climate conditions overview for Papua New Guinea. Source: World Bank (2022)

2.1 OBSERVED CHANGES IN CLIMATE

Current trends have been shifting towards much hotter temperatures, with a greater concentration of extreme heat days evident from the year 2000 onwards. Figure 3 below shows the change in the mean (average) temperature at the different times of the year, with the colour shift to red showing greater temperature variation during April to December from 2000 onwards. Each bubble represents climate extremes as standard deviations (SD) away from the monthly mean determined over the current climatology of 1991-2020.

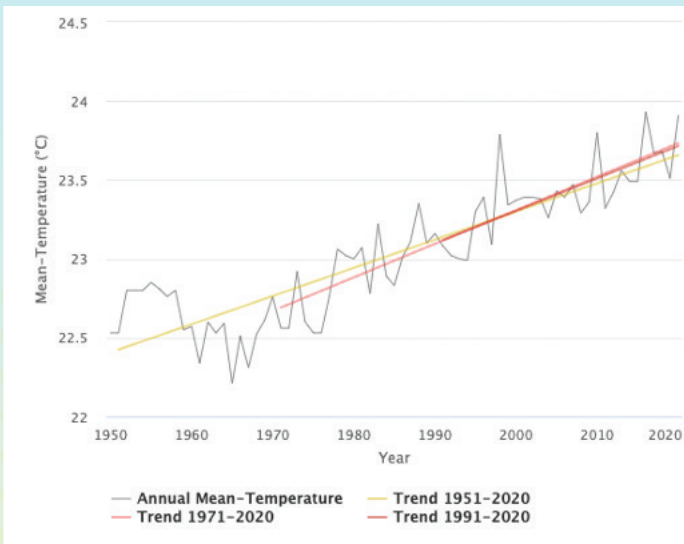


Figure 2 Changes in event intensity of maximum of daily maximum temperatures for Papua New Guinea. Source: World Bank (2022).



Figure 3 Mean temperature annual trends with the significance of trend per decade for Papua New Guinea. Source: World Bank (2022).

Similarly, precipitation periods and the distribution of rainfall periods have significantly altered to show a trend toward increasing rainfall intensity for Papua New Guinea.

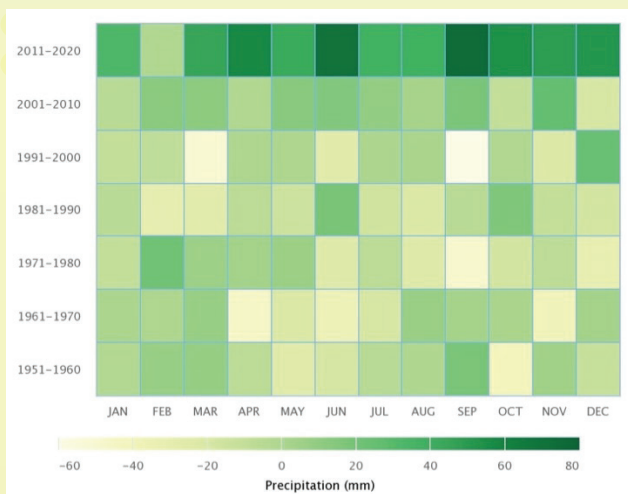


Figure 4 Precipitation monthly trends show increased amounts in millimetres (mm) for 2011-2020. Source: World Bank (2022).

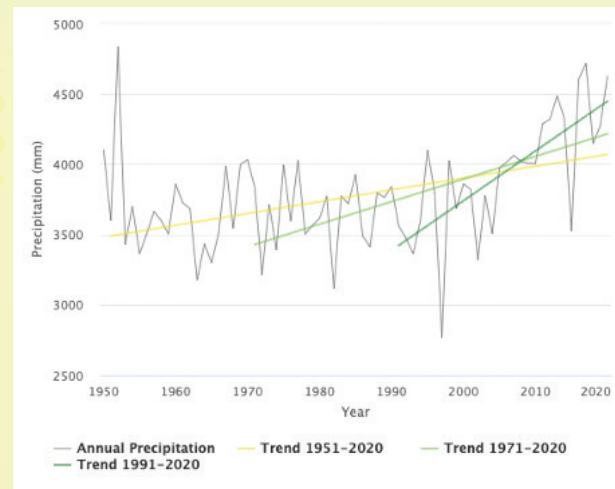


Figure 5 Precipitation annual trends with the significance of trend per decade for Papua New Guinea. Source: World Bank (2022).

2.2 CLIMATE CHANGE PROJECTIONS FOR PAPUA NEW GUINEA

Following the current trends in observed climate change, Papua New Guinea will likely face several continued and additional increases in climate changes, variability, and impacts. These changes are likely to increase surface air temperature, sea surface temperature, and the intensity and frequency of days with extreme heat, accompanied by increasing incidents of drought. Conversely, annual mean rainfall is projected to increase, but with greater intensity and frequency of extreme rainfall days (affecting permeability and resulting in flash floods and landslides) and increases in the frequency of tropical cyclones. Increasing ocean acidification will continue at the current trend rate, while sea-level rise will increase. Papua New Guinea's projections are shown in Table 2 below, with the confidence level included on how accurate these projections are:

Table 2 Climate Projections for Papua New Guinea and the level of confidence with which they are predicted.

CLIMATE VARIABLE	PROJECTION	CONFIDENCE LEVEL
Surface Air Temp.	Projected to Increase	Very High Confidence
Sea Surface Temp.	Projected to Increase	Very High Confidence
Annual Mean Rainfall	Projected to Increase	High Confidence
Seasonal Mean Rainfall	Projected to Increase	High Confidence
Intensity and Frequency of days of extreme Heat	Projected to Increase	Very High Confidence
Intensity and Frequency of days of extreme Rainfall	Projected to Increase	High Confidence
Incidence of Drought	Projected to Increase	Moderate Confidence
Frequency of Tropical Cyclones	Projected to Increase	Moderate Confidence
Ocean Acidification	Projected to Continue	Very High Confidence
Mean Sea-Level Rise	Projected to Increase	Very High Confidence

Source: Government of Papua New Guinea (2020)

i. Temperature

Typically, two forecasting measurements are used to compare likely temperature forecast projections: Representative Concentration Pathways (RCP) set pathways for different greenhouse gas concentrations, whereas Shared Socioeconomic Pathways (SSPs) are based on scenarios according to whether specific reductions in emissions will or will not be achieved. The fifth and sixth phases of the global climate models (GCMs) are the Coupled Model Inter-comparison Project Phase 5 (CIMP5) and Coupled Model Inter-comparison Project Phase 6 (CIMP6). The Coupled Model Inter-comparison Project Phase 5 (CIMP5) models are used by the IPCC Fifth Assessment Report (AR5). The IPCC Sixth Assessment Report (AR6) was updated with the Coupled Model Inter-comparison Project Phase 6 (CIMP6).

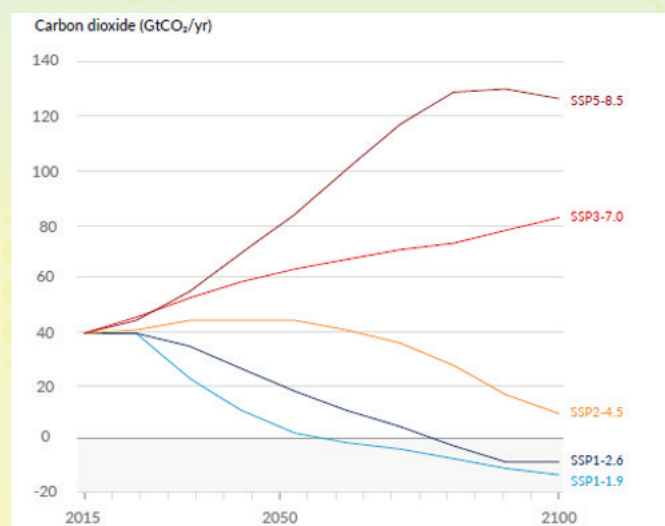


Figure 6 Shows the future Co2 emissions used in SSP1-8.5. Source IPCC AR6 WGI, 2021.

SSP data uses the Coupled Model Inter-comparison Project Phase 6 (CIMP6) models used by the IPCC Sixth Assessment Report (AR6). SSPs are based on five different scenarios (see Figure 6): SSP1-1.9: equate to a very ambitious scenario to represent the 1.5°C goal of the Paris Agreement (the rising global temperature at 1.4°C); SSP1-2.6: equate to a sustainable development scenario (the rising global temperature at 1.9°C); SSP2-4.5: equate to an intermediate scenario (the rising global temperature at 3.8-4.2°C); SSP3-7.0: equate to a regional rivalry scenario (the rising global temperature at 3.5-3.8°C); and, SSP5-8.5: equate to a fossil-fuel based development (the rising global temperature at 4.7-5.1°C). SSPs provide insight into potential future climates based on defined emissions, mitigation efforts, and development paths. The projection data is presented as multi-model ensembles, representing the range and distribution of the most plausible projected outcomes of change in the climate system for a selected SSP.

Figure 8 shows the projected likely monthly temperature for 2040 – 2059 under RCP8.5 compared with the historical reference period from 1986 to 2005 (World Bank 2022). This equates to a severe continuing increase past the 2060 interval under the RCP 8.5 scenario pathway and a stable trend under RCP 2.6. Projected estimates are forecast here under the Four Representative Concentration Pathways (RCP) used by the AR5 for Papua New Guinea, which ranges from slight at 2.6 (a likely global increase of 1.0°C), moderate at 4.5 (a likely global increase of 1.8°C), high at 6.0 (a likely increase of 2.2°C globally) to very high, at 8.5 (a likely increase of 3.7°C globally).³ Figure 7 indicates the rising upwards trend in average (median) temperature comparing the RCP 2.6 measurement with the RCP 8.5 scenario.

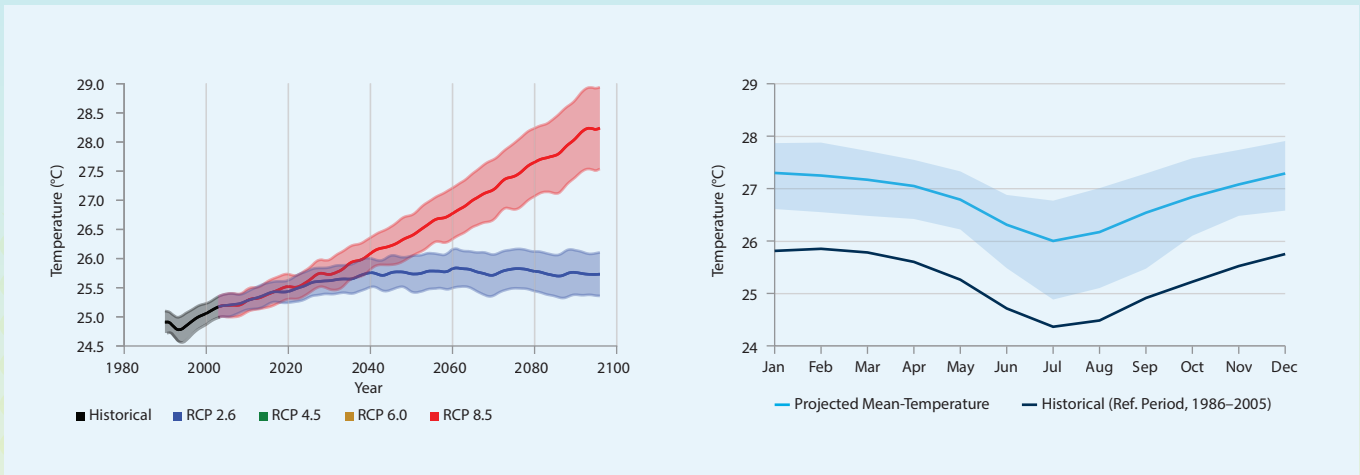


Figure 7 Comparative temperature trends between RCP 2.6 and RCP 8.5 from the historical records during 1986-2005. Source: World Bank (2022).

Figure 8 Projected likely monthly temperature for 2040-2059 under RCP 8.5 compared with the historical reference period during 1986 - 2005. Source: World Bank (2022).

Figure 9 shows projected changes in mean temperature for Papua New Guinea. These show that increases in average temperatures are expected to result in a rise in the number of hot days and warm nights. The number of days with a heat index higher than 35°C is also projected to increase (Figure 10), having implications for health and well-being, agriculture and food security, water security, ecosystems, and biodiversity, as well as infrastructure and transport.

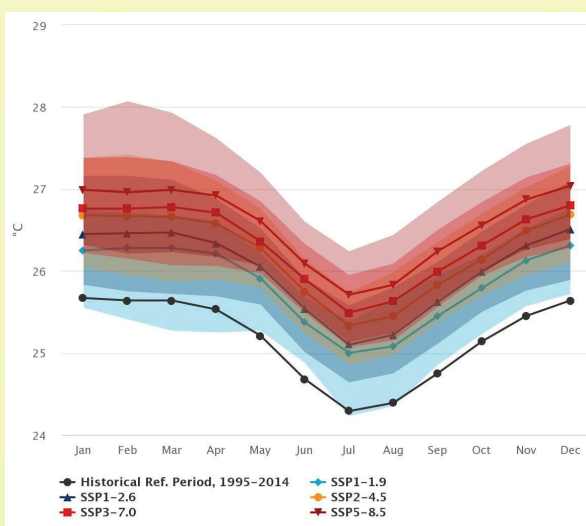


Figure 9 Shows the projected mean temperature for 2040-2059 for Papua New Guinea (using reference period 1995-2014). Source: World Bank (2022).

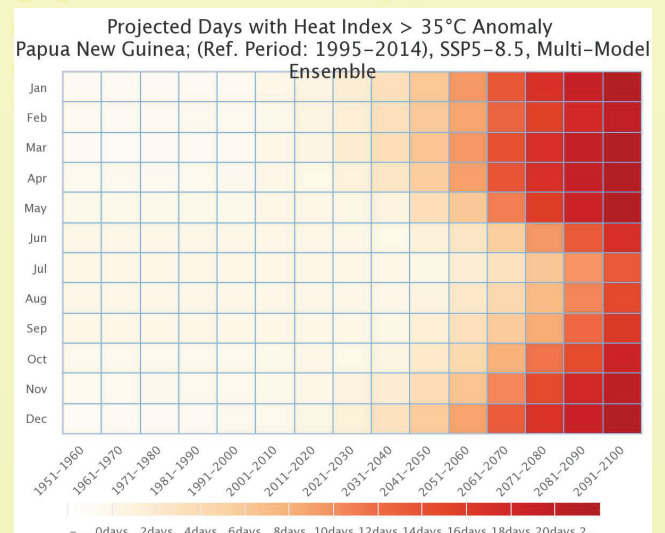


Figure 10 Projected days with heat index >35°C for Papua New Guinea (1951-2100) under SSP5-8.5. Source: World Bank (2022).

³Spanning a broad range of forcing in 2100 without socioeconomic narratives included.

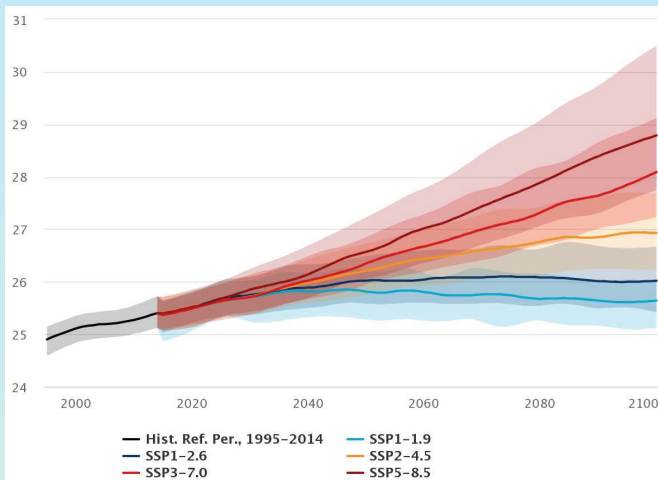


Figure 11 Projected mean temperature in Papua New Guinea under different SSPs (Reference Period: 1995-2014). Source: World Bank (2022).

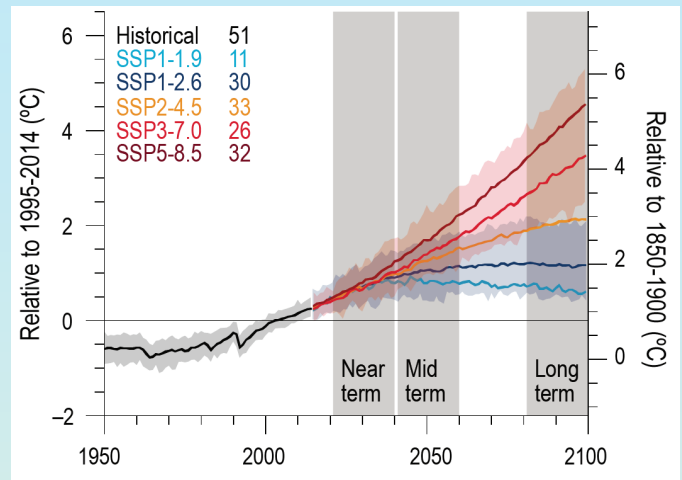


Figure 12 Shows increase in global surface temperature in each SSP scenario relative to historic 1850-1900 levels. Source IPCC AR6 WGI (2021).

The projection forecasts for temperature for 2040-2059 under climate projection modelled data from the Sixth Phase of the Coupled Model Inter-comparison Projects (CMIP6) suggest an increase in the annual mean temperatures for Papua New Guinea to 25.84°C [25.39°C-26.09°C] under SSP1-1.9 Ensemble and 26.55°C [26.16°C-27.17°C] under the SSP5-8.5 Ensemble.

ii. Precipitation

Notably, as one of the wettest areas in the region, Papua New Guinea is set to see an increase in precipitation according to climate projections. The El Niño Southern Oscillation (ENSO) phenomenon has already negatively affected Papua New Guinea's climate, triggering more intense drought and flood events. While there is a high degree of uncertainty about changes in rainfall patterns and significant modelling uncertainties for the Pacific region, rainfall patterns are expected to become less predictable, with more frequent and intense extreme events. Future El Niño-related events are likely to drive many expected changes in rainfall, including a rise in annual precipitation and increases in drought conditions throughout the region, as well as sea-level changes (World Bank 2021; USAID 2018).

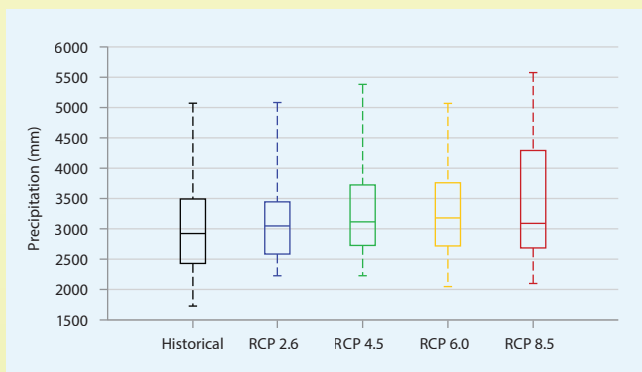


Figure 13 Boxplots showing the projected average annual precipitation for Papua New Guinea in the period 2080-2099. Source: World Bank (2022)

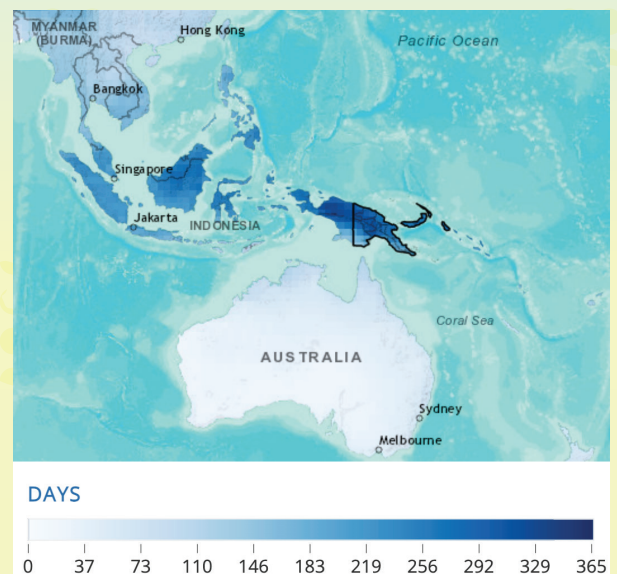


Figure 14 Projected number of consecutive wet days for 2020-2039 (annually) using the 1995-2014 reference period, SSP3-7.0. Source: World Bank (2022).

2.3 VULNERABILITY

Climate change is expected to exacerbate existing risk factors, raising significant challenges for the country's development, with expected impacts on development sectors, natural resources, assets, services, and livelihoods. Papua New Guinea is highly vulnerable to climate change impacts such as floods and landslides, sea-level rise and coastal erosion and inundation, inland and coastal flooding, increased periods of heat, drought, soil salinisation and coral reef degradation, ocean acidification, and tropical cyclones (Figure 15). The country's highland region is susceptible to heavy rainfall. In contrast, the coastal areas, the islands, and the low-lying atoll areas are mainly affected by extreme weather events, storm surges, sea-level rise, and coastal inundation (World Bank, 2021). This section provides an overview of climate hazards and impacts based on existing information in Papua New Guinea using data from the CMIP5.⁴

KEY CLIMATE IMPACTS



Figure 15 Expected climate impacts in Papua New Guinea

The climate risks faced by Papua New Guinea include rapid onset and long-term changes in climate parameters and the impacts on communities and economies because of these variations, which are already underway (Table 3).

⁴ Fifth phase of the global climate model compilations of the Coupled Model Inter-comparison Projects (CMIPs)

Table 3 Overview of the key impacts facing Papua New Guinea from climate-related risks

	Description
Floods	The risk of flooding is ranked among the highest level of climate risks in Papua New Guinea. Floods affect most parts of Papua New Guinea during the monsoon season. The highlands, in particular, have a long history of severe floods. Floods cause erosion and heavy sedimentation in the coastal plains that impact agricultural productivity and downstream settlements. In the lowlands, coastal ecosystems such as mangroves, estuaries, and coral reefs endure damage due to heavy silt loads and debris brought in by flood events.
Droughts	Affects much of the Southwestern plains, Central Province plains, Cape Vogel area, Markham Valley, Bulolo Valley, Maprik–Angoram areas as well as parts of the Eastern Highlands and Madang Provinces.
Landslides	Are a common occurrence in the high mountainous regions of Papua New Guinea and frequently damage vital infrastructure, upland forests, and the homes and gardens of thousands of residents.
Tropical cyclones	Papua New Guinea is classified as a country with a high risk of cyclones, where there is more than a 20 per cent chance of potentially damaging wind speeds in the next 10 years. Cyclone-related damages can occur due to wind, cyclone induced heavy rainfall and subsequent flooding, as well as coastal floods in coastal areas.
Sea-Level Rise	The effects of sea-level rise are already apparent in the Carteret Islands and the Mortlock Islands, near the Solomon Islands, where much of the land is now underwater.

Source: Adapted from World Bank (2022) and GFDRR (2020)

Drought and heatwaves

Drought affects Papua New Guinea’s Southwestern plains, Central Province plains, Cape Vogel area, Markham Valley, Bulolo Valley, Maprik–Angoram area, and areas in the Eastern Highlands and Madang Provinces (World Bank, 2021). Past drought incidents in Papua New Guinea have led to significant disaster events. For example, the severe drought caused by El Niño in 2015–2016 affected about 40 per cent of the population, with approximately 480,000 people impacted by critical food shortages due to subsistence crops failing and extreme water shortages (Chua et al. 2019). Although there is some uncertainty about how climate change will drive drought impacts, Papua New Guinea faces an annual median probability of severe meteorological drought of around 4 per cent, defined by a standardised precipitation evaporation index (SPEI) of less than two (World Bank, 2021). Climate change-related warming and increased climate variability are also projected to drastically increase the frequency of heat waves (World Bank, 2021). Heatwaves represent a significant potential health hazard to Papua New Guinea’s communities. By the 2090s Papua New Guinea is likely to experience a considerable increase in the likelihood of a heat wave under all emission pathways (World Bank, 2021).

Floods and landslides

The risk of flooding is ranked among the highest climate impacts for Papua New Guinea. Changes in the intensity and severity of rainfall are expected to increase inland flooding, and more frequent and intense rainfall events are also expected to increase the risk of coastal flooding, which is already high (GFDRR, 2020).

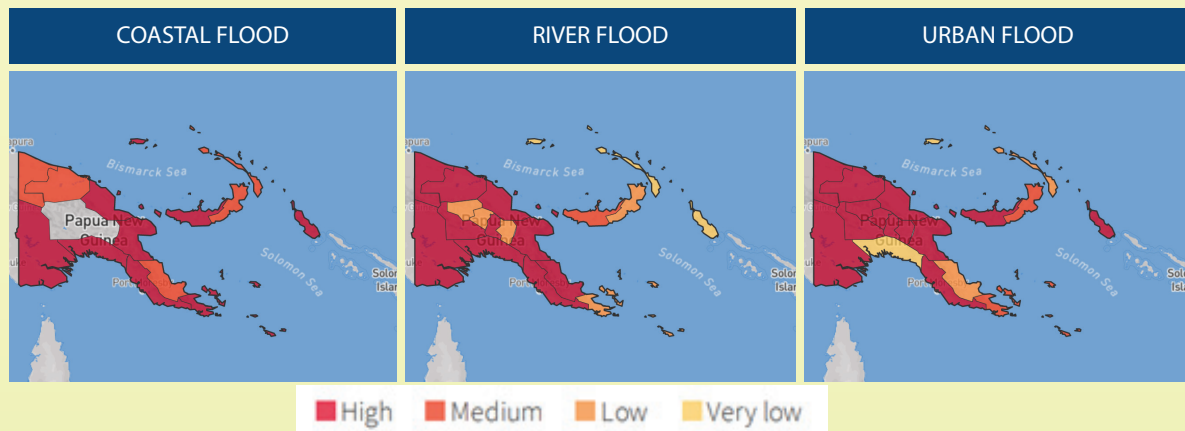


Figure 16 Risk to river, urban and coastal floods in Papua New Guinea. Source: GFDRR (2020)

Approximately 18 per cent of the total landmass of Papua New Guinea already experiences flooding, with the incidence and extent of coastal flooding expected to increase, particularly in the northern areas (Government of Papua New Guinea, 2020). These changes will regularly impact Papua New Guinea’s valleys and wetlands in both lowland and highland areas, adversely affecting agriculture-dependent livelihoods, public services, and infrastructure. Between 22,000 and 26,000 people are already affected annually by inland floods, which displace 6,000-8,000 people annually, with estimated annual damages of over USD 8 million, a burden usually shouldered by the poorest people in the country (Government of Papua New Guinea, 2014). Atolls are also threatened by periodic inundation from extreme events, such as high waves and storm surges. Coastal flooding already affects 8,000 people annually and causes damages estimated at USD 10 - 20 million (Government of Papua New Guinea, 2014). Floods cause erosion and heavy sedimentation in the coastal plains, affecting agricultural productivity and downstream settlements. In the lowlands, heavy silt loads and debris brought in by flood events cause damage to coastal ecosystems such as mangroves, estuaries, and coral reefs (World Bank, 2021).

Higher rainfall intensity cumulates with Papua New Guinea’s steep mountainous ranges, and elevated seismicity, in a very high landslide risk. Triggered by increased rainfall intensity and land-use changes in the mountainous rural areas of Papua New Guinea, landslides frequently already cause damage to vital infrastructure, homes and gardens, and upland forests (Government of Papua New Guinea, 2020). The increased risk of landslides is influenced by climate change, as changes in precipitation and temperature will likely alter the slope and bedrock stability (GFDRR, 2020).

Tropical Cyclones

Papua New Guinea is also classified as a country with a high risk of cyclones, with more than a 20 per cent chance of potentially damaging wind speeds in the next ten years. Cyclone-related damages can occur due to wind, cyclone-induced heavy rainfall and subsequent flooding, and related coastal floods in coastal areas (GFDRR, 2020). Tropical cyclones affect southern Papua New Guinea areas, usually between November and April. An average of fifteen cyclones per decade developed within or crossed into Papua New Guinean waters during 1969-2010, with the number of cyclones varying widely from year to year (Figure 17). While the frequency of tropical cyclones is expected to decrease as part of a global trend, when cyclones do occur, they are likely to be of greater intensity, with projections estimating an increase of maximum tropical cyclone wind speeds by around 5–10 per cent by 2050 (GGGI 2019).

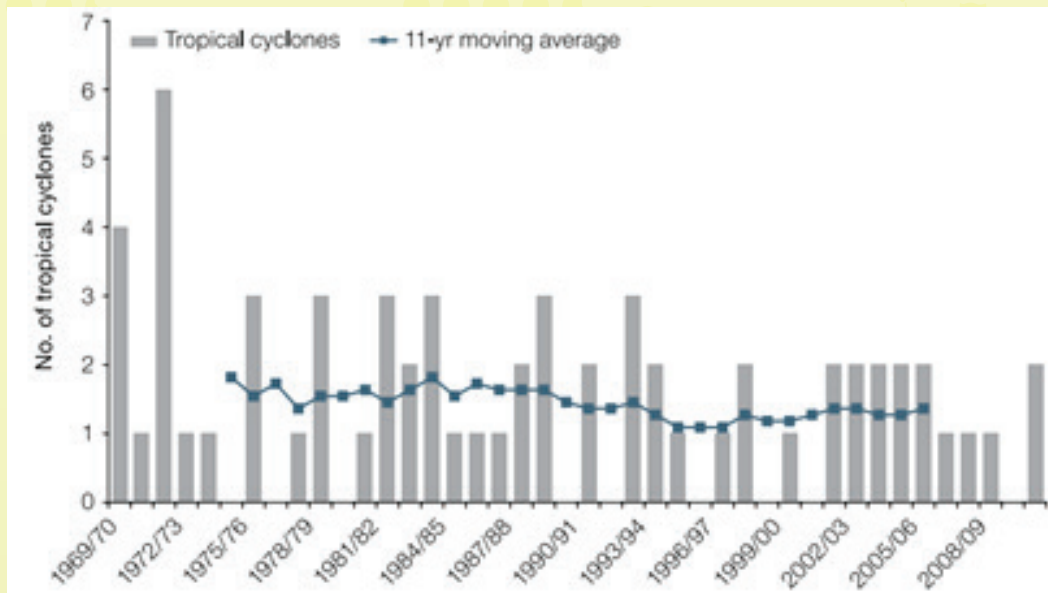


Figure 17 Number of tropical cyclones historically crossing Papua New Guinea’s Exclusive Economic Zone per season during the 1970-2010 period. Source: CSIRO (2015)

Sea level rise and Ocean acidification

The IPCC estimates that sea levels will likely continue to rise around Small Islands and over more extended periods under higher emissions (IPCC 2022). In the Pacific Region, sea levels are likely to increase between 17 and 38 centimetres by 2050 and are expected to rise by at least the global average projection of over 1 meter by 2100 (USAID 2018). By the 2050s, Papua New Guinea is likely to experience a sea-level rise of +0.2 to +0.3 meters (against the mean value of 1986-2005), while by the end of the century, projections estimate a sea-level rise of +0.4 to +0.5 meters under a low emissions scenario (RCP 2.6) and +0.7 to +0.9 meters under a high emissions scenario (RCP 8.5) shown in Figure 18 (World Bank 2021). Ocean acidification has slowly increased in Papua New Guinea’s water (CSIRO, 2015).

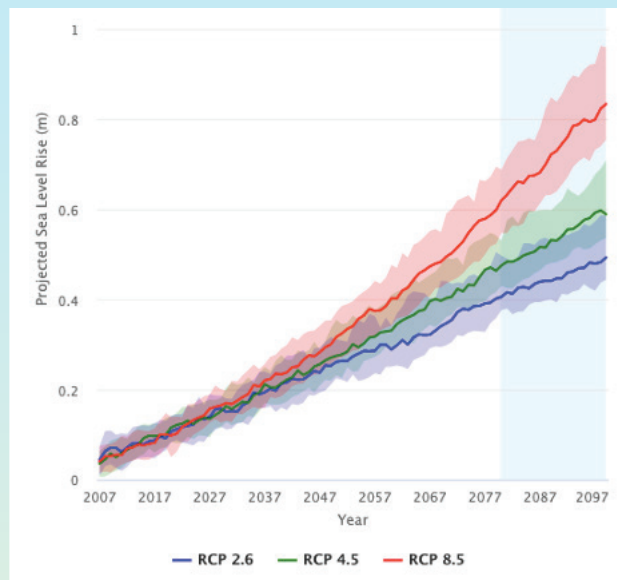


Figure 18 Projected Sea Level Rise (SLR) for Papua New Guinea’s coastal areas. Source: World Bank (2022)

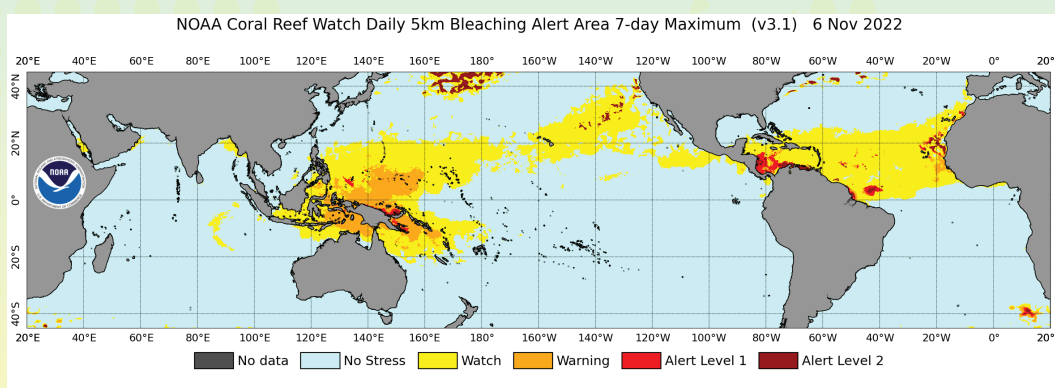


Figure 19 NOAA Coral Reef Watch Daily 5km Bleaching Alert Area for 12 June 2022. Source: NOAA Coral Reef Watch

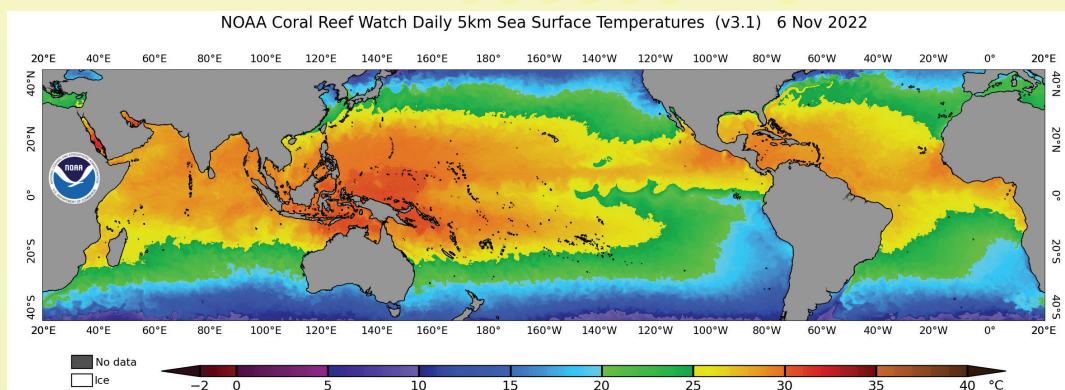


Figure 20 NOAA Coral Reef Watch Daily 5km Sea Surface Temperatures for 12 June 2022. Source: NOAA Coral Reef Watch

Increasing warming of ocean surface waters around Papua New Guinea has put coral and marine ecosystems at risk, with high temperatures resulting in coral bleaching for most of the north coasts of Papua New Guinea at present (2022).

2.4 Sector-specific climate change impacts and vulnerabilities



Figure 21 Sectoral impacts and vulnerabilities for Papua New Guinea

Figure 21 provides an overview of the expected climate impacts by sector, considering the two main climatic variables: temperature and precipitation and the main climate-related hazards associated with the impact. These critical areas most vulnerable to climate change impacts have been consistently identified as priority areas for adaptation in Papua New Guinea's key national documents. These documents include the Nationally Determined Contributions (NDC) and the Revised Enhanced NDC, the Climate Change Management Act (CCMA) of 2015 and 2022 Amendment, the National Communications to the UNFCCC, the CCDA Climate Change Corporate Plan, and the Green Climate Fund (GCF) Papua New Guinea Country Programme (CP). The Revised Enhanced NDC has prioritised Papua New Guinea's most critical climate change impact areas as 1) Coastal flooding and sea-level rise, 2) Inland flooding, 3) Food insecurity, 4) Cities and climate change, 5) Climate-induced migration, 6) Damage to coral reefs, 7) Malaria and vector-borne diseases, 8) Water and sanitation, and 9) Landslides.

3. INSTITUTIONAL AND POLICY SETTING FOR CLIMATE CHANGE ACTION

Specific adaptation measures need to be planned and integrated into sectoral policies and planning and budgeting processes. Accordingly, a concerted approach to adaptation planning under the NAP ensures that climate change adaptation is streamlined into existing government plans, policies, and budgets, aligning with key development and sectoral strategies. Papua New Guinea's NAP has been designed to reconcile multiple objectives and sectoral planning for climate change adaptation framed by the international, national policy and strategic planning landscape.

3.1 NATIONAL LEGISLATION AND POLICY FRAMEWORKS

Building resilience to climate change has featured in the national dialogue and political commitments for over a decade. Papua New Guinea passed legislation on climate change through the Climate Change Management Act of 2015 and the Amendment of the Climate Change Management Act of 2022. The Climate Change Management Act (CCMA) sets an overarching regulatory instrument for climate actions in the country and sectoral entities to mainstream adaptation into sectoral planning and budgeting through climate-compatible adaptation action plans. At the National level, the CCMA constitutes an overarching regulation that underpins the NAP, as it provides an institutional and operational framework to foster climate-compatible development in Papua New Guinea and establishes the mandate for priority sectoral entities to “*implement a climate change and climate-compatible adaptation action*” plan (Government of Papua New Guinea, 2021b). The Papua New Guinea Government established the Climate Change and Development Authority (CCDA) as the mandated entity to manage climate change matters in Papua New Guinea through the Climate Change Management Act (2015). Overall, the role of the CCDA includes overseeing the implementation of the National Climate Compatible Development Management Policy, implementing and reporting on Papua New Guinea's international commitments and actions on addressing climate change and coordinating various stakeholders' participation in the sector.

Under the CCMA, the CCDA is mandated as the coordinating body for all climate change-related policies and tasked with ensuring a path of climate-compatible growth. The CCMA also sets out the regulatory framework to a) Promote and manage climate-compatible development through climate change mitigation and adaptation activities; b) Implement any relevant obligations of the State under applicable rules of international law and international agreements related to climate change, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement; and c) Establish Papua New Guinea's National Designated Authority (NDA) or an equivalent entity for the UNFCCC, the Paris Agreement, and any other or subsequent arrangements or agreements made under the UNFCCC and the Paris Agreement. The CCMA Amendment 2022 also provides legislation to drive adaptation planning throughout Papua New Guinea's regulated sectors and supports the implementation of the NAP. Under the CCMA Amendment 2022, all regulated sectors (identified in article 53) must develop sectoral adaptation plans. The CCMA's regulated sectors are the areas of agriculture and livestock; the energy sector (electricity generation, energy, petroleum, and natural gas production); the Transport sector (road, sea, and air); works & infrastructure sector (including the manufacturing industry); the forestry and land use sector (LULUCF); the mining sector (minerals exploration, extraction, production, and refining); the fisheries and marine resources sector, and; the waste management sector (including industrial processing and disposal). Accordingly, several key departments and national agencies are critical in leading the implementation of the NAP in line with the mandated sectors.

The Department of Agriculture and Livestock (DAL) oversees climate change adaptation policy and planning for food security and the agriculture sector, with legislation governing separate commodities and decision-making powers and functions. The National Agriculture Research Institute (NARI), for example, was established as an independent research institution responsible for providing technical, analytical, diagnostic, and advisory services along with up-to-date information to the agriculture sector in Papua New Guinea, under the Minister for Higher Education, Research, Science and Technology. Provincial agricultural offices report to the Provincial Administration Provincial Government and Provincial Executive Council to progress five-year provincial and ward development plans. Key policies such as the National Food Security Policy, the Papua New Guinea E-agriculture Strategy 2017-2023, and the (Draft) Climate Smart Agriculture Policy link the agriculture sector with the objectives of the NAP.

The National Department of Health (NDoH) is responsible for administering the health system, structures, institutions, services, and personnel, as well as critical health-related policies such as the (Draft) National Strategy and Action Plan on Climate Change and Health, the (Draft) National Environmental Health Policy 2021-2030. At the organisational level, the NDoH has a dedicated section on Environmental Health, which in turn has programmes on water and sanitation, sustainable environmental health and climate change, and food and quarantine, with four sub-programmes, including climate change and health, waste management, occupational health and safety, and environmental health impact assessments. Aside from the NDoH, other key stakeholders include the Provincial Health Authorities and the Institute of Medical Research; there are also the Provincial and District Health Services at the sub-national level under the administration of the Provincial Health Authority. The WASH Policy 2015-2030 covers some aspects of the relevant issues relating to climate change risks as it relates to adaptation priority areas. This is provided as part of the information disseminated through the DNPM and as part of its core mandate as the central agency in coordination of overall national development plans and policies and cross-sector or critical thematic plans and policies within the country.

The Department of Works and Highways (DoWH) is mandated as the agency responsible for infrastructure in Papua New Guinea, specifically focused on quality control through implementing infrastructure regulations and standards. These responsibilities cover land use zoning and physical planning, as well as establishing and enforcing standards for the engineering, construction and maintenance of roads, the road network, and bridges throughout the country. DoWH also provides technical assistance to provincial, district and local governments to develop infrastructure. The CCMA calls for the need to have specific building standards to align with the climate change requirements under the UNFCCC relating to adaptation. At the same time, the Building Act (1971) prescribes the minimum environmental standards in the construction and performance of all new buildings and refurbishments. The Physical Planning Act provides for specific land development plans that cover provincial, urban, local, or subject development and measures for improving the physical environment or land zoning.

The Department of Works and Highways (DoWH) Climate Change Policy and Action Plan (2022), as well as the National Transport Strategy 2013, outline the transport sector's broad objectives on climate change as well as the specific adaptation measures to be adopted in addressing both current and future impacts of climate change. The 2030 Transport Policy and Investment Plan also highlights climate change as a cross-cutting issue that needs to be integrated into all planning and development aspects of road, sea and air transport planning and development aspects. The Department of Transport (DoT) works closely with six separate government agencies in formulating new policies, including the Department of Works and Highways, the Civil Aviation Safety Authority (CASA), the National Maritime Safety Authority (NMSA), PNG Ports Corporation (PNG Ports), the National Roads Authority (NRA) and the National Road Safety Council. There is a clear distinction between the mandate that the DoWH and the Department of Transport (DoT) hold regarding building and infrastructure in Papua New Guinea. The DoWH is responsible for ensuring supervision and quality control by implementing the country's regulations and standards. Roads, ports, and airports meet the bulk of Papua New Guinea's transport demands, and the government plays a vital role in managing transport systems. As a unit within the DoT, the National Weather Service (NWS) plays a crucial role in adaptation monitoring to assess the scale of vulnerability and its associated risk level at each location. The NWS is responsible for collecting and analysing meteorological data for historical and current weather reporting and near-term weather forecasting within Papua New Guinea and the surrounding region. Weather reports and forecasts are provided for general use and specialist aviation and maritime purposes. NWS also advises on medium-term climatic variation and long-term climate change.

At the Provincial level, the five-year development plans are the primary legal instruments that help to promote the integration and coordination of climate change initiatives into development objectives and projects at the subnational level. The DNPM is also linked to the provincial level through its provincial planning divisions, ensuring that crucial information on these key policies and plans is disseminated at the subnational level and integrated into its existing institutional arrangements. The NAP highlights the coordination between these bodies through the CCDA Adaptation Technical Working Committee (ATWC), which meet quarterly or when the need arises.

In addition to the CCMA and mandated areas, several laws, regulations, policies, and planning instruments have mandated and underpinned the design of Papua New Guinea’s first NAP. These include the constitutional and directive policies (Vision 2050, Papua New Guinea Development Strategic Plan 2010-2030, the Medium-Term Development Plan (MTDP), Sector, Provincial, District, Local-level Government and Ward Plans, and Annual Budgets) and those that support national government policy implementation (Alotau Accord II, StaR, Papua New Guinea’s Development Cooperation Policy, all sector policies, and policy M&E frameworks, amongst others) set out in Table 4 below.

Table 4 Relevant laws, regulations, policies, and other instruments underpinning Papua New Guinea’s

LAWS, REGULATIONS, POLICIES & INSTRUMENTS	
Climate Change Management Act (CCMA) 2015 and Amendment 2022	The CCMA is the central legislation for the promotion and management for climate - compatible development in Papua New Guinea. The CCMA legislates climate change mitigation and adaptation measures and actions, including for Papua New Guinea’s UNFCCC commitments such as the Paris Agreement (2015) and all subsequent Conference of Parties (COP) agreements into Papua New Guinea’s legal framework. The 2015 Act has been recently Amended (2022).
Paris Agreement Implementation 2015	The UNFCCC Paris Agreement was ratified by Papua New Guinea and is legally enforceable domestically, providing the structure and support to implement climate change adaptation measures and actions in Papua New Guinea. In addition to serving as a ratification instrument, the Paris Agreement serves as the basis for the development of Climate Change Management (Nationally Determined Contributions) Regulation 2021 and enforcing the recently Revised Enhanced NDC Implementation Plan.
Papua New Guinea’s Enhanced Nationally Determined Contribution (NDC) 2020	Papua New Guinea’s Enhanced Nationally Determined Contribution to the UNFCCC provides Papua New Guinea’s targets on national climate change emissions reductions, as well as setting core targets for national adaptation to the impacts of climate change. The adaptation targets in the NDC target the agriculture, health, transport and infrastructure sectors, establishing four targets for achievement by 2030: <ul style="list-style-type: none"> a) in <i>agriculture</i> “10 percent of the total population (0.8 million beneficiaries (25 percent are women)) have increased resilience with respect to food and water security, health and well-being in Papua New Guinea”; b) in <i>health</i> “100 per cent of the population benefits from improved health measures to respond to malaria and other climate-sensitive diseases in Papua New Guinea”; c) in <i>transport</i> “US1.2 billion (PGK 4.2 billion) value of transport (air, sea, and land) infrastructure and assets built/rehabilitated according to climate-resilient codes and standards”; d) in <i>infrastructure</i> “6 million people (70 percent of the population) benefit from improved early warning systems/information to respond to extreme climate events” as well as “ US\$172 million (PGK 608 million) value of building and utility infrastructure assets built/rehabilitated according to climate-resilient codes and standards.”
National Strategy on Responsible Sustainable Development	National Strategy on Responsible Sustainable Development promotes sustainable development and management of natural resources to preserve Papua New Guinea’s environment and biodiversity via energy efficient (low carbon/carbon neutral) green growth paths for sustainable development in Papua New Guinea.

Medium Term Development Plan III (2018-2022)	The Medium-Term Development Plan III (2018-2022) sets out specific indicators and targets relating to the development of Papua New Guinea’s resources. All subsequent sectoral plans and programmes must align with or be consistent with these objectives, including forestry and climate change programs (under sections 2.1, 3.2, 3.3, 4.2 and 4.4). The Medium-Term Development Plan III will shortly be replaced with the Medium-Term Development Plan IV.
National Climate Compatible Development Management Policy 2014	The National Climate Compatible Development Management Policy preceded the Climate Change Management Act 2015 informs the basis for a NAP. The policy was the Government of Papua New Guinea’s blueprint to build a climate-resilient and carbon-neutral pathway through sustainable economic development by 2030 and become climate compatible by 2050.
Papua New Guinea’s Sustainable Development Goal 13 Roadmap	Papua New Guinea’s Sustainable Development Goal (SDG) 13 Roadmap (“take urgent action to combat climate change and its impacts”) outlines a path towards climate compatible development and reduced vulnerability to climate change. The roadmap targets action on reducing greenhouse gas emissions by 2030 including 30 specific actions to be completed between 2020 and 2030 to achieve SDG 13, as well as to make progress across all 17 of the SDGs.
Papua New Guinea Green Climate Fund Country Programme 2020	Papua New Guinea Green Climate Fund (GCF) Country Programme (CP) 2020 sets out country priorities in relation to the Green Climate Fund (GCF), as well as the current pipeline of investment and readiness projects. These priorities have been selected based on alignment with the GCF’s result areas and investment criteria. The Country Programme was developed by synthesising national climate change and development strategies and action plans, and by conducting intensive stakeholder engagement at the national and provincial levels. The Country Programme is in alignment with the priorities, goals and targets outlined throughout Papua New Guinea’s strategic documents relating to climate change, e.g., the National Climate Compatible Development Management Policy (NCCDMP) 2014, the Nationally Determined Contribution (NDC) 2015, the Medium-Term Development Plan III (2018-2022) and Papua New Guinea’s Vision 2050.
The National Disaster Risk Reduction Framework 2017-2030	The National Disaster Risk Reduction Framework (NDRRF) 2017-2030 provides policy and operational framework for risk prevention and reduction, inclusive of climate induced risks in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030. The NDRRF 2017-2030 articulates seven agreed national targets to be achieved by 2030. ⁵
The National Disaster Mitigation Policy 2019	The National Disaster Mitigation Policy 2019 aims to enhance the powers and functions of the Disaster Management Act (1984, currently under review) in its role in management of disasters and emergencies in Papua New Guinea and highlighting the need for a National Environment and Disaster Mitigation Authority. This policy

⁵Government of Papua New Guinea, 2017

Environment Act 2000	The <i>Environment Act 2000</i> governs and regulates the protection of the environment from the impacts of developmental activities to environment-conscience development, safeguarding environmental systems. The <i>Environment Act 2000</i> is integrated into the development and planning process, regulating development, and ensuring environmental protection through the permitting process required for economic activities covered under the <i>Environment (Prescribed Activities) Regulation 2002</i> , which will have impacts on the environment, including for adaptation activities under the NAP (Agriculture, Health, Transport, and Infrastructure).
The National Policy for Women and Gender Equality (2011-2015)	The National Policy for Women and Gender Equality (2011-2015) was aimed at providing strategic direction to advance gender mainstreaming and equality in Papua New Guinea. Although this policy does not address gender differentiated climate-induced risks and vulnerabilities, the policy provides the basis for improving and strengthening women’s rights within key sectors such as agriculture, while sensitising responsible sectoral institutions to incorporate gender-responsive considerations across levels of government.
National Public Service Gender Equity and Social Inclusion (GESI) Policy	National Public Service Gender Equity and Social Inclusion (GESI) Policy for the public service, focused on the prevention of gender discrimination and inequality across all central line agencies and departments in Papua New Guinea.
Organic Law on Provincial Governments and Local-level Governments	Organic Law on Provincial Governments and Local-level Governments 1998/ Amendment No.13 Law 2014 and all subsequent amendments provide the overarching legal framework for subnational levels of government, and implementing agencies, including in relation to provincial-level 5-year development plans. The Organic Law on Provincial and Local Level governments recognises the capacity of subnational tiers of government in terms of enacting appropriate laws at their level, provided they do not directly contradict National Laws, the provisions of the Constitution and certain provisions of the OL itself.
Framework for Resilient Development in the Pacific 2017-2030	The Framework for Resilient Development in the Pacific 2017-2030 provides an integrated framework for Pacific Islands nations on addressing climate change and disaster risk management, under high level strategic guidance on enhancing resilience to climate change and disaster within sustainable development.
National Oceans Policy	Working with the Maritime Zones Act 2015 seeks to improve the governance framework for the sustainable use and management of the oceans and its resources in PNG.

3.2 INTERNATIONAL LEGISLATION AND POLICY FRAMEWORKS

Alongside national-level efforts, Papua New Guinea has committed to international frameworks addressing climate change under the UNFCCC. At the international level, adaptation has taken a prominent role in the discussions under the UNFCCC. The Paris Agreement recognises in Article 7 the global goal on adaptation and that the current need for adaptation is significant. The Paris Agreement establishes that Parties shall, as appropriate, engage in adaptation planning processes and implementing actions, including developing NAPs (Article 7.9). Guided by these international commitments and Papua New Guinea’s national policy and legal frameworks, the Papua New Guinean government has undertaken diverse activities geared towards a national adaptation planning process.

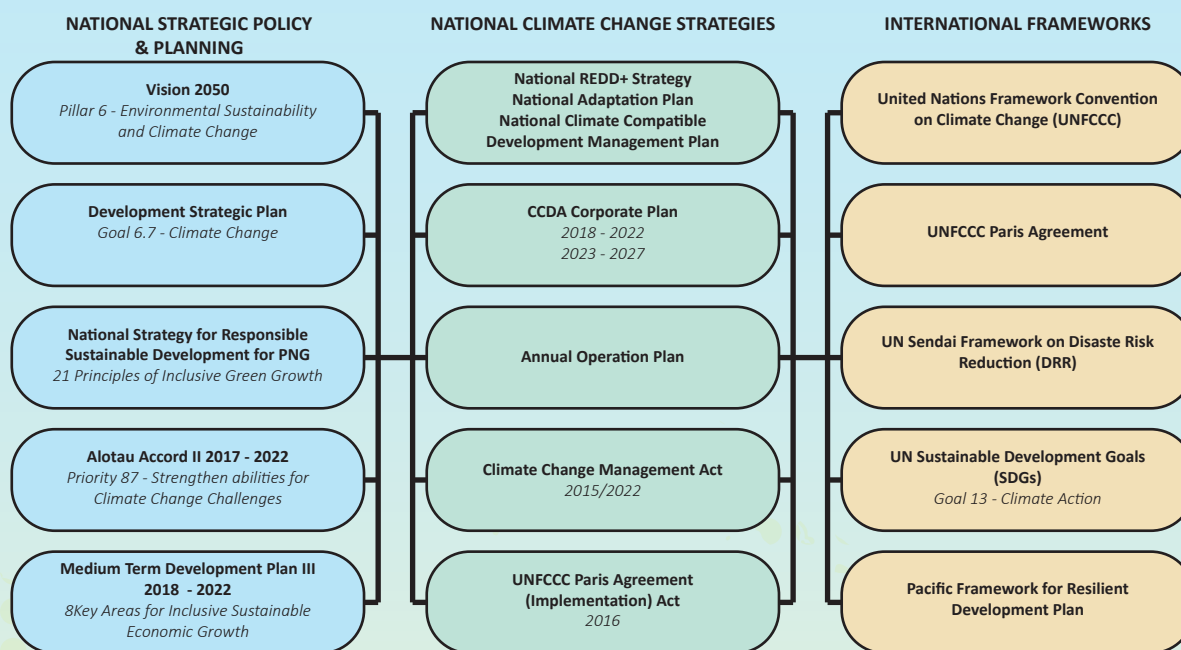


Figure 22 Relationship between Papua New Guinea's National and International Frameworks on Climate Change.

Papua New Guinea submitted its Initial National Communication (INC) to the UNFCCC in 2000, and in 2014 submitted its Second National Communication (SNC) to the UNFCCC, which already identifies adaptation as a high priority. The SNC identifies sea-level rise, agriculture and food security, landslides, and risks to public health as the greatest climate change impacts on the country. The SNC also outlines a diversity of approaches for effectively mainstreaming adaptation across sectors and levels of government. These include but are not limited to strengthened community resilience, particularly of local livelihoods, and reducing dependence on fragile natural resources; mainstreaming climate change considerations into national development planning; informing national planning according to climate impact information at global, regional and national scales, and; highlighting the need for adaptation given that climate change and variability pose a challenge for Papua New Guinea's development (Government of Papua New Guinea, 2014). Papua New Guinea's First Biennial Update Report (BUR) to the UNFCCC was submitted in 2018/9, providing an overview of the country's national circumstances and observed climate impacts. Papua New Guinea's Nationally Determined Contribution (NDC) and, most recently, the updated Enhanced NDC 2020 directly recognise adaptation to climate change as a high priority for the country. Submitted during the Conference of Parties (CoP) 26 in Glasgow in 2021, Papua New Guinea presented the Revised Enhanced NDC 2020 Implementation Plan, providing a concrete framework for the country to meet its mitigation and adaptation priority actions by 2030, and identifying nine predominant hazards that require strategic attention.

At the international level, Papua New Guinea's Enhanced NDC 2020 – 2030 underscores the country's high vulnerability to climate-induced hazards and prioritises four development sectors given their role in Papua New Guinea's economy and development priorities: agriculture, health, transport, and infrastructure. The Revised Enhanced NDC 2020 Implementation Plan underscores the role of NAP as the Implementation Roadmap for Adaptation. It reconfirms national goals and adaptation priority development sectors and actions (Government of Papua New Guinea, 2021). Accordingly, the Enhanced NDC established a series of adaptation targets by 2030, including:

- Ten per cent of the total population (0.8 million beneficiaries, 25 per cent of whom are women) have increased resilience concerning food and water security, health, and well-being in Papua New Guinea.
- One hundred per cent of the population benefits from improved health measures to respond to malaria and other climate-sensitive diseases in Papua New Guinea.
- US\$1.2 billion/PGK 4.2 billion value of transport (air, sea, and land) infrastructure built/rehabilitated according to climate-resilient codes and standards.
- Six million people (70 per cent of the population) benefit from improved early warning systems/information to respond to extreme climate events.

4. PAPUA NEW GUINEA'S NATIONAL ADAPTATION PLAN FORMULATION

The NAP takes a phased approach to implementation that considers the institutional frameworks, and the NAP priority sectors. Sectoral climate change adaptation priority areas outline Papua New Guinea's climate change adaptation priorities for expected climate impacts and adaptation targets, focusing on four priority sectors for the first phase: agriculture, health, transport, and infrastructure, and are accompanied by cross-cutting strategies in six areas. The critical sectoral priority actions and cross-cutting strategies have been formulated to ensure that Papua New Guinea's NAP both considers and adheres to key principles and objectives.

4.1 THE NATIONAL ADAPTATION PLAN PRINCIPLES AND GUIDING FRAMEWORK

Papua New Guinea's NAP is underpinned by core goals and principles of integral human development defined in the country's National Constitution, including equality and participation, national sovereignty and self-reliance, and Papua New Guinean ways.

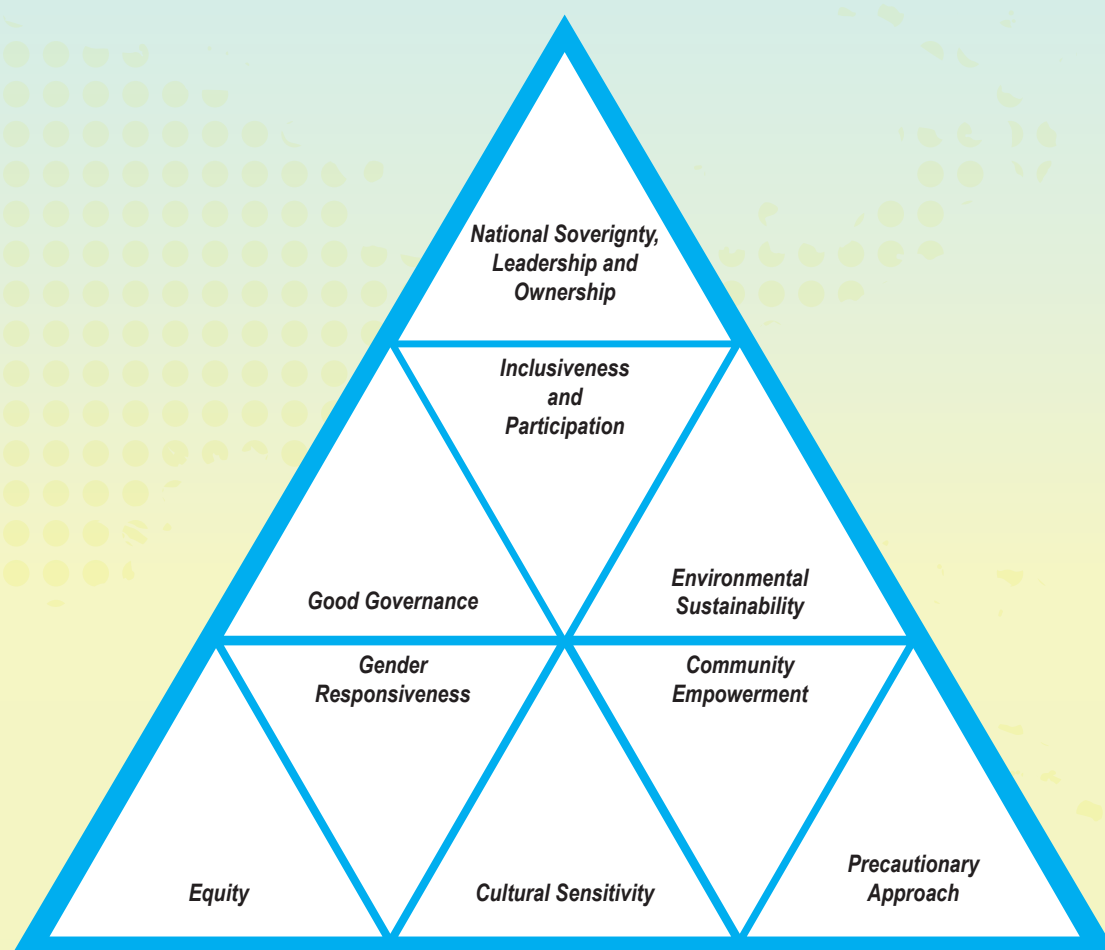


Figure 23 Papua New Guinea National Adaptation Plan Guiding Principles.

Ensuring the successful implementation of Papua New Guinea's NAP will require adherence to a set of governance, social, environmental and sustainability guiding principles (Figure 23) to achieve Papua New Guinea's adaptation priorities, objectives and goals: national sovereignty, leadership and ownership; inclusiveness and participation; good governance; environmental sustainability; gender responsiveness; community empowerment; gender responsiveness; community empowerment; equity; cultural sensitivity, and; a precautionary approach.

National adaptation planning can enable countries to assess their vulnerabilities, mainstream climate change risks, and address adaptation (UNFCCC, 2012). Under the UNFCCC process, Papua New Guinea's first NAP enables this by providing a strategic framework to support country-driven efforts to effectively mainstream adaptation to climate-induced risks within sectoral planning processes. NAPs are key planning instruments that support the development and assessment of options to reduce vulnerability to the adverse impacts of climate change and define implementation arrangements and financing sources for implementing these measures. These planning processes also seek to facilitate the integration of climate change adaptation into development planning processes and strategies across all relevant sectors and levels. Accordingly, the objectives of the NAP process set out in the UNFCCC decision relating to NAPs (Decision 5/CP.17 para 1) are to:

- Reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and
- Facilitate the integration of climate change adaptation into relevant policies, programmes and activities, particularly development planning processes and strategies, within all relevant sectors and at different levels.

Key steps and building blocks for the NAP process have been developed through the technical guidelines for the NAP process, taking into consideration vulnerable groups, communities, and ecosystems (Decision 5/CP.17, para 3). The UNFCCC has established guidelines for the formulation of national adaptation plans, including four key elements: 1) laying the groundwork and addressing gaps; 2) preparatory elements; 3) implementation strategies; and 4) reporting, monitoring, and review (Decision 5/CP.17). The development of the NAP and the objectives, outcomes, and outputs of the Advancing Papua New Guinea's NAP project supporting the development of the NAP, therefore, followed the guidance provided, including key elements considered integral. These elements include linking the implementation and development of NDC adaptation components with the NAP process, which has been identified as a good practice to strengthen adaptation action and promote policy coherence and clarity on national priorities. Similarly, alignment with Sustainable Development Goals has been sought, given the various intersections between Sustainable Development Goals (SDGs), NDCs and NAPs. Climate-resilient development is considered key to the broader sustainable agenda, providing opportunities to streamline efforts to achieve the SDGs. The NAP is intended to build capacities and be formulated with a country-driven, gender-sensitive, participatory and fully transparent approach. At the same time, gender responsiveness is one of the characteristics of an effective NAP.

Intended as a continuous and iterative process, adaptation planning is built on past experiences, current observations and advice, and future scientific projections to create robust adaptation plans and programs. Ensuring alignment of adaptation options with development planning is needed to streamline planning and promote policy coherence. The MTDP III seeks equal opportunities for all citizens to benefit from development (KRA 3.5), highlighting the need to address gender inequality and promote equal opportunities for women. Papua New Guinea's adaptation actions aim to comprise tangible and intangible activities that benefit targeted populations. These include smallholder farmers, micro, small and medium enterprises in business, community-based organisations, clans, and villages, and focusing on the most vulnerable groups, including women, children, youth, and persons with disabilities. It is vital to ensure a socially inclusive approach to climate change adaptation, so that adaptation measures do not exacerbate existing social inequalities. Therefore, planning and implementing adaptation actions considering mitigation and sustainable development benefits can help achieve positive benefits beyond climate change adaptation, such as conservation or improvement of ecosystems, job creation, reduced poverty, and better health. In addition, prioritising adaptation options that generate positive mitigation benefits can create synergies between mitigation and adaptation initiatives to support mitigation goals in the country.

4.2 THE NATIONAL ADAPTATION PLANNING FORMULATION PROCESS

In 2016, the Green Climate Fund (GCF) Board established the opportunity for countries to access up to USD 3 million per country through the GCF Readiness and Preparatory Support Programme. GCF has accordingly funded, as a key priority, the development of the National Adaptation Plan (NAP) and supporting framework through the Advancing Papua New Guinea's National Adaptation Plan project. The joint UNDP-UN Environment National Adaptation Plan Global Support Programme (NAP-GSP), funded by the Global Environment Facility (GEF), has assisted in identifying technical, institutional, and financial needs to integrate climate change adaptation into medium and long-term national planning and financing. In 2017, supported by USAID through the Climate Ready Project, Papua New Guinea started the development of a rapid baseline assessment on capacity and policy needs to support the national adaptation planning process. A series of stocktaking efforts and consultations were conducted, informing the preparation of a UNDP-implemented NAP proposal for GCF financing under its Readiness and Preparatory Support, approved in 2019, as well as informing Papua New Guinea's Country Programme under the GCF.

Commencing in 2020, the Advancing Papua New Guinea's National Adaptation Plan project built on earlier work to develop national adaptation capacities and planning. The Advancing Papua New Guinea's National Adaptation Plan project engaged in analysing the gaps needed for the NAP to address, assessing current national strategy, planning and policy, and capacity needs. A legal, institutional policy assessment and capacity development plan were developed as part of the NAP formulation⁶. Aside from the gap analysis for policy and planning, the capacity assessment looked at the needs of local, provincial, and national levels of government to implement climate change adaptation within the wide range of sectors needing to include and mainstream addressing climate change impacts within their future budgeting and planning. Several capacity training workshops followed this assessment for the national and provincial levels and the development of a broadly accessible training module by the University of Papua New Guinea for enhancing adaptation planning and action capacities⁷. Alongside these activities, the NAP formation as a consultative process has engaged validation by critical stakeholders across many sectors and endorsement through the National Executive Council (NEC) for Papua New Guinea. An overview of Papua New Guinea's NAP planning process is presented in Figure 24.

One national workshop and four regional workshops were held between June and August 2021, aimed at socialising adaptation mainstreaming into policy development and planning in Papua New Guinea. The national workshop included stakeholders from across government at national and provincial levels with an emphasis on priority sectors (agriculture, transport, health and infrastructure), as well as from CCDA, the Adaptation Technical Working Group (ATWG), and other relevant institutions. Despite COVID-19-related travel restrictions, regional workshops included stakeholders from subnational government authorities, provincial administrators, provincial disaster planning, planning, finance and budgeting divisions, development partners and other relevant institutions. The workshop allowed the CCDA, the ATWG, the Department of National Planning & Monitoring (DNPM) and other relevant institutions to engage, seek and provide feedback on the development of the NAP. As the NAP document was initially drafted following these workshops, the ATWG held a 3-day workshop in Loloata in late January 2022 to review a draft NAP document, as well as a follow-up session in Port Moresby in February 2022, with subsequent regular ongoing meetings throughout February to July to iteratively review and adjust the NAP tailored to feedback received. Supporting the provincial level capacity to implement the NAP activities, were then also three, week-long Capacity Development Training held during April – June 2022 in Port Moresby, Madang and Kokopo for the Southern, Highlands, Momase and New Guinea Island regions. Finally, ongoing engagement meetings to finalise the NAP with key sectoral stakeholders and a peer review process were undertaken throughout June and July. A National Validation Workshop was held in Port Moresby in August 2022, with national and provincial stakeholders participating. Finally, the NAP was submitted to the NEC for endorsement in November 2022.

⁶See www.cdda.gov.pg

⁷See www.cdda.gov.pg

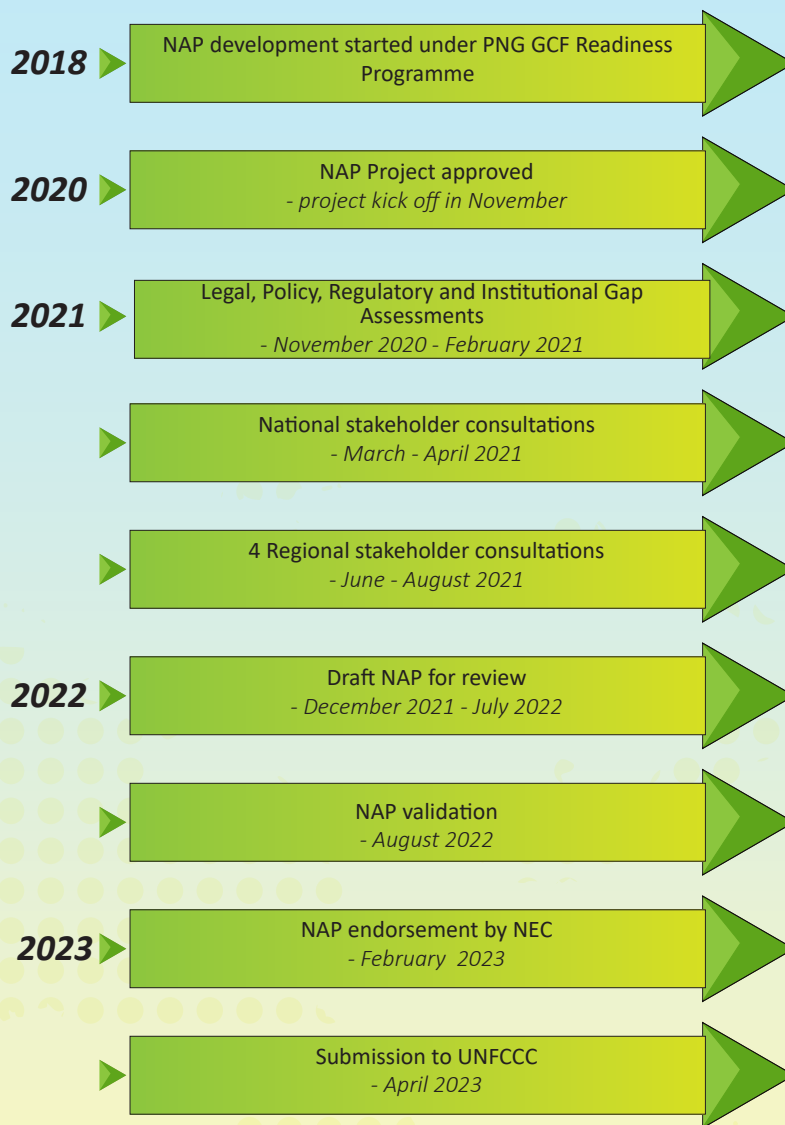


Figure 24: Papua New Guinea's national adaptation planning process and timeline



5. PAPUA NEW GUINEA'S NATIONAL ADAPTATION PLAN

The NAP 2022-2030 forms a comprehensive, continuous, gender-sensitive and iterative climate change adaptation planning process for Papua New Guinea that builds on past experiences, current observations, and scientific projections to inform robust climate change adaptation plans, strategies, and measures. Papua New Guinea's first NAP 2022-2030 has been conceived as a strategic and operational framework to enable Papua New Guinea's CCDA and other government departments to lead climate change adaptation efforts in advancing effective adaptation planning and action.

5.1 NATIONAL ADAPTATION PLAN OBJECTIVES AND OUTPUTS

The NAP supports the government's efforts to build a climate-resilient and compatible development pathway through increased social, environmental, and economic resilience to climate-induced risks through three objectives:

- i) Strengthen institutional capacities and the ability to effectively mainstream climate change adaptation and disaster risk reduction.
- ii) Build resilience at the national, subnational, and sectoral levels through information and awareness-raising, education, and capacity building, as well as the provision of early warning systems.
- iii) Facilitate resource mobilisation and foster public and private investment in climate change adaptation priority areas.

The NAP 2022-2030 sets about achieving these three objectives in five main outputs.

1. **Output 1:** Climate change adaptation is budgeted for, and plans developed at the sectoral and provincial levels.
2. **Output 2:** Papua New Guinea's climate change regulatory and coordination framework strengthened.
3. **Output 3:** Enhanced information, capacity building and awareness raising.
4. **Output 4:** Strengthened financial planning and resource mobilisation.
5. **Output 5:** Enhanced capacities for monitoring and evaluating climate change adaptation measures and impacts.

To achieve these, the Papua New Guinea NAP 2022-2030 takes a phased approach to implementation that considers the institutional frameworks and NAP priority sectors, through aligned adaptation targets and goals.

5.2 THE NATIONAL ADAPTATION PLAN TARGETS AND GOALS

The NAP establishes actions to be implemented through sectoral climate change adaptation plans under the Climate Change Management Act (CCMA)⁸ annually. These should incorporate priority climate change vulnerabilities and risks and address these as strengthened climate change adaptation compatible sectoral plans or as stand-alone adaptation sectoral plans. Adaptation plans for each regulated sector, as defined in the amended CCMA, should be prepared in a way that relevant priority climate change vulnerabilities and risks are identified, including adapting to climate-induced natural events; and identifying ways to participate in coastal early warning systems; community-based mangrove planting; coastal engineering protection; agricultural intervention; human settlement and migration; or protection of marine protected areas or marine reserves (CCMA, 2021). These adaptation plans will form strengthened climate change-compatible sectoral plans or stand-alone adaptation sectoral plans, as appropriate within the key sectoral and cross-cutting areas (Government of Papua New Guinea, 2021b).

⁸The Climate Change (Management) Act (under the 2022 Amendment) mandates the CCMA-regulated sectors to develop and implement a climate-compatible adaptation action plan on a yearly basis that is immediately actionable.

Through the close alignment of the NAP with the adaptation goals of the Enhanced NDC, the NAP will also operationalise the implementation of the national targets and goals contained within the Enhanced NDC:

10% of the total population (0.8 million beneficiaries (25% are women)) have increase resilience with respect to food and water security, health and well-being in Papua New Guinea

100% of the population benefits from improved health measures to respond to malaria and other climate-sensitive diseases in Papua New Guinea

US \$1.2b (PGK 4.2b) value of transport (air, sea and land) infrastructure built or rehabilitated according to climate-resilient codes and standards

US \$172m (PGK 608m) value of building and utility infrastructure assets built/rehabilitated according to climate-resilient codes and standards

6 million people (70% of the population) benefit from improved early warning systems/information to respond to extreme climate events

Figure 25: Adaptation targets have been established throughout the national policy, such as the Enhanced NDC.

To strengthen adaptation action and target efforts to address the expected impacts of climate change in Papua New Guinea, mainstreaming and adaptation options in sector-specific adaptation plans must be consistent with Papua New Guinea’s nine adaptation priority areas.

These priority area sectors for the NAP’s first phase have also been defined in the Revised Enhanced Nationally Determined Contribution (NDC) 2020 adaptation targets to the UNFCCC. Thus, implementing strategic actions under climate change adaptation priority areas in agriculture, health, transport, and infrastructure is an immediate priority. The nine adaptation priority areas within the priority sectors are summarised in Table 5 below.

Table 5 Key priority adaptation areas in Papua New Guinea and links to priority sectors in the NAP

Adaptation priority areas	Priority sectors			
	Agriculture	Health	Transport	Infrastructure
1. Coastal flooding and sea level rise	●	●	●	●
2. Inland flooding	●	●	●	●
3. Food insecurity	●	●		
4. Cities and climate change		●	●	●
5. Climate-induced migration		●	●	●
6. Damage to coral reefs	●			●
7. Malaria and vector-borne diseases		●		
8. Water and sanitation		●		●
9. Landslides		●	●	●

Source: adapted from Papua New Guinea’s Enhanced NDC.

5.3 CLIMATE CHANGE ADAPTATION PRIORITIES FOR THE 2022-2030 PERIOD

Papua New Guinea's commitment to adaptation for the 2022-2030 period emphasises four key priority development sectors: agriculture, health, transport, and infrastructure, as the focus of climate change adaptation efforts, noting their priority in Papua New Guinea's economy and development priorities.



AGRICULTURE

Papua New Guinea's population is primarily dispersed across islands and remote areas, relying on subsistence farming for their livelihoods. Rural economies and agricultural production in Papua New Guinea continue to be highly vulnerable to climate-induced disasters. Agriculture is a priority sector in Papua New Guinea, given its importance for rural livelihoods, particularly food security, and as an essential export commodity. An estimated 20 per cent of the population practices intensive commercial agriculture in rural landscapes. Subsistence and smallholder agricultural practices provide a source of income for over 80 per cent of Papua New Guinea's population, mainly from small-scale crops such as coffee, cocoa, sugar, copra, oil palm, rubber, and fresh vegetables (Government of Papua New Guinea, 2020b). The agricultural sector accounts for approximately a quarter of Papua New Guinea's GDP (PWC, 2022). Although Papua New Guinea's land mass is extensive and fertile due to the volcanic soil in most parts of the country, only around 30 per cent is agriculturally viable due to mountainous landscapes and localised climatic conditions, including long dry seasons, heavy rainfall, or excessive cloud cover (Government of Papua New Guinea, 2018). Women also traditionally dominate subsistence farming requiring that climate change adaptation is gender-responsive adaptation measures designed and implemented should ensure women's participation and empowerment. Therefore, enhancing food security is critical for Papua New Guinea's sustainable development and growth.



TRANSPORT

Given its importance for the economy and overall services for the general population, enhancing the transport sector's ability to adapt to climate-induced impacts is crucial to ensure these public services are not disrupted. Due to the dispersed geographical distribution of Papua New Guinea's population, the transport and infrastructure sectors play a vital role in the economy, both as significant drivers in facilitating the logistics of economic growth and via the provision and distribution of services to the general population. The transport sector is crucial regarding the overall provision of services to the country and its general contribution to the economy. It provides services essential for the general population who rely on them for their daily livelihoods. Means of transportation in Papua New Guinea include road, air, and water. Passenger vehicles account for 20 per cent of road vehicles, government vehicles 15 per cent, and private use vehicles 65 per cent. Air transport in Papua New Guinea includes twenty national and one international airport, all operated by the National Airports Corporation. Another six airports are used for mining and gas operations. Regarding maritime and inland water transportation, Papua New Guinea hosts 22 ports operated by the country's Ports Corporation. Some smaller private ports provide services for extractive industries (Government of Papua New Guinea, 2018).



INFRASTRUCTURE

Infrastructure is an essential driver of economic growth and development in Papua New Guinea. Papua New Guinea's challenging geography comprising mountainous areas and remote islands with a scattered population requires massive investment for connecting rural people to urban areas throughout the country. Investing in climate-resilient infrastructure is essential for lasting and enhanced economic growth and ensuring access by the population to economic and social services. The development of climate-resilient infrastructure is an important priority of the Government of Papua New Guinea. It will contribute to achieving economic development and strengthening other sectors' resilience, for instance, agricultural producers and rural communities. In prioritising the infrastructure sector, the NAP will also contribute to the achievement of the goals and targets of the National Climate Compatible Development Management Policy (2014), the National Road Network Strategy (2018-2037), and the MTDP III (2018-2022). Papua New Guinea's 2022 National Budget reiterates the political commitment to continue supporting critical development and infrastructure

programs across the country, providing an opportunity to support sectoral adaptation strategies under the NAP with domestic funding, for instance, by supporting the Connect Papua New Guinea initiative⁹.

Moreover, given the intricate connection between the transport and infrastructure sectors, where climate-resilience infrastructure (roads, bridges, jetties, wharves, airstrips, etc) enables climate-resilience economic activities, improved coordination between these two priority sectors will be essential for mainstreaming climate change adaptation for the country, accessing to climate finance for climate-proofing Papua New Guinea's infrastructure, and ultimately promoting co-benefits on economic growth and poverty alleviation.

HEALTH

The health sector is at the core of Papua New Guinea's Vision 2050, "for a happy, healthy and wealthy society by 2050", and is one of Papua New Guinea's highest development priorities when considering the 2022 National Budget. As a result of increased average temperatures, particularly those rising in areas such as the

highlands of Papua New Guinea, Papua New Guinea is at risk of increased malaria infection rates, including in these previously risk-free regions. For example, the increased cost for the health sector is likely to reach estimated costs to the government of Papua New Guinea of over USD 210 million by 2030. Increased climate hazards such as sea-level rise, drought, inland flooding, landslides, and higher temperatures pose a significant threat to public health, including environmental drivers of vector and water-borne diseases. Diarrheal disease is a significant health risk in Papua New Guinea. Around three in every 1,000 children die before the age of five due to diarrheal disease, and it is the cause of about 5 per cent of hospital admissions. A primary driver is the lack of essential clean water supply and sanitation services, and global research relates floods and droughts to increased incidence of diarrheal disease. The rise in temperatures poses a significant risk for public health, as it has led to an increase in the malaria infection rate from 27 per cent to 29–31 per cent in 2015 – mainly due to a shift of endemic and epidemic malaria zones to higher elevations (Government of Papua New Guinea, 2014). The World Food Program (WFP) estimates that without adaptation, the risk of hunger and child malnutrition on a global scale could increase by 20 per cent, respectively, by 2050 (WFP, 2022). In Papua New Guinea, extreme weather events and climate disasters are becoming more frequent, with food shortages commonly experienced by many rural communities in Papua New Guinea. Thus, enhancing climate change adaptation action in the health sector in Papua New Guinea is crucial to address the needs of vulnerable persons, recognising the critical role of the health sector in climate change, health protection and well-being, as well as its contribution to growth and productivity in Papua New Guinea.



⁹The Connect Papua New Guinea Development Infrastructure Program 2020-2040 aims to enhance support for sustainable socio-economic development and national cohesion and unity by connecting Papua New Guinea's four main regions over the next 20 years. <https://Papua New Guinea.highcommission.gov.au/pmsb/1154.html>

Sectoral Priority Area 1: CLIMATE-RESILIENT AGRICULTURE

Target 1: 10 per cent of the total population (0.8 million beneficiaries, 25 per cent are women) have increased resilience with respect to food and water security, health, and well-being in Papua New Guinea

Strategic action		Implementing entity	Supporting entity	Activities	Timeframe
CLIMATE-RESILIENT AGRICULTURE					
1.1 Scale-up climate-smart agriculture best practices and action in vulnerable regions of Papua New Guinea.	DAL	NARI CEPA NFA		<ul style="list-style-type: none"> Finalisation of the Climate Smart Agriculture Policy Encourage implementation of conservation agriculture and integrated farming systems. Promote and implement indigenous coping strategies to drought and introduce new crop varieties that can extend the tolerance range of crop growing conditions (e.g., drought, excess moisture, saline soil conditions and higher temperatures). Research and development of resilient varieties. Establishment of seed banks. Improve extension services and dissemination of information. Training, improving information and knowledge management and agricultural extension 	<ul style="list-style-type: none"> Immediate (2023-2026)
1.2 Implement climate resilient water management & conservation strategies/systems	DAL	CEPA		<ul style="list-style-type: none"> Protect and enhance water sources and strengthen water and soil use management Water efficient irrigation and improved water use Improve water access (digging of wells, water collection, rainwater harvesting, kitchen gardens with recycling of water, etc). 	<ul style="list-style-type: none"> Mid (2026-2028)
1.3 Develop climate-resilient agricultural value chain/value chain/market infrastructure, market information and business support services to enhance food security and the resilience of vulnerable farmers.	DAL	DoWH DoT NARI		<ul style="list-style-type: none"> Development of climate-resilient infrastructure (e.g., supporting linkages between farmers to markets). Expand climate resilient post-harvest processing/storage techniques and facilities and improve supply and market access. Build capacity in small scale food processing, preservation and storage at household and community levels. Encourage and support the formation of small and medium enterprises (SME) in the food sector. Establishment of farmer co-operatives and microcredit facilities. Incorporation of agriculture risk insurance into all production, supply and value adding, transportation and marketing systems. 	<ul style="list-style-type: none"> Mid (2026-2028)
1.4 Increase sustainable income generating opportunities for women and diversify economies to reduce risks of climate impacts and improve access to food for children and families.	DAL	DoCDR NARI		<ul style="list-style-type: none"> Diversify and implement climate resilient livelihoods practices/strategies, focusing on women. Improve women's access to extension services, technology, inputs, markets, and information. Expand microfinance access and small enterprise creation, mentoring and support programs for women. 	<ul style="list-style-type: none"> Immediate (2023-2026)

Table 6 Agriculture priority area climate change adaptation implementation actions

A thriving and climate-resilient agricultural sector is crucial to achieving Papua New Guinea’s vision of climate-compatible development pathways while reducing poverty, ensuring food security, and promoting sustainable socio-economic development in rural areas. Enhancing smallholder productivity, production capacity, and competitiveness of value chains will be critical to protecting and sustaining food security in Papua New Guinea (Government of Papua New Guinea, 2018). Climate change adaptation interventions should strengthen the resilience of agriculture-dependent communities and agribusiness to climate change and associated risks whilst fostering wealth creation and enhancing food security, underpinned by sustainability principles. To do so, sectors will need to identify a portfolio of sector-specific climate change adaptation options tailored to local conditions and context, from the farm size and market conditions to the overall value chain. In addition, agriculture is a critical sector for enhancing women’s resilience to climate change as key stakeholders in subsistence agricultural production. So, this sectoral priority area provides opportunities to foster gender-responsive sectoral climate change adaptation options while strengthening women’s control and management of resources.

Sectoral Priority Area 2: CLIMATE-RESILIENT INFRASTRUCTURE

Goal 2: Enhance the resilience of infrastructure to protect physical assets and communities and enhance livelihoods.

Target: USD 172 million (PGK 608 million) value of building and utility infrastructure assets built/rehabilitated according to climate-resilient codes and standards

CLIMATE-RESILIENT INFRASTRUCTURE				
Strategic action	Implementing entity	Supporting entity	Activities	Timeframe
2.1 Develop climate-resilient codes and standards for the construction/rehabilitation of buildings and transport and utility infrastructure	DoWH	DoT NDoH CCDA CEPA NWS	<ul style="list-style-type: none"> Conduct a rigorous risk and vulnerability assessment including inland road network, coastal roads, and buildings. Develop an asset-at-risk inventory and management plans Update road design standards including climate change considerations Develop/update building codes to address the variety of hazards that are likely to result from climate change 	<ul style="list-style-type: none"> Mid (2026-2028)
2.2 Build/rehabilitate urban and coastal infrastructure according to climate resilient codes and standards for increased resilience of physical assets, communities and livelihoods	DoWH	DoT CCDA CEPA	<ul style="list-style-type: none"> Coastal defence structures (including construction of seawalls). Include climate change considerations in urban development plans to restrict development and redevelopment in risk-prone areas 	<ul style="list-style-type: none"> Long-term and ongoing (2028-2030)
2.3 Improve water and sanitation infrastructure and services to meet demand considering expected climate impacts	DoWH	WaterPNG NDoH CCDA DNPM CEPA	<ul style="list-style-type: none"> Develop long-term assessments of potential water supply threats (such as droughts, saltwater intrusion, and flooding) and implement strategies to increase resilience to these threats and ensure long-term availability of water. Improve water and sanitation infrastructure to enhance access to safe water supply and sanitation facilities Improvements in storm water and drainage systems 	<ul style="list-style-type: none"> Mid (2026-2028)

Table 7 Infrastructure priority area climate change adaptation implementation actions

Climate change risks important infrastructure assets such as ports, roads, power, sanitation and sewage facilities and systems. To reduce the vulnerability of physical assets, systems and communities, infrastructure investments need to directly build resilience (e.g., storm-water drainage or protection against sea-level rise), foster improvements in water use efficiency and integrate new climate risks at different levels of planning and operation. Climate-proofing existing infrastructure and building new climate-resilient infrastructure represent cost-effective investments as upfront costs can increase by about 3% but has benefit-cost ratios of about 4:1 (GCA, WRI 2019). Climate-proofing infrastructure in Papua New Guinea can also support development efforts by improving economic connectivity and strengthening poverty reduction efforts (Government of Papua New Guinea, 2020)

Sectoral Priority Area 3: CLIMATE-RESILIENT TRANSPORT

Goal 2: Enhance the resilience of infrastructure to protect physical assets and communities and enhance livelihoods.

Target: US\$ 1.2 billion (PGK 4.2 billion) value of transport (air, sea, and land) infrastructure built/rehabilitated according to climate-resilience codes and standards

CLIMATE-RESILIENT TRANSPORT		Strategic action	Implementing entity	Supporting entity	Activities	Timeframe
	3.1 Develop climate-resilient codes and standards for the construction/rehabilitation of buildings and transport and utility infrastructure	DoWH	DoT NDoH CCDA CEPA LDPP	<ul style="list-style-type: none"> Conduct a rigorous risk and vulnerability assessment including inland road network, coastal roads and buildings. Develop an asset at risk inventory and management plans. Update road design standards including climate change considerations. Develop/update building codes to address the variety of hazards that are likely to result from climate change. 	<ul style="list-style-type: none"> Mid (2026-2028) 	
	3.2 Build/rehabilitate transport infrastructure according to climate resilient codes and standards	DoT	DoWH CCDA CEPA NCDC Provincial Authorities LDPP	<ul style="list-style-type: none"> Design and/or management of the 4 wharves in partnership with development partners. Construction and/or rehabilitation of climate resilient roads, bridges and culverts according to climate resilient standards. Design and/or manage the rehabilitation of airports to international and climate resilient standards. 	<ul style="list-style-type: none"> Long-term and ongoing (2028-2030) 	

Table 8 Transport priority area climate change adaptation implementation actions

The transport sector is crucial regarding the overall provision of services to the country and general contribution to the economy. It provides services essential for the general population who rely on them for their daily livelihoods. Enhancing climate-proofing of existing and new infrastructure will be essential to enhance Papua New Guinea's overall resilience to climate change. The transport sector has been prioritised for rehabilitating critical transport infrastructure to be climate-robust and improving the resilience of transport infrastructure for the use and safety of the public, economy, and essential livelihoods.

Sectoral Priority Area 4: HEALTH SECTOR RESPONSIVE TO CLIMATE CHANGE DRIVEN HEALTH IMPACTS

Strategic action		Implementing entity	Supporting entity	Activities	Timeframe
HEALTH SECTOR RESPONSIVE TO CLIMATE CHANGE DRIVEN HEALTH IMPACTS					
4.1 Evidence-based planning and decision-making to develop climate change adaptation strategies in the health sector.	NDoH	PHAS PNG IMR		<ul style="list-style-type: none"> Develop standardized assessment tools to assess health impacts of environment and climate change to obtain comparable data for planning, evaluations, and reporting. Conduct vulnerability and adaptation assessments using standardized approaches to develop a national climate change and health profile. Develop strategies and systems to improve monitoring of health impacts of climate change to set priorities for Papua New Guinea based on evidence. Establish climate-health information system. Assess and estimate the cost of climate change impacts on health. 	<ul style="list-style-type: none"> Immediate (2023-2026)
4.2 Improve environmental health services promoting climate change adaptation and reduction of climate risks.	NDoH	PHAS PNG IMR		<ul style="list-style-type: none"> Strengthen environmental health programs to include primary health care and preventive health services, environmental health in emergencies, disaster risk management in health, communicable and non-communicable diseases. Develop investment case for climate-health resilience building on evidence-based information. Strengthen public health systems and climate related disaster preparedness and response capacities. 	<ul style="list-style-type: none"> Mid (2026-2028)
4.3 Improve the climate resilience of health infrastructure.	NDoH	DoWH		<ul style="list-style-type: none"> Develop detailed investment plans informed by sound economic analyses, inclusive of existing resources, costs and gaps to increase resilience of health-care facilities. Rehabilitate and refurbish priority health infrastructure identified to meet the National Health Service Standards. 	<ul style="list-style-type: none"> Mid (2026-2028)
4.4 Scale-up measures for the prevention and control of malaria and other climate-sensitive diseases.	NDoH	PHAS PNG IMR		<ul style="list-style-type: none"> Maximize access to prompt quality diagnosis and appropriate treatment for malaria. Maintain high coverage of LLINs and increase the utilization of appropriate malaria prevention measures. Strengthen malaria program management at all levels with district level as priority. Strengthen malaria advocacy, communication, and social mobilization. 	<ul style="list-style-type: none"> Immediate (2023-2026)

Table 9 Health priority area climate change adaptation implementation actions

Papua New Guinea seeks to achieve an efficient health system that can deliver an internationally acceptable standard of health services. Thus, improving access to health services is critical for achieving health outcomes. Existing health risks are amplified by climate change, so strengthening the health sector's capacity to respond effectively to climate-sensitive diseases is urgent. There are significant challenges in environmental health management in Papua New Guinea, as the environmental health area has been traditionally neglected in public health, and there are limited resources, capacities and evidence-based information systems for planning and decision-making. Increasing climate variability and change are expected to increase the risk of healthcare costs. Therefore, country-tailored approaches to assess and estimate the cost of climate change impacts on health are essential to building economic evidence to inform decision-making and foster scaled-up investments for a climate-resilient health sector in Papua New Guinea. Climate-resilient health facilities are crucial for addressing emerging and future health challenges from climate change.



5.4 CROSS-CUTTING CLIMATE CHANGE ADAPTATION STRATEGIES

As a strategic and operational framework to support country-led efforts to achieve Papua New Guinea’s adaptation goals and successfully mainstream climate change adaptation in sectoral planning processes and instruments, the NAP also defines a series of cross-cutting strategies. Cross-cutting climate change adaptation strategies aim to enable the effective and sustained implementation of climate change adaptation measures by providing solutions and addressing policy, institutional, coordination and technical barriers across sectors and levels of government with a whole-of-society approach. Given the cross-cutting, multi-stakeholder and multi-level nature of climate change adaptation, the operationalisation of the NAP will require a diversity of mutually reinforcing efforts across different levels of government and with the participation of a variety of actors, including civil society, academia and research institutions, the private sector and local stakeholders. The NAP’s cross-cutting strategies aim to enable the effective and sustained implementation of sectoral strategic areas while addressing policy, institutional, coordination and technical barriers across sectors and levels of government with a whole-of-society approach.

Cross-cutting Area 1: MAINSTREAMING ADAPTATION AND RESILIENCE

Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
MAINSTREAMING ADAPTATION AND RESILIENCE	Strategy Action 1.1: Mainstreaming climate change adaptation into sectoral and provincial plans.	<ul style="list-style-type: none"> • Prepare sectoral climate change adaptation plans according to the “Sectoral Guidelines for Planning for Climate Change Adaptation”. • Prepare provincial climate change adaptation plans consistent with Council Wards and Districts and facilitated by Provincial Authorities. 	<ul style="list-style-type: none"> • CCDA 	<ul style="list-style-type: none"> • DPLLG • DNPM • CCDA 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)
	Strategy Action 1.2: Strengthen Papua New Guinea’s regulatory framework	<ul style="list-style-type: none"> • Streamline climate change in relevant sectoral policies (e.g., review, finalise, adopt, and enforce the Draft Climate Smart Agricultural Policy; develop a dedicated climate resilience policy in the infrastructure and transport sectors; finalise and enact the draft National Environmental Health Policy and Papua New Guinea’s Strategy and Action Plan on Climate Change and Health). • Strengthen and/or develop regulations and standards (e.g., integrate climate change adaptation standards within EIAs, developing Climate Resilient Infrastructure Standards Regulation, sectoral climate compatible standards). 	<ul style="list-style-type: none"> • CCDA 	<ul style="list-style-type: none"> • Office of the State Solicitor • DPLLG • CCDA 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)
	Strategy Action 1.3: Improve financing planning	<ul style="list-style-type: none"> • Strengthen the Public Financial Management (PFM) system to improve effective allocation and use and resources for climate change adaptation. • Align sectoral climate change adaptation plans with sectoral budgets to provide a basis for tracking implementation and financing for climate change adaptation (e.g., strengthening the links between plans and budgets, improving the budget preparation and consultation process). 	<ul style="list-style-type: none"> • CCDA 	<ul style="list-style-type: none"> • DoT • DNPM • CCDA 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)

Table 10 Mainstreaming of climate change adaptation and resilience strategies to enable the implementation of climate change adaptation action

The NAP seeks to foster the effective integration of climate change adaptation and disaster risk prevention and management into national and provincial planning and budgeting processes across sectors and levels of government. Strategic actions under this cross-cutting area aim to address barriers related to limited alignment and integration across policies, the absence of effective means to translate a diverse and evolving policy landscape into tangible and pragmatic actions on the ground, and the limited availability of a comprehensive and coherent approach to adaptation planning and budgeting processes. A detailed list of entry point opportunities to strengthen Papua New Guinea’s policy and regulatory framework is included in Annex 1 and may inform sectoral climate change adaptation planning efforts.

Cross-cutting Area 2: CLIMATE AND ADAPTATION GOVERNANCE

Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
CLIMATE AND ADAPTATION GOVERNANCE	Strategy Action 2.1: Strengthen and operationalize decision-making and coordination arrangements	<ul style="list-style-type: none"> • Strengthen the Adaptation Technical Working Committee (ATWC) to ensure consistency with the NAP, including in terms of objectives, roles and responsibilities and composition. • Designation of high-level / political focal points in each sectoral entity, at both decision-making and technical level. • Establish Sectoral climate change adaptation Core Teams to design and track progress of sectoral climate change adaptation plans, associated regulations, and standards (see Sectoral Planning Guidelines). 	<ul style="list-style-type: none"> • CCDA • DFAIT 	<ul style="list-style-type: none"> • CCDA • DPLLG 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)

Table 11 Climate and adaptation governance strategies to enable the implementation of climate change adaptation action

The Cross-cutting Area 2 of Climate and Adaptation Governance aims to foster a robust and operational governance framework that facilitates policy integration, interinstitutional coordination, and participation of relevant non-governmental stakeholders, including civil society, academia and research institutions, the private sector, and local stakeholders. Strategic actions under this cross-cutting area aim to address challenges related to the institutionalisation, representation and operation of the institutional framework established to facilitate decision-making and inter-institutional collaboration and coordination. A detailed overview listing potential entry points for strengthening governance and coordination are included in Annex 1.

Cross-cutting Area 3: INFORMATION, EDUCATION, CAPACITY BUILDING AND AWARENESS-RAISING

Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
INFORMATION, CAPACITY BUILDING AND AWARENESS RAISING	Strategy Action 3.1: Increase institutional and technical capacities for climate change adaptation	<ul style="list-style-type: none"> • Implement the NAP's capacity development plan, with a focus on priority sectors and consider provinces at the Ward and District Level and other State Agencies that will be supporting the Sectors with the implementation, such as CEPA. • Strengthen the CCDA's institutional capacities to foster its ability to lead the implementation of the NAP and oversee the coordinated design and implementation of sectoral climate change adaptation actions in priority sectors, including in relation to the design and implementation of sectoral climate change adaptation plans in application of the Sectoral Planning Guidelines. • Facilitate high-level dialogues across sectors to foster and accelerate climate change adaptation action. 	<ul style="list-style-type: none"> • CCDA • DFAIT 	<ul style="list-style-type: none"> • CACC • CCDA 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)
	Strategy Action 3.2: Awareness raising and education at the local level	<ul style="list-style-type: none"> • Integrate targeted efforts for continuous information dissemination and awareness raising activities on climate-induced impacts and opportunities to engage in the design and implementation of climate change adaptation actions. • Integrate basic concepts of climate change mitigation and adaptation within primary and high school curriculum development (via the Department of Higher Education, Research, Science and Technology (DHERST) and the Department of Education (DoE)). • Include the DHERST as a member of the ATWC in a key advisory role. • Collaborate with the DHERST in the design of education and awareness raising material on climate change, climate-induced impacts and climate change adaptation options, targeted for the provincial and local community level. 	<ul style="list-style-type: none"> • CCDA 	<ul style="list-style-type: none"> • CCDA • DHERST • DoE • DPLLG • CSOs • NARI • NWS • NDC 	<ul style="list-style-type: none"> • Immediate (2023-2026) • Mid (2026-2028) • Long-term and ongoing (2028-2030)

Table 12 Information, capacity building and awareness strategies to enable the implementation of climate change adaptation action

<p>Strategy Action 3.3: Strengthen climate information research and knowledge generation</p>	<ul style="list-style-type: none"> Facilitate coordinated, interdisciplinary, and continuous research that provides information on climate related impacts, technologies and potential solutions to adapt to climate change to inform policy decision-making and implementation in priority sectors. Establish a climate research and information working committee under the NCCB to facilitate 	<ul style="list-style-type: none"> CCDA DHERST 	<ul style="list-style-type: none"> DPLLG CCDA NARI 	<ul style="list-style-type: none"> Immediate (2023-2026) Mid (2026-2028) Long-term and ongoing (2028-2030)
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Information, capacity building and awareness-raising aim to improve understanding of climate-induced risks and increase capacities to implement climate change adaptation actions across governmental entities at the national and subnational level, as well as across members of the society, in a way that enhances their ability to prevent and respond to climate-induced impacts. Papua New Guinea has undertaken significant efforts to assess institutional capacities and identify options to address existing gaps to enhance climate action. As part of these efforts, Papua New Guinea has identified the need for developing a robust base of individual capacities and skills across institutions to design, implement and monitor climate change adaptation actions across sectors, which will be essential to achieving the objectives of the NAP. Such capacity development needs have been captured in a climate change adaptation capacity development plan prepared as part of the national adaptation planning, which will be instrumental in strengthening the institutional ability to effectively mainstream climate change adaptation in sectoral policies and instruments.

Target: 10 per cent of the total population (0.8 million beneficiaries, 25 per cent are women) have increased resilience with respect to food and water security, health, and well-being in Papua New Guinea					
Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
GENDER-RESPONSIVENESS	<p>Strategy Action 4.1: Conduct sector-specific gender gap assessments</p>	<ul style="list-style-type: none"> Conduct sector-specific gender gap assessments when setting the ground for the development of sectoral climate change adaptation plans to ensure the NAP and sectoral climate change adaptation plans and actions are responsive to the differentiated vulnerabilities, needs and capacities of both men and women alike. Ensure women representation and participation in climate change adaptation national and sectoral decision-making platforms in relation to the NAP and sectoral climate change adaptation plans and actions. Ensure gender-equitable access to financial resources and other benefits from climate finance for climate change adaptation. 	<ul style="list-style-type: none"> CCDA 	<ul style="list-style-type: none"> DCDYR DPLLG CCDA 	<ul style="list-style-type: none"> Immediate (2023-2026)

Table 13 Gender responsive strategies to enable the implementation of climate change adaptation action

Gender responsiveness is inclusive not just in terms of equal participation but ensures all sectoral climate change adaptation plans and actions are responsive to the differentiated vulnerabilities, needs and capacities of both men and women. This includes ensuring gender-responsive planning, budgeting, and implementation process, promoting full, effective, and informed participation in both the development and implementation of sectoral climate change adaptation plans and actions. Ensuring gender-responsive implementation of the NAP will require women's representation and participation in decision-making platforms to prioritise sectoral climate change adaptation options and measures to be implemented at the community level. Effective participation will also require efforts to raise awareness-raising and disseminate information, training and other capacity-building measures targeting women. Gender-responsiveness and inclusiveness ensure the recognition of women as agents of change in the community, reflecting the view of other vulnerable/marginalised groups. A gender-responsive approach to developing, monitoring and evaluating sectoral climate change adaptation plans can provide an opportunity to effectively promote or foster gender equality in i) the recognition of gender differences in adaptation needs and capacities; ii) gender-equitable participation and influence in adaptation decision-making processes, and; iii) gender-equitable access to financial resources and other benefits resulting from investments in adaptation (GGGI, 2020; UNFCCC, 2020; UNDP, 2020).

Cross-cutting Area 5: CLIMATE - RESILIENT TERRESTRIAL, COASTAL AND MARINE ECOSYSTEMS

Goal 5: Improve conservation, restoration and management of terrestrial and coastal ecosystems to protect livelihoods and communities

Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
CLIMATE-RESILIENT TERRESTRIAL, COASTAL & MARINE ECOSYSTEMS	Strategy Action 5.1 Improve the management of coastal and inland fisheries and support the development of sustainable value chains	<ul style="list-style-type: none"> Develop and implement ecosystem-based approaches for the management of fisheries. Support the development of sustainable aquaculture and the value chains for their outputs. Improve research, extension services and marketing capacities to support vulnerable fishers and SMEs manage climate risks. 	<ul style="list-style-type: none"> NMSA NOO NFA 	<ul style="list-style-type: none"> CCDA 	<ul style="list-style-type: none"> Mid (2026-2028)
	Strategy Action 5.2 Coastal rehabilitation and protection to enhance resilience of coastal communities and ecosystems.	<ul style="list-style-type: none"> Mangrove management and rehabilitation. Planting of sea grass and coral replanting, rehabilitation, and protection. Establishment of marine protected areas (MPAs), locally managed marine areas (LMMA). Development of sustainable reef to ridge programme to enhance the resilience of vulnerable communities to improve food and water security. Protection and promotion of biodiversity conservation through EbA approaches. 	<ul style="list-style-type: none"> CEPA NMSA NOO 	<ul style="list-style-type: none"> PNG FA 	<ul style="list-style-type: none"> Mid (2026-2028)
	Strategy Action 5.3 Protection, restoration and sustainable management of forest resources and biodiversity to reduce vulnerability and enhance natural capital	<ul style="list-style-type: none"> Protection and restoration of terrestrial landscapes, biodiversity and degraded ecosystems through ecosystem-based adaptation (EbA) approaches. Develop strategies to protect forests from climate-related risks such as pest, disease, and forest fires. Development of terrestrial protected areas to enhance ecosystem services and community resilience and livelihoods. Reforestation and soil stabilization. Promote the adoption of sustainable and climate resilient natural resource management practices. 	<ul style="list-style-type: none"> PNG FA 	<ul style="list-style-type: none"> CEPA DAL 	<ul style="list-style-type: none"> Mid (2026-2028)
	Strategy Action 5.4 Green urban development	<ul style="list-style-type: none"> Create, protect and manage systems of green infrastructure (e.g., urban forests, parks and open spaces, natural drainage systems) in towns and cities. 	<ul style="list-style-type: none"> CEPA 	<ul style="list-style-type: none"> DoWH DPLLG 	<ul style="list-style-type: none"> Long-term and ongoing (2028-2030)

Table 14 Climate resilient terrestrial, coastal and marine ecosystem strategies to enable the implementation of climate change adaptation action

Resilient and sustainably managed terrestrial, coastal and marine ecosystems are critical to enhancing Papua New Guinea's resilience to climate hazards like floods, droughts, heat waves, and hurricanes. Forests, fisheries and soil and water resources are sources of food and shelter, so resilient ecosystems are essential to achieve Papua New Guinea's objectives for a climate-compatible economic development pathway (Government of Papua New Guinea 2018). Sustainable management practices in terrestrial, coastal and marine ecosystems will be critical to fostering climate-resilient and sustainable livelihoods in Papua New Guinea. Strategic adaptation actions under this Sectoral Priority Area seek to promote Ecosystem-based Adaptation (EbA) to foster a holistic approach to adaptation planning and implementation, harnessing the potential of healthy ecosystems and biodiversity to reduce vulnerability and build social and economic resilience to climate change (SPREP 2020).

Cross-cutting Area 6: EARLY WARNING SYSTEMS AND RESPONSE MEASURES TO CLIMATE-INDUCED EVENTS

Goal 4: Strengthen climate information and early warning systems to improve community resilience and livelihoods

Target: 6 million people (70% of the population) benefit from improved early warning systems/information to respond to extreme climate events.

Cross-cutting Area	Cross-cutting Strategic Actions	Overview of Cross-cutting Strategic Activities	Lead	Target and coordinating Entities	Timeline
EARLY WARNING SYSTEMS & RESPONSE MEASURES TO CLIMATE-INDUCED EVENTS	Strategy Action 6.1 Improve information for adaptation planning and management of climate risks	<ul style="list-style-type: none"> Develop vulnerability assessments and climate change scenarios at the sectoral level and integrate these into provincial and national planning tools and instruments. Consolidate updated information on climate risks in a centralized instrument (e.g. climate risk atlas, web platform, sectoral risk profiles). 	<ul style="list-style-type: none"> CCDA 	<ul style="list-style-type: none"> NDC NWS 	<ul style="list-style-type: none"> Immediate (2023-2026)
	Strategy Action 6.2 Enhance adaptation and resilience through impact-based forecasting and early warning systems.	<ul style="list-style-type: none"> Establish effective early warning systems and communication networks that provides alerts on nutrition and food insecurity which may be precipitated by emergencies such as drought and floods or unfavourable food market conditions. Scale up climate information and early warning systems (including community-based flood simulation exercises and early warning systems for coastal flooding) 	<ul style="list-style-type: none"> NWS 	<ul style="list-style-type: none"> NDC CCDA 	<ul style="list-style-type: none"> Immediate (2023-2026) Mid (2026-2028) Long-term and ongoing (2028-2030)
	Strategy Action 6.3 Develop a strategy for relocation/resettlement/retreat	<ul style="list-style-type: none"> Develop vulnerability assessments and analysis on expected climate impacts on migration and relocation, as well as implications for resettlement, gender and social inclusion. Develop strategies and activities to prepare for relocation, including comprehensive consultations with the climate-induced migrants and their host communities 	<ul style="list-style-type: none"> NDC 	<ul style="list-style-type: none"> CCDA 	<ul style="list-style-type: none"> Long-term and ongoing (2028-2030)

Table 15 Early warning systems and response measures to climate-induced events strategies to enable the implementation of climate change adaptation action

Reducing Papua New Guinea’s vulnerability to climate-induced risks to achieve a climate-resilient and climate-compatible development pathway across all priority sectors, requires strengthening the ability of national and provincial institutions to prevent and respond to the impacts of climate change, including through improved understanding of climate hazards and risks, as well as concerning climate-induced migration. Essential features of protecting Papua New Guinea’s population from climate change hazards include conducting rigorous risk and vulnerability assessments. These can be updated on a regular basis according to new or improved information, or to strengthen and scale up the Early Warning Systems (EWS), along with the capacities of the NWS, NDC and other national, provincial, and local level institutions to provide timely information and enhance disaster preparedness. Efforts on climate-induced migration are also critical to NAP implementation, in considering that islands like Manam and Carteret have already seen the displacement of communities due to environmental degradation and climate-related impacts.

6. IMPLEMENTATION FRAMEWORK

This section of the NAP covers the NAP implementation framework, providing an overview and guidance to enable the operationalisation of the NAP using a whole-of-government approach to address the climate change challenge in strategic sectoral actions and applying cross-cutting strategies. Included here is the summary of the full implementation framework (see Annex 2), which provides a roadmap to guide the implementation of the NAP and track progress in the period 2022-2030, including illustrative timelines, targets, and indicators.

The Papua New Guinea 2022-2030 NAP oversees all of Papua New Guinea’s adaptation planning, based on an overarching framework that aims to facilitate the systematic integration of climate change adaptation considerations throughout government, partner, and private sector operations. Aligned with the mandate of the CCMA, and coordinated by the CCDA, the NAP implementation will be undertaken in a phased approach – with immediate priority actions (2023-2026), mid-term priority actions (2026-2028), as well as long-term and ongoing priority actions (2028-2030). At the same time, the NAP will be reviewed in 2025, and adjustments will be made aligning the review of the Enhanced NDC on adaptation also in 2025. Primarily, NAP implementation relies on mainstreaming climate change adaptation into the plans and policies at the national and provincial levels, with adjustments for the impacts of climate change and actions taken to reduce these impacts. Implementation of the NAP should therefore supplement existing systems in a way that minimises resource demands, avoids duplicating established arrangements, and facilitates the mainstreaming of adaptation. The NAP does not replace existing plans and policies, processes, and mechanisms or any supporting arrangements necessary to facilitate responding to the urgent and complex nature of climate change adaptation in Papua New Guinea. Rather, the NAP is concerned with creating an enabling environment for the effective and sustained mainstreaming of climate change adaptation in sectoral planning and policy instruments to achieve Papua New Guinea’s adaptation targets and goals. The financing and resourcing mobilisation strategy also includes a tracking system for monitoring the progress of the NAP implementation.

The Implementation Framework brings together information facilitating the mainstreaming of plans, policies, and systems; mobilisation of resources for adaptation; and tracking of progress against agreed adaptation targets. Overall, the Implementation Framework for the NAP uses four modes of implementation, based on the recommendations from the NAP Financing Baseline assessment¹⁰. These are:

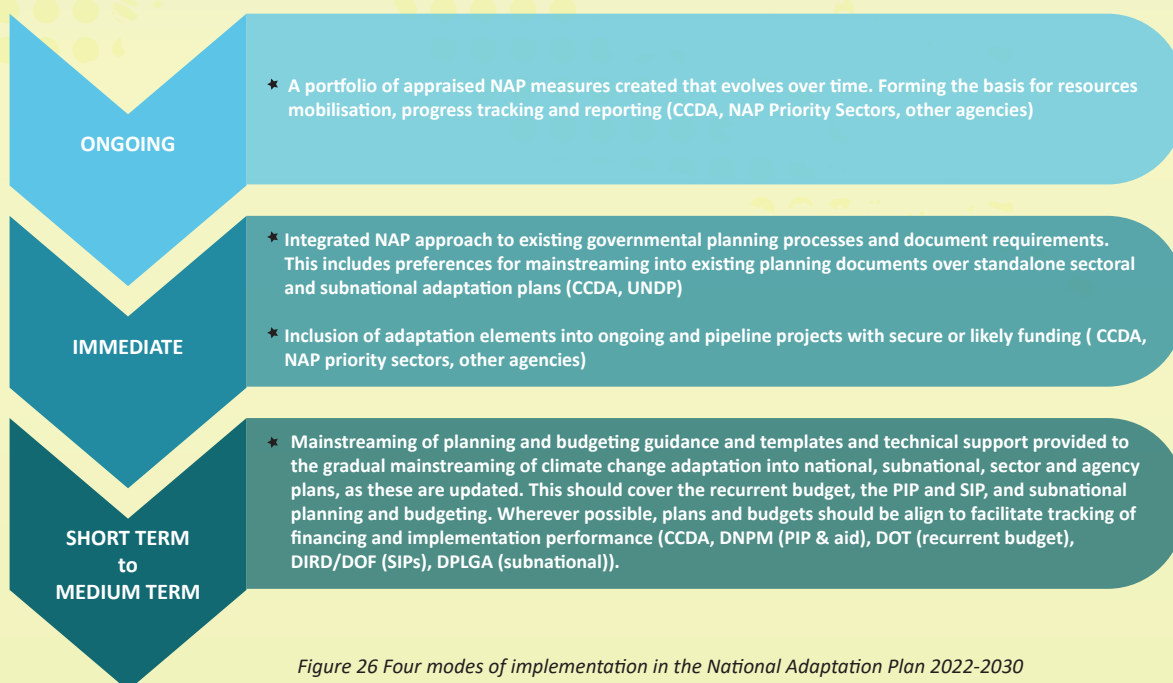


Figure 26 Four modes of implementation in the National Adaptation Plan 2022-2030

¹⁰NAP Financing Baseline Assessment www.cdda.gov.pg

Sectoral climate change adaptation plans¹¹, accompanied by the mainstreaming of climate change adaptation, are key in implementing the NAP and achieving Papua New Guinea’s adaptation goals and targets. Papua New Guinea’s NAP also incorporates tools such as the stepwise and self-guided tool, and sectoral planning guidelines for climate change adaptation (see Annex 1). These tools for implementing the NAP are intended to guide, facilitate and assist the national, provincial, and local level governments in implementing the NAP. The guidelines, for example, aim to facilitate decision-making in priority sectors when identifying and prioritising climate change adaptation options to address key sectoral climate change impacts, building synergies across sectors and promoting a gender-responsive and inclusive approach. The guidelines constitute an instrumental tool in the NAP implementation as they aim to facilitate decision-making in priority sectors. As such, sectoral climate change adaptation planning is a key part of the NAP’s implementation framework and roadmap.

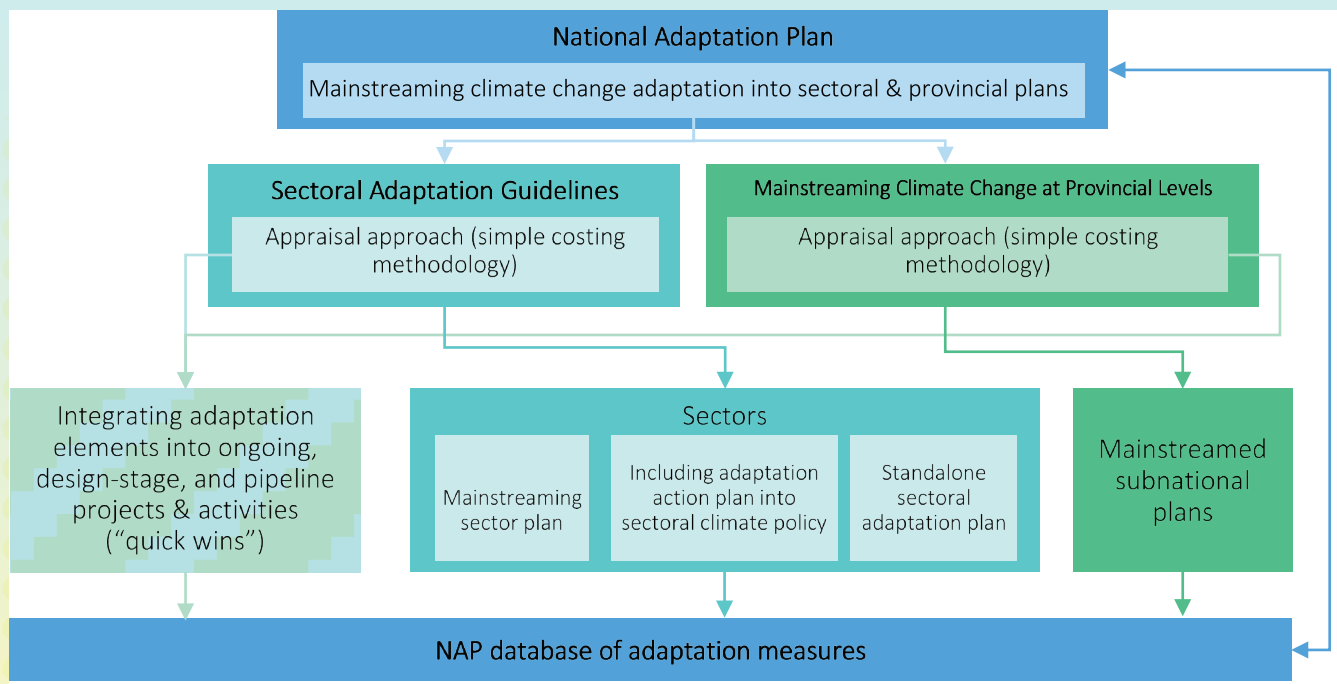


Figure 27 Adaptation planning approach under the National Adaptation Plan

The Implementation Framework, therefore, suggests integrated, useful tools that link planning, resource mobilisation, implementation progress tracking/monitoring, and reporting. Figure 28 outlines the supporting system for implementing the NAP arrangements.

¹¹ As defined in the Guidelines, pathways or options to develop sectoral CCA plans, include: 1) Mainstreaming CCA into an existing sectoral development plan; 2) Integrate a CCA plan in existing sectoral climate policies; and 3) Developing a stand-alone dedicated sectoral CCA plan.

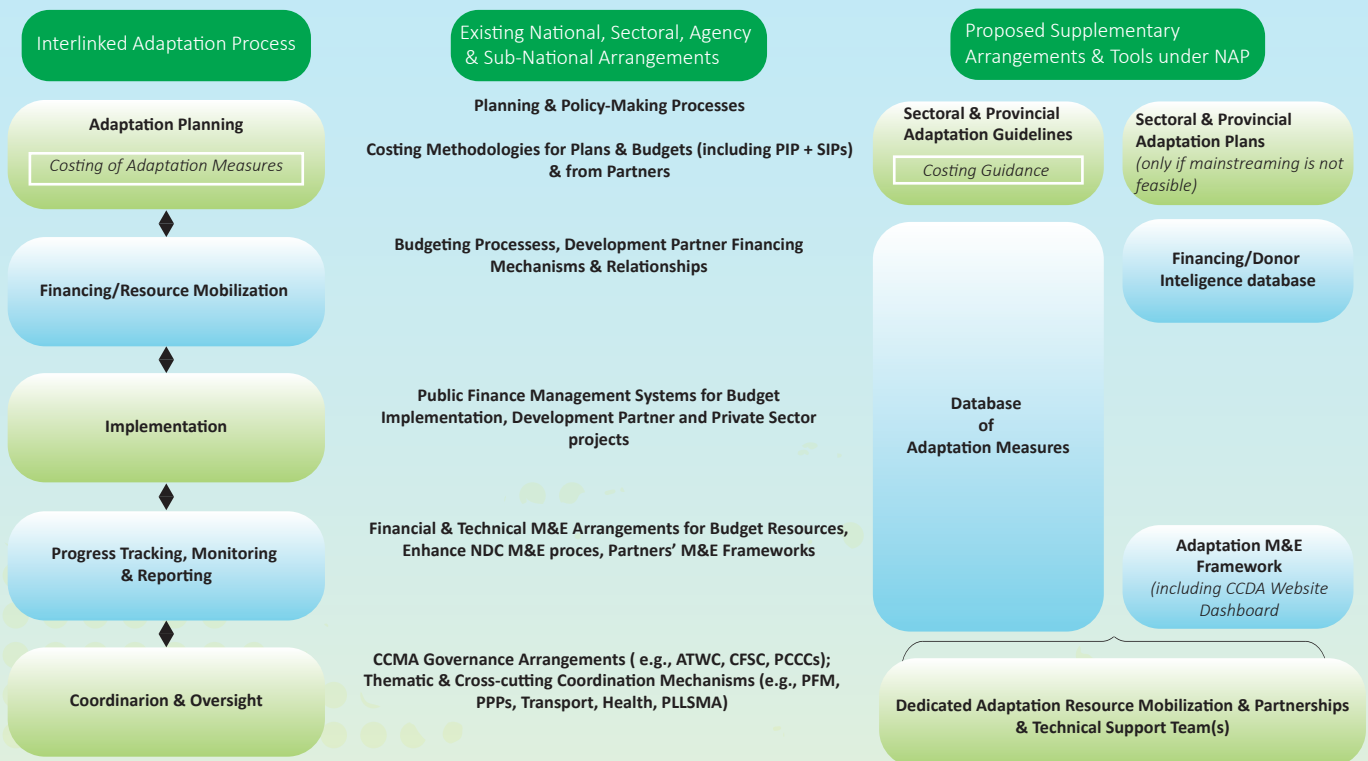


Figure 28 Support arrangements and tools under the NAP vis-à-vis existing systems.¹² Source: USAID 2022

6.1 COORDINATION AND IMPLEMENTATION ARRANGEMENTS

The overall governance structure to support the implementation of Papua New Guinea’s first NAP 2022-2030 involves governance, coordination, and implementation roles, as structured below.

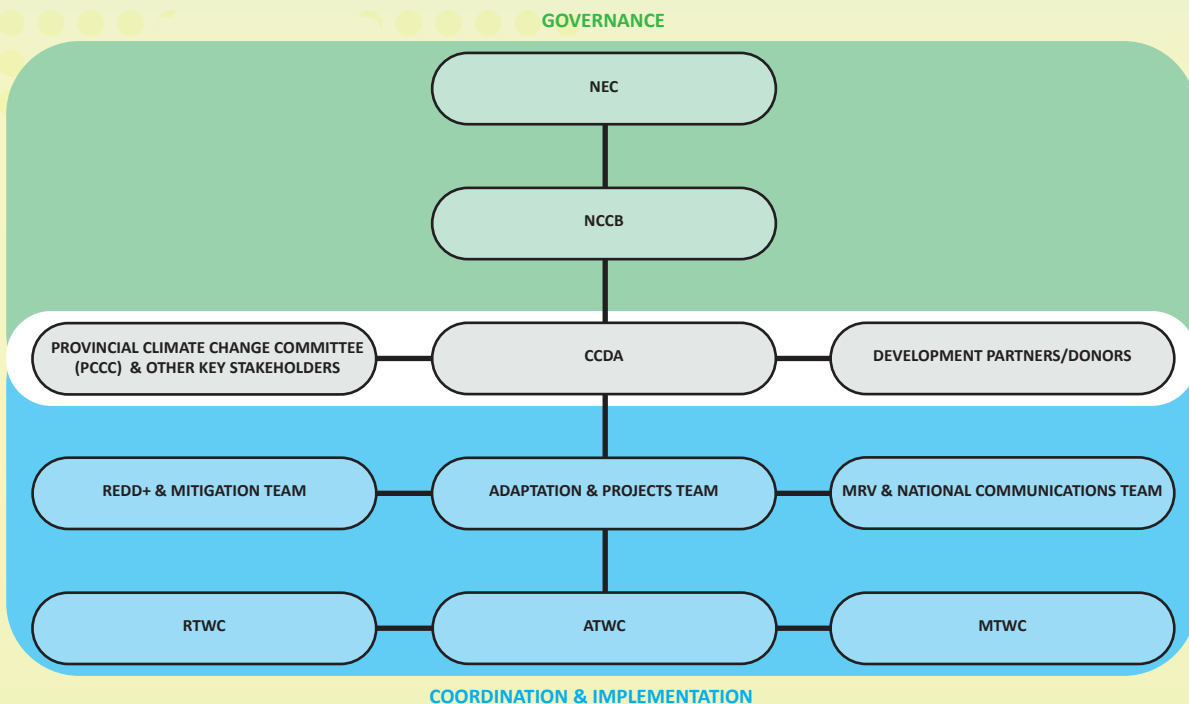


Figure 29 Structure for Governance, Coordination and Implementation for the NAP 2022-2030

¹²ATWC = Adaptation Technical Working Group, CCDA = Climate Change and Development Authority, CCMA = Climate Change (Management) Act, CFSC = Climate Finance Steering Committee, M&E = monitoring and evaluation, NDC = Nationally Determined Contribution, PCCC = Provincial Climate Change Committee, PFM = public financial management, PLLSMA = Provincial and Local-level Services Monitoring Authority, PPP = public private partnership, PIP = Public Investment Program, SIP = Service Improvement Program.

At the Governance level, the Climate Change and Development Authority (CCDA) interfaces with both the governance and implementation arrangements. The National Climate Change Board (NCCB) will also play an oversight role and report to the National Executive Council (NEC) through the Minister responsible for climate change. The Managing Director of CCDA reports directly to the NCCB on all areas of climate change relating to policy formulation, upscaling, replication, and general reporting to the government on funding or otherwise in both areas of mitigation and adaptation. The Adaptation Division will then be responsible for mobilising resources to ensure the effective implementation of the NAP in close consultation with all relevant stakeholders. The Adaptation and Projects Division is expected to coordinate and facilitate scheduled meetings and provide the necessary secretariat responsibilities.

Implementing a resource mobilisation strategy is a key part of the operationalisation of the NAP. The resource mobilisation approach for mainstreaming adaptation under the NAP, and corresponding sectoral climate change adaptation plans are envisaged as a long-term continuous, actively managed stakeholder engagement process using both formal and informal channels. To support resource mobilisation, a dedicated team of CCDA and priority sector focal points, supplemented with technical expertise provided by development partners, is to be established. The positioning of the team is to strengthen the CCDA’s role as a climate finance coordination and a support hub with resource mobilisation expertise, as well as strengthen the capacities of sectoral Departments Authorities to carefully prioritise adaptation initiatives based on their potential return on investment. In addition, the resource mobilisation team will bring together local and international expertise on public finance to understand government systems and processes (such as the roles of DNPM and the Department of Treasury for grants and loans, respectively) as well as partnership building with donor agencies and private sector organisations.

The roles and responsibilities of each entity are outlined in Table 16 below.

Table 16 Roles and responsibilities to support the implementation of the NAP

Entity	Roles and Responsibilities
National Executive Council (NEC)	The NEC is the highest-level decision-making body in Papua New Guinea, chaired by the Prime Minister and composed of senior government ministers. The NEC will officially review the NAP every five years, as part of the iterative and adaptative implementation process. The NEC will also enact stand-alone sectoral climate change adaptation plans or amend existing sectoral or climate policies/plans, as required.
Climate Change Development Authority (CCDA)	The CCDA is Papua New Guinea’s overarching authority on climate change mitigation and adaptation and is responsible for promoting, coordinating, and managing a climate change compatible development in Papua New Guinea. The Climate Change Management Act 2022 (amendment) provides for the establishment of the CCDA. The Authority is mandated to execute all functional responsibilities related to Climate Change. The CCDA is Papua New Guinea’s focal point under the UNFCCC, the Adaptation Fund, and National Designated Authority (NDA) under the GCF. The CCDA is the overall body responsible for the NAP and will oversee the development, implementation, and evaluation of sectoral climate change adaptation plans in priority sectors and oversee the achievement of Papua New Guinea’s adaptation targets.
Department of Foreign Affairs & International Trade	Plays a significant role in coordinating and fostering continued high level bilateral and multilateral relations for Papua New Guinea in areas of security, trade and others including climate change and ensuring climate change policies, partnerships, programs, etc are mainstreamed to ensure alignment with international agreements such as the Paris Agreement on Climate Change.

Adaptation Technical Working Committee (ATWC)¹³	The Adaptation Technical Working Committee (ATWC), established under the CCMA Amendment 2022, is responsible for planning the development of climate change adaptation regulatory developments, as well as the review of climate change adaptation projects and interventions. The ATWC will provide strategic direction and oversight to sectoral [and/or provincial] climate change adaptation core teams in the development of their climate change adaptation implementation action plans. The ATWC is focused overall on adaptation with an overview on developing and implementing sectoral and/or provincial climate change adaptation plans, as well as strategic direction. The committee will also focus on decision-making, with specific sub-committees for the NAP providing: 1) policy directions, 2) recommendations, and 3) financing recommendations. The ATWC is composed of members from government departments, the private sector, development partners, non-governmental organisations (NGOs) and civil society organisations (CSOs) as well as provincial/ local-level representatives. Facilitated by the CCDA, this includes key sector agencies for the NAP, including Transport, Works, Health, and Agriculture.
Sectoral Lead Entities	Sectoral Lead Entities are responsible for developing, implementing, and evaluating sectoral climate change adaptation plans in their respective priority sectors, informed by the NAP and its cross-cutting and sectoral areas and strategic actions.
Cross-cutting Entities	Cross-cutting entities facilitate the effective, efficient, and coordinated implementation of the NAP as permanent members of the ATWC and provide targeted technical and strategic advice to the CCDA and Sectoral Leading Entities, as necessary.
Sectoral climate change adaptation core teams	Sectoral climate change adaptation core teams established by lead sectoral entities, through existing or dedicated sectoral coordination platforms, include representation from relevant sectoral entities, public and private, civil society organisations. These comprise gender representation, cross-cutting entities and the CCDA, as appropriate. Sectoral climate change adaptation core teams ensure inclusive and sector-driven development, implementation and evaluation of the sectoral climate change adaptation plans.
Department of Health	Key implementing department for the first phase of the NAP 2022-2030, at both national and regional levels for adaptation activities and planning under health.
Department of Transport	A key implementing department for the first phase of the NAP 2022-2030, at both national and regional levels for adaptation activities and planning under transport.
Department of Works & Highways	A key implementing department for the first phase of the NAP 2022-2030, at both national and regional levels for adaptation activities and planning under infrastructure. This also includes for the infrastructure under health (e.g., water and sanitation infrastructure), transport (e.g., road and facility infrastructure), and agriculture (e.g., market infrastructure, water infrastructure).

¹³Consistent with the recent amendments made to the CCMA, an Adaptation Technical Working Committee (ATWC) builds on the existing ATWG, which will then become the main advisory and coordination body for CCA in Papua New Guinea, including the NAP.

Provincial Governments	Provincial governments have the devolved authority to develop provincial climate change adaptation plans and so may choose to implement relevant cross-cutting and sectoral strategic actions through provincial planning instruments.
Provincial Climate Change Committees (PCCCs) and Provincial Disaster Committees	Provincial Climate Change Committees (PCCCs) and Provincial Disaster Committees (PDC) can play a key role in the development, implementation, and evaluation of provincial climate change adaptation actions.
National Marine Time Safety Authority (NMSA)	The Papua New Guinea National Maritime Safety Authority (NMSA) was established by the NMSA Act 2003 and is responsible for matters concerning maritime safety, coordination of search and rescue and marine pollution prevention. Additional to these mandated functions, the NMSA is also responsible for collecting and managing data, as well as, to act on behalf of the State on any domestic and international agreements relating to maritime safety, marine pollution prevention and search and rescue. Under NMSA the Oceans Zone committee was established to provide overseer roll on the Oceans activities and matters.
National Oceans Office	The NOO provides oversight, coordination and implementation of the Maritime Zones Act 2015. Coordinate Maritime Boundary Delimitation Negotiations, meetings and related work and Marine Scientific Research (MSR). Play the Secretariat support to Governance Committees and any other work identified in relation to the oversight and implementation of the MZA.

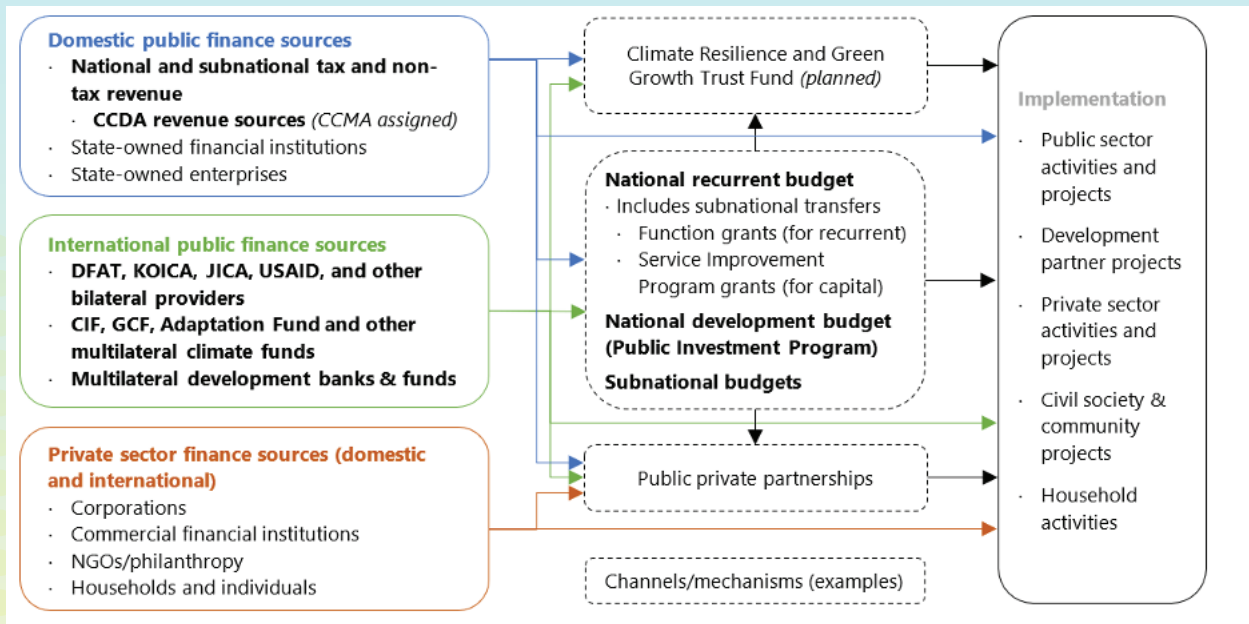
6.2 NAP FINANCING AND RESOURCE MOBILISATION

The NAP envisages a strategic approach for financing and resource mobilisation, focusing on the most promising financing sources in the short term while exploring access to additional resources and channels in the medium- and long-term. By 2100 the annual cost of adaptation is estimated to range between 0.14 and 1.52 per cent of Papua New Guinea's GDP (Government of Papua New Guinea, 2020a). Financing these adaptation costs, in addition to socio-economic development needs, is a mounting challenge for Papua New Guinea. One that requires additional resources and a global mobilisation of climate finance that must go far beyond previous efforts. Nevertheless, financing for the NAP is also taking place within a favourable environment framed by high-level political commitments globally. Various financing sources are available to fund NAP interventions, comprising domestic, international and private sector finance sources. For example, in recognition of the large financing gap for climate action, both for mitigation and adaptation in developing countries, climate change commitments are accompanied by growing financing pledges from developed countries, multilateral development banks, and other development partners. Although, currently, the global financial resources pledged or committed have not met the expectations of these pledged amounts. The private sector is also increasingly aware of the importance of climate resilience. Considering this context, the NAP financing and resource mobilisation will be formed through three key source areas

- (a) **Domestic public finance** is channelled through the government's national recurrent and development budgets as well as subnational budgets, to fund sectoral activities and projects that can address climate change adaptation.
- (b) **International sources** from bilateral partners, climate financing facilities, and multilateral development banks are channelled through either the government budget (as grants and loans) or directly to projects, to fund activities that can address climate change adaptation.

- (c) **Earmarked domestic revenue sources for climate change action**, including those assigned to the CCDA under the CCMA (2015 and 2022 amendment) and provide complementary funding for CCDA to deliver roles, responsibilities and supplementary resources for climate change adaptation activities and projects.

Figure 30 Financing options for the NAP



Source: Baseline Assessment Report for Papua New Guinea's NAP financing and investment strategy

General domestic public finance channelled through national budgets: General domestic revenues, which are not explicitly earmarked for climate change action, constitute the largest potential source of financing for the NAP. Supplemented by domestic borrowing (as well as external grants and loans) and complemented by subnational revenue collected by provincial administrations, these resources fund the government's national recurrent and development budgets. Together, they constitute a substantial financing potential for capital investments in adaptation (e.g., to climate-proof infrastructure) and recurrent activities (e.g., to develop and implement sectoral resilience policies). These resources are allocated through established budget processes. At the national level, the budget is prepared annually and passed by the Parliament in the last quarter of each year comprising two components, the recurrent budget and the development budget.

Recurrent budget: The recurrent budget is developed by the Department of Treasury and funds staff, operational expenses, and minor capital outlays for activities of national departments and agencies and provides support to subnational government administrations and authorities. The latter includes function grants primarily for non-staff recurrent costs and Service Improvement Program (SIP) grants for capital projects in priority sectors of provinces, districts, local-level governments, and wards.

Development budget: The development budget includes the Provincial Support Improvement Program (PSIP), the District Support Improvement Program (DSIP), and the Public Investment Program (PIP), with preparation led by the Department of National Planning and Monitoring (DNPM). The development budget comprises one-year or multi-year public investment projects and programs, primarily in physical capital (e.g., roads, schools, health facilities) and human capital. The development budget can also provide co-financing/counterpart funding for development partner projects.

Subnational budgets: At the subnational level, budgets are prepared for activities and projects in provinces, districts, local-level governments, and wards. These bring together locally generated revenues and transfers from the national government, including for staff, function grants and Service Improvement Program (SIP) funding. Two elements are important in accessing these resources. First, as adaptation measures will be implemented mainly through the sectors at national and subnational levels, mainstreaming plans at all levels to ensure these plans consider climate change adaptation throughout their activities and investments will be critical. These plans then provide the basis for resource allocation through the different budgeting processes. Climate change adaptation should also gradually be reflected in planning and budgeting guidance, starting with the Public Investment Program (PIP) Guidelines, which are currently being updated and will feature a risk screening process. Second, every government agency needs to make a case for the financing of identified priority climate change adaptation measures. This includes working closely with the Department of Treasury (DoT), Department of National Planning and Monitoring (DNPM) and its Budget Screening Committee (during the preparation of the recurrent and development budgets), Provincial governors and legislators (including through Provincial Planning & Budget Priorities Committees), and provincial administrations. Provincial Health Authorities will need to be consulted with for the use of provincial revenues and national transfers, including function grants and Provincial SIP funds. Members of Parliament in their constituencies, District Development Authorities, and local-level governments (LLG) and Ward Development Committees (WDC) are also key in consultations for local revenues and national transfers, including District, LLG, and Ward SIPs.

International climate finance sources: International climate finance sources constitute another significant financing source for adaptation. Sources include bilateral providers, multilateral climate funds, multilateral development banks, and other international and regional organisations. Adaptation finance commitments have increased substantially in Papua New Guinea in recent years, primarily as development-funded projects with climate adaptation components¹⁴. As government capacity is increasing, Papua New Guinea will also strive to access financial resources from climate funds directly (e.g., by becoming accredited as a National Implementing Entity). Alternatively, or in parallel, Papua New Guinea can also continue to nominate Multilateral Implementing Entities (MIEs) particularly where pre-accreditation is required to implement funds. At the same time, also to mobilise technical expertise and resources to secure funding on behalf of the Executing Agency as they are internationally recognised and have sound fiduciary and project management experience.

When seeking international finance for climate change adaptation, it will be necessary to include critical long-term aspects that cover:

- Building government capacity as well as including activities, tools and knowledge products in the project and programme designs that allow upscaling and replication of results across other sectors and communities within the country.
- Ensuring that the external financing supplements the government's resources (including through counterpart funding) and does not replace it.
- Proactive coordination in overseeing the various projects and programming, including through CCDA and central agencies (Department of Treasury, Finance and National Planning), to ensure alignment and consistency with the medium- and long-term national development plans and the United Nations Sustainable Development Goals (SDGs).

Earmarked domestic revenue sources for climate change action: Earmarking specific revenue sources or expenditure programs for climate change adaptation also provides supplementary domestic public financing.

¹⁴The baseline assessment report for Papua New Guinea's NAP financing and investment strategy provides more information on the allocation of international finance in Papua New Guinea.

Dedicated revenue sources currently comprise the CCMA legislation, for example on import, climate, and deforestation levies and other fees and charges that fall under the CCMA legislation imposing funding levies, fees, and charges in accordance with Section 38 of the CCMA¹⁵. A planned Climate Resilience and Green Growth Trust Fund (CRGGTF) to be established under the CCMA can provide a transparent channel for funds earmarked for climate change adaptation. By aiming to pool financing to help Papua New Guinea transform into a climate-resilient development path consistent with national poverty reduction and sustainable development goals. Similarly, the recently established Papua New Guinea Biodiversity and Climate Fund (PNG BCF) is an independent Conservation Trust Fund catalysing financial and technical resources to enable present and future generations of Papua New Guineans to restore, protect, and enhance the country's biodiversity and build resilience in the face of climate change. The Fund builds on the priorities of the Protected Area Act (2020) and the Climate Change Management Act in establishing long-term sustainable financing strategies for protected area management and climate change mitigation and adaptation.

Additional potential sources of finance: Other sources of finance can complement these key sources for NAP financing, such as private sector financing for adaptation from corporations, commercial, financial institutions, NGOs/philanthropy, and households and individuals have significant potential. Private enterprises and financiers contribute to adaptation by capitalising on business opportunities and mainstreaming climate change risks into their business operations. Private resources can also be leveraged with the help of public funds, including through mainstreaming adaptation into public-private partnerships, and revenue-generating projects. Tax incentive schemes, such as the tax credit for infrastructure development as well as rural development, primary production, and agricultural production extension services incentive schemes can also be included.

i. Mobilising climate finance

Overall, mobilising climate finance is a complex process because of the technical requirements and capacities needed to design and implement climate change adaptation projects, the diversity of funding sources (national, subnational, international, private), and the requirements to access those funds. Financing sources and channels will be pursued in a phased manner that fits with the phasing of the NAP into immediate, mid-term, long-term and ongoing phases of implementation, in order to reduce stresses upon and work within the limitations of implementation capacities. Efforts to strengthen governance (including public financial management), in general, and specifically concerning transparency and accountability of climate finance, will be key to enabling a prudent and efficient use of resources.

General guidance on budgeting is provided in the Department of Treasury's Budget Manual from 2008 and the Consolidated Budget Operating Rules from 2017 (2015 version available online). For the recurrent budget, the annual budget circular and information sessions provide guidance and templates for the budgeting of new priorities in Stage 1 and ongoing activities in Stage 2 of the budget preparation process. For the capital budget's Public Investment Program (PIP), the DNPM issued PIP Guidelines in 2007, which are currently being updated and will feature basic risk screening. For the capital budget's Service Improvement Program (SIP), the Department of Implementation and Rural Development issued SIP Administrative Guidelines (4A/2019) in 2019. The Department of Finance issued complementary financial instructions for the SIP. Guidance is also given in the Annual Activity (or Implementation) Plan templates for agencies.

ii. Costing and appraisal of adaptation measures

Aside from identifying and prioritising the climate change impacts and the adaptation measures to address these, the first step in implementing adaptation measures is costing and appraisal. The adaptation appraisal tool included in the Sectoral Planning Guidelines (Annex 1) assists with appraising and prioritising adaptation activities in detail. Costing these remains, within limits, a variable factor that can be adjusted through changes to scale and technical specifications of an intervention. Ideally, detailed assessments of the costs and benefits of various

¹⁵The fiscal arrangements for the CCMA and its ability to implement Climate Change programs are governed by the CCMA. Under the CCMA, it is intended that the Authority should have sufficient revenue raising powers to become financially autonomous. The proceeds are expected to be used to finance climate change adaptation and mitigation activities in vulnerable communities throughout Papua New Guinea.

interventions and different design options for each intervention would lead to the selection, specific design, and prioritisation of effective, value-for-money adaptation measures. In practice, however, real-life complexities, data gaps, and resource limitations in terms of capacity and funding more broadly render such an approach unfeasible. The costing of adaptation options should utilise the established costing/budgeting and appraisal approaches from the government of Papua New Guinea and development partners. This aims to strengthen existing processes, avoid duplication, and reduce resource demands regarding funding and capacity. Basic costing and appraisal approaches, guidance, and templates exist for domestic government financing sources. While more comprehensive approaches are supported mainly by technical assistance. To avoid the inefficient use of resources on costing, estimates should be developed stepwise as part of the project or activity design process and in parallel with the progress made on resource mobilisation.

The approach to costing follows three steps:



Costs are only one factor among several that influence decisions and design. Available financing is a critical factor that often drives the scope and specific design of interventions rather than the estimated costs of a proposed intervention. The way funding decisions are taken is therefore also important, regularly involving informal decision-making processes, such as preferences of the political leadership or a specific development partner reflected in earmarked resource allocations. Lastly, technical feasibility influences the costs of an intervention. In this context, costs are a variable factor that can be adjusted based on a proposed intervention’s approach, scope, and design features. Table 17 below sets out the phases for costing adaptation measures.

Different costing and appraisal approaches are available, and approaches vary depending on the stage of the intervention. Generally costing and appraisal becomes more comprehensive as an idea is developed into a concept and ultimately into a detailed design. At the idea stage, either no estimates of benefits and costs exist, or a short list of probable benefits and ballpark costs is developed to serve as an initial estimate when exploring potential funding sources. At the concept stage, the absence of any estimates of benefits and costs is less common, with templates generally requiring a list of non-monetised, probable benefits and ballpark costs (e.g., subdivided into main cost categories or by activity). Only in a few cases, more detailed information on benefits and costs is developed at the concept stage. At the detailed design stage, substantiated information on benefits and costs is compiled, and at times, benefits are monetised and put into relation to costs in the form of a cost-benefit analysis or similar methodology.

Stage	Documentation	Costing approach	Sources of information (examples)
Idea	CCA Option Factsheet, <i>Project Identification Document for Government of Papua New Guinea projects</i>	Ballpark cost estimate	Existing plan, expert knowledge, experience from similar interventions in PNG or elsewhere
Concept	Concept note using prescribed templates and guidance from specific financing source, <i>Project Formulation Document for Government of Papua New Guinea projects</i>	High-level cost estimates by main activity and/or cost category	Quantities and unit costs of main inputs, expert knowledge, experience from similar interventions in PNG or elsewhere
Detailed design	Project document package using prescribed templates and guidance from specific financing source	Detailed cost estimates: cost-benefit and/or financial analysis as required	Quantities and unit costs of inputs, feasibility studies, impact evaluations, cost-benefit analysis from similar interventions

Table 17 Stages for adaptation costing

Financing instruments generally prescribe specific approaches, with templates and guidance often included for the planning, appraisal, and budgeting of interventions. Climate funds, as well as bilateral and multilateral development partners, prescribe their own guidance and templates for the development of costings and project budgets, which are generally completed by staff from the organisation, with inputs from government staff as required. Climate funds and bilateral and multilateral development partners, also produce guidance and templates for the development of costings and project budgets. These are generally completed by staff of the partner organisation, requesting specific information inputs from government counterparts in the process as needed. Most development partners also have their own requirements, methodologies, and templates for costing and economic analysis, which need to be followed when funding for a specific intervention is requested. While on the private sector side, detailed costings and financial analysis is generally required for obtaining financing. For domestic public finance sources, this can include guidance for multi-year national, sector, agency, and subnational plans as well as annual implementation plans; separate guidance for recurrent budget activities and capital projects; and guidance for specific expenditure programs, e.g., for grants/transfers provided to authorities or organisations outside the government.

6.3 MONITORING AND EVALUATION

Table 18: The NAP Roadmap: initial implementation and monitoring framework

Outputs	Implementation period		2030-2040	Responsibility for implementation		Result Indicator	Monitoring and Evaluation				Responsibility for monitoring and reporting	
	2022-2025	2025-2030		Lead Entity	Supporting entities		Baseline (2022)	Mid-term Target (2027)	End Target (2030)	Lead Entity	Supporting entities	
Output 1. Climate change adaptation budgeted for, and plans developed at the sectoral and provincial levels												
1.1 Prepare sectoral climate change adaptation plans and budgeting for the NAP priority sectors according to mainstreaming and the Sectoral Guidelines for Planning for climate change adaptation				DAL DoWH DoT NDoH	CCDA DNPM DoF	Number of CCA sectoral plans developed	0	2	4	CCDA	DAL DoWH DoT NDoH	
1.2 Establish sectoral climate change adaptation teams for the planning, implementation and monitoring of climate change adaptation measures according to the Sectoral Guidelines for Planning climate change adaptation				DAL DoWH DoT NDoH		Number of sectoral CCA teams established	0	4	4	CCDA	DAL DoWH DoT NDoH	
1.3. Prepare sectoral climate change adaptation plans for fisheries, environment and forestry sectors according to the Sectoral Guidelines for Planning for climate change adaptation				NFA CEPA PNGFA	CCDA DNPM CCDA DoF	Number of CCA sectoral plans developed	0	1	2	CCDA	NFA CEPA PNGFA	
1.4 Conduct sector-specific gender gap assessments for the development of sectoral climate change adaptation plans				DAL DoWH DoT NDoH		Number of sector-specific gender gap assessments developed	0	2	4	CCDA	DAL DoWH DoT NDoH	
1.5 Sectoral climate change adaptation plans designed and implemented through a gender responsive approach, including a gender inclusive planning process and gender-responsive and women-led climate change adaptation actions				DAL DoWH DoT NDoH		Number of gender responsive sectoral CCA plans and strategic actions	0	2	4	CCDA	DAL DoWH DoT NDoH	

1.6 Implement sectoral climate change adaptation plans in the NAP priority sectors	DAL DoWH DoT NDoH	CCDA DNPM CCDA DoF	Number of sectoral CCA strategic actions implemented	0	3	7	DAL DoWH DoT NDoH	CCDA
				0	3	5		
1.7 Assess the status of provincial adaptation plans and identify provinces where support should be provided to enhance the preparation of provincial plans	CCDA DPLL G	DNPM	Number of assessments developed	0	1	1	CCDA	DPLLG
Output 2. Papua New Guinea's climate change regulatory and coordination framework strengthened								
2.1 Review, finalize and adopt the Draft Climate Smart Agricultural Policy (CSAP)	DAL	CCDA DNPM	Number of national policies or plans developed or adjusted to integrate climate risks and CCA measures	0	2	3	CCDA	DAL DoWH DoT NDoH
2.2 Develop a climate resilience policy for the infrastructure and transport sectors	DoWH DoT	CCDA DNPM						
2.3 Finalize and adopt the draft National Environmental Health Policy and Papua New Guinea's Strategy and Action Plan on Climate Change and Health	NDoH	CCDA DNPM						
2.4 Develop/revise the composition, roles and responsibilities of the ATWC to support the implementation of the NAP.	CCDA		ToRs developed/ revised	0	1	1 ToRs revised	CCDA	
2.5 Establish high-level/political and technical focal climate change/ climate change adaptation points in sectoral entities from the NAP priority sectors	DAL DoWH DoT NDoH	CCDA	Number of sectoral entities with a high-level/political and/or technical CC or CCA focal point	0	4	4	CCDA	DAL DoWH DoT NDoH

Output 3. Enhanced information, capacity building and awareness raising									
3.1 Implement the NAP's capacity development plan	CCDA	DAL DoWH DoT NDoH NFA CEPA PNGFA DPLLG DNPM	Number of capacity building and training programs developed and rolled out ¹⁶	0	2	2	2		DAL DoW DoT NDoH NFA CEPA PNGFA DPLLG DNPM
				0	50 (25 women and 25 men)	100 (50 women and 50 men)	CCDA		
3.2 Strengthen CCDA's technical and institutional capacity	CCDA	DNPM DoF	Number of additional staff trained in specialised areas	0	3	3	3		DNPM DoF
				0	1	1 plan for re-structuring CCDA developed and implemented			
3.3 Establish a climate research and information working committee under the ATWC to facilitate collaboration across sectoral and research entities.	CCDA	Academic and research institutions	Working committee established	0	1	1	1		CCDA

¹⁶The NAP capacity development plan establishes three key themes for which training programmes should be developed: A) Expected impacts of climate change in the agriculture, transport, infrastructure and health sectors, costs and opportunities; B) Design, implementation and monitoring of adaptation measures; and C) Climate Adaptation Finance.

3.4 Develop partnerships with training institutions & universities to support strengthening of information and capacities relevant to climate change adaptation.				CCDA	Academic and research institutions	Number of partnerships/MOAs developed with training institutions & universities	0	1	2	CCDA	DoE DHERST
3.5 Integration of basic concepts of climate change mitigation and adaptation within primary and high school curriculum development via the Education Department (DHERST).				CCDA	DoE DHERST	Primary and high school curriculum integrates basic concepts of climate change mitigation and adaptation	0	1	1	CCDA	DoE DHERST
3.6 Design of education and awareness raising material on climate change, climate-induced impacts and climate change adaptation options, targeted for the provincial and local community level.				CCDA	DoE DHERST	Number of education and awareness raising material on climate change, climate-induced impacts and CCA options produced and dissemination efforts	0	1	1	CCDA	DoE DHERST
Output 4. Strengthened financial planning and resource mobilization											
4.1 Align sectoral climate change adaptation plans with sectoral budgets in the NAP priority sectors to provide a basis for tracking implementation and financing for climate change adaptation				DAL DoWH DoT NDoH	DoF	Number of sectoral budgets that include allocation to CCA measures according to sectoral CCA plans	0	2	4	DAL DoWH DoT NDoH	DoF
4.2 Establish a portfolio of appraised measures included in climate change adaptation sectoral plans including cost and financing information.				CCDA	DAL DoWH DoT NDoH	NAP database and a progress dashboard published on the CCDA website and regularly updated	0	1 NAP database and a progress dashboard developed and updated	1 NAP database and a progress dashboard developed and updated	CCDA	DAL DoWH DoT NDoH

4.3 Establish a dedicated team to support resource mobilisation comprised of staff from CCDA and NAP priority sectors, supplemented with technical expertise provided by development partners.				CCDA	DAL DoWH DoT NDoH	Resource mobilization team established	0	1 Resource mobilization team established	1 Resource mobilization team established	CCDA
Output 5. Enhanced capacities for monitoring and evaluating climate change adaptation measures and impacts										
5.1 Establish a M&E framework for monitoring climate change adaptation in Papua New Guinea which allows to integrate information on impacts as well as facilitate reporting of NDC targets.				CCDA	DAL DoWH DoT NDoH NFA CEPA PNGFA	CCA M&E Framework established and used for monitoring and reporting implementation of CCA measures		CCA M&E Framework established and used	CCA M&E Framework established and used	CCDA
DAL DoWH DoT NDoH NFA CEPA PNGFA										



i. Tracking database of adaptation measures, finance, and impact-outcome effectiveness

The NAP's monitoring and reporting framework require an integrated approach to monitor and evaluate progress in relation to sectoral climate change adaptation plans and strategic actions and their contribution to achieving Papua New Guinea's adaptation targets, as well as to monitor and evaluate progress on the NAP's objectives and cross-cutting strategies and sectoral priority areas. Conceived as a policy integration and mainstreaming instrument, the NAP also builds on existing policy, institutional, regulatory and coordination arrangements in Papua New Guinea. The monitoring and evaluation framework for the NAP draws on these systems to facilitate the collection and aggregation of qualitative and quantitative data on the progress of implementation of the adaptation measures for the sectoral areas and cross-cutting pillars of the NAP. However, a large segment of this information will be drawn from the ongoing updates to the tracking database, housed online by CCDA, which will also form an integral part of the communication strategy for the NAP progress, in turn informing reviews and updates to the next phase of the NAP. Adaptation communication under the Paris Agreement was established by Article 7 and refers to the voluntary submission and periodic updates of information on adaptation, including in relation to priorities, implementation, and support needs, plans and actions. Regular and consistent reporting on adaptation is critical to increase the visibility and importance of adaptation, promote a balance with support provided to mitigation and strengthen adaptation actions, inform global stocktakes, as well as improve the understanding of adaptation needs and actions.

A database including the climate change adaptation measures in the NAP portfolio has been established and published on CCDA's website, alongside a progress dashboard to monitor resource mobilisation and delivery in progress on adaptation measures under the NAP. The database will combine implementation progress information with financial data, with summary information, for example, by intervention stage, sector, and results¹⁷. Information will be regularly collected from lead sectoral entities to CCDA and updated in the progress dashboard. Efforts should also be conducted to identify and address implementation issues for successful future fundraising. The NAP database and progress dashboard will provide inputs for the monitoring and reporting of NAP progress, as well as for the monitoring and evaluation of climate change adaptation strategic actions and impacts. Such an approach will allow the NAP to evolve over time, keeping it a "living" document/framework with the database providing a 'home' for adaptation measures from existing plans, policies, and strategies; future mainstreamed plans; and measures not (yet) included in plans, e.g., resulting from feasibility studies or implemented outside the public sector (e.g., by the private sector, non-government organisations, or communities). This is intended to over-time provide a (gradually more) comprehensive, real-time overview of adaptation activity in Papua New Guinea. The database could integrate appraisal, fundraising, implementation monitoring, and reporting aspects, enabling the NAP to fulfil its mainstreaming, fundraising support and accountability functions effectively while minimising duplication with established processes and documents.

After successfully implementing the financing monitoring and tracking through the database and website dashboard, Papua New Guinea will strive to build upon this design to transition towards a system to track climate change adaptation-related budget allocations and expenditure in the medium term. A stepwise approach will be pursued, starting with the NAP priority sectors before covering the entire budget.

¹⁷NAP Climate Change Adaptation Database www.ccda.gov.pg

7. ACCESSING NAP RESOURCES, GUIDANCE AND MATERIALS

All NAP resources, guidelines and other tools and support developed and provided to assist in the implementation of the NAP can be found online, through the Climate Change and Development Authority's portal website: www.cdda.gov.pg



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9. ANNEXES

- 9.1 Annex 1: Sectoral Planning Guidelines for Climate Change Adaptation
For Annex 1: Sectoral Planning Guidelines for Climate Change Adaptation, see www.cdda.gov.pg
- 9.2 Annex 2: NAP Financing and Implementation Framework Guidance
For Annex 2: National Financing and Implementation Framework Guidance, see www.cdda.gov.pg





