Country Profile
PAPUA NEW GUINEA

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COUNTRY OVERVIEW[1]

Papua New Guinea ranks among the countries most at risk to natural disasters and climate change (World Bank, 2021). Increased exposure to natural hazards such as coastal and inland river flooding as well as landslides are likely to intensify in PNG, affecting agriculture production patterns and household livelihoods. In addition, the IPCC's 5th Assessment Report suggests that Pacific coral reefs face a negative outlook under all climate change scenarios, whereby increased coral bleaching will have significant negative impacts on the health of coastal fisheries in PNG (Nurse et al., 2014).

Nationally Determined Contribution Snapshot	Not available	Draft	Finalized
Frameworks			
Results Framework	X		
M&E Framework	X		
MRV System			X
Implementation and Coordination			
Implementation Plan			X
Climate Change Action Plan			X
Multi-Stakeholder Working Group (MSWG)			X

MSWG Lead	**National Executive Council**
NDC	Revised in 2021
NAP	Finalized in 2023

PNG has developed a number of policies and targets tailored towards climate change mitigation and adaptation, including the National Adaptation Plan (NAP) 2023 which defines the actions and investments required for key sectors. In addition, the government submitted their Enhanced Nationally Determined Contribution (NDC) in 2020, however government documents highlight the need to strengthen the implementation and capacity building of proposed action plans and necessary data collection and analysis, as well as provide accountable financing for proposed activities (Energy Roadmap, 2021). PNG strives to include stakeholders from private and public sectors, as well as academia, NGOs, and local and international development organizations in the review and validation of climate change action plans, however document analysis suggests that greater coordination for review and feedback of key policy documents is warranted (Asian Development Bank, 2022; Food and Agriculture Organization, 2022; Lea, 2012).

CLIMATE RISK

Approximately 80 percent of PNG's population live in rural communities that depend on subsistence farming, where climate-induced hazards affect agriculture and rural livelihoods disproportionately. While PNG has a monsoonal climate, with consistent rainfall and average temperatures between 25-35 degrees Celsius throughout the year, it also boasts a diverse range of agroecological zones that includes highland elevations (up to 4500 meters above sea level), tropical rainforests, swampy wetlands, and coral reefs. Rural livelihood and agriculture activities are organized around these diverse ecosystems, and projected climate change will affect these areas differently and at differing intensities.

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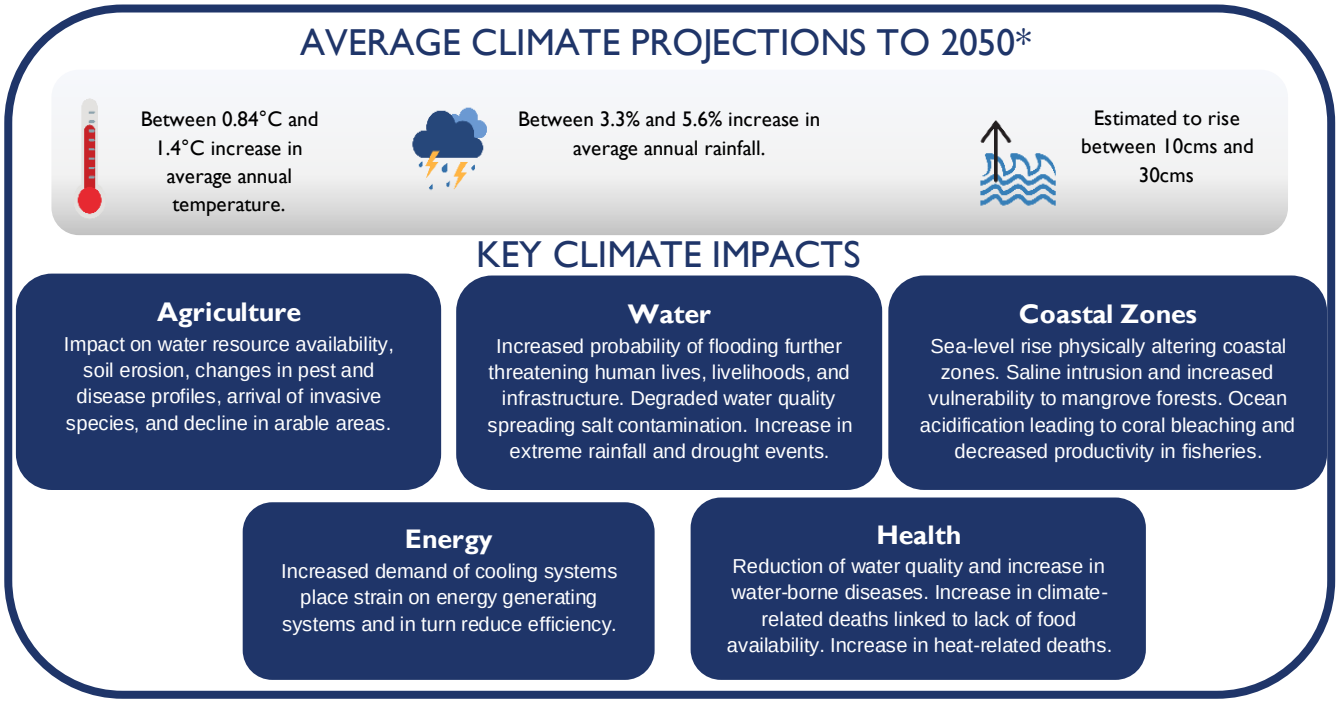
Climate models suggest that the minimum and maximum temperatures are expected to rise at a faster rate than average temperatures in PNG. Average rainfall projections under different climate change scenarios are less certain for PNG, however climate model simulations agree that the frequency and intensity of extreme rainfall events will increase (Lafale et al., 2018). Both staple food and cash crops will most likely be affected by these extreme events. Sweet potato, the primary staple food of PNG, which is prevalent throughout the highlands, is highly vulnerable to increases in soil moisture due to higher rainfall. Coffee, a major cash crop in the central highland region of the country, is vulnerable to increasing temperature and rainfall, as well as increased risk of coffee leaf rust due to increased humidity (Arneson, 2000). Along the coastal and atoll communities of PNG, production losses of swamp taro and other coastal crops have been recorded due to saltwater contamination and increasing sea levels. Already in 2003, the PNG government funded the total evacuation of the Carteret Islands to nearby Autonomous Region of Bougainville due to increasing sea levels and agriculture crop and rural livelihood demise.

The island nations of the Pacific, including PNG, are also impacted by El Niño-Southern Oscillation (ENSO) events. El Niño usually delays the start of the monsoon season and brings drought conditions, especially in the southern areas of the main island of PNG. The highland region of the country is susceptible to heavy rainfall which, in turn, induces inland flooding and landslides. La Niña events also heavily impact PNG agriculture, bringing drought and frost to highland agricultural regions. The last severe ENSO event was in 2015/16, whereby an estimated 480,000 people faced food insecurity due to failed crop production and extreme water shortages (Chua et.al., 2020). It remains unclear how climate change will impact ENSO frequency and intensity, and further data and research are necessary to better predict potential impacts.

Figure 1. Climate Projections and Vulnerabilities by Key Sectors



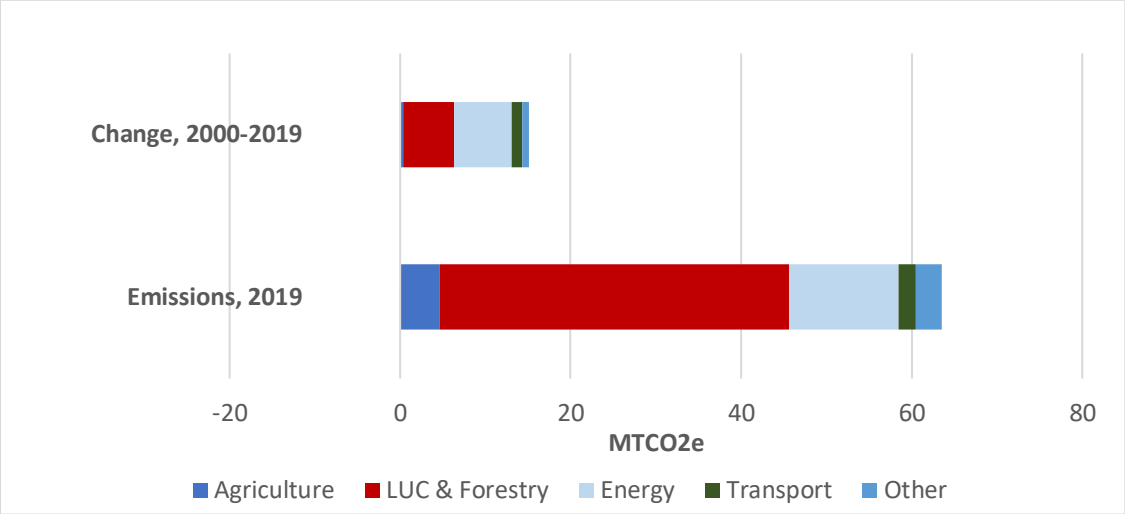
Source: World Bank climate knowledge portal country pages: https://climateknowledgeportal.worldbank.org/
*Note: Projections for temperature and precipitation based on SSP1-2.6 and SSP5-8.5 model estimates; and are an average projection for years 2040-2059 relative to 1986-2005 baseline under RCP8.5. Projections for change in sea

level based on CMIP3 model estimates https://www.pacificclimatechangescience.org/wp-content/uploads/2013/09/Papua-New-Guinea.pdf

EMISSIONS BY SECTOR

PNG's emission of greenhouse gases is mainly due to the Land Use Change and Forestry sector (LUCF), which is responsible for approximately 41 metric tons of carbon dioxide in 2019, or 65 percent of total emissions (Figure 2). The primary activities contributing to greenhouse gas emissions within this sector are deforestation and forest degradation which is in part due to ongoing carbon sink reductions due to tree cover loss, as well as logging activities. The energy sector is the second largest emitter and released almost 13 metric tons of carbon dioxide in 2019, or 20 percent of total emissions. The emissions from liquid fuel combustion and gaseous fuel combustion contribute the largest share of greenhouse gas emissions within the energy sector in PNG (Second Biennial Report, 2022).

Figure 2. Climate Emissions by Standardized Sectors (2019)



Source: Historical data emissions file downloaded from https://www.climatewatchdata.org/ghg-emissions?end_year=2019&start_year=1990

INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION OF NATIONALLY DETERMINED CONTRIBUTION

In order to continue developing, adapting, and evaluating climate sensitive policy and investments in PNG, the Climate Change and Development Authority (CCDA) was formed in 2015 in replacement of the former Office of Climate Change and Development. Their primary role is to coordinate climate related policies and actions at the federal level. In doing so, the CCDA drafted the National Adaptation Plan (NAP) and continues to collaborate with the Nationally Determined Contribution (NDC) Partnership, who's primary role is to aid countries in meeting sustainable development goals and achieving the Paris agreement through technical assistance, expertise, and funding.

A key implementing strategy for both the CCDA and the NDC Partnership is the Climate Action Enhancement Package (CAEP). The CAEP is a program under the NDC Partnership which is designed to deliver fast support for the enhancement and implementation of NDCs. The publishing and revision of the Enhanced NDC has been a process led by the NDC Partnership alongside the Climate Change and Development Authority (CCDA) as part of the Climate Action Enhancement Package (CAEP). The

institution in charge is the National Executive Council which together with the Central Agency Coordination Committee form the Climate Change Ministerial Committee.

KEY SECTORS AND PRIORITY ACTIONS

PNG's Enhanced NDC (2020) and NAP (2023) identify four priority sectors for climate change mitigation and adaptation activities in the country. These sectors were identified based on the country's economic and development agenda, and include the: agriculture, transport, infrastructure, and health sectors. Within these sectors, specific targets and actions were defined and some include specific financing needs to meet climate adaptation targets through 2030 (Table 1).

Table 1. Key sectors and actions identified in PNGs NAP (2023)

Sector	Targets & Actions
Agriculture	**Target:** 10 percent of the total population, 25 percent of whom are females, have increased resilience with respect to food and water security, health, and well-being **Actions:** Enhance smallholder productivity and competitiveness of value chains. Improve climate-smart agricultural practices and value chains including supporting indigenous coping strategies to drought and introducing new crop varieties. Implement and develop climate-resilient water management and improved water access through water harvesting and other structures. Increase sustainable income opportunities and economic access for women.
Transport	**Target:** US$1.2b investment in transport infrastructure and assets built and/or rehabilitated according to climate-resilient codes and standards **Actions:** Enhance climate-proofing of existing as well as new transport and utility infrastructure
Infrastructure	**Target:** US$172m investment in building or rehabilitating structures and utility infrastructure according to climate-resilient codes and standards **Actions:** Climate-proof existing infrastructure and build new climate-resilient infrastructure with a focus on urban and coastal infrastructure
Health	**Target:** 100 percent of the population benefits from improved health measures to respond to malaria and other climate-sensitive diseases **Actions:** Implement approaches to assess and estimate the cost of climate change impacts on health. Improve environmental health services to aid in the prevention of climate-sensitive diseases such as malaria

Source: Papua New Guinea National Adaptation Plan (2023): https://unfccc.int/documents/628062

The **agriculture sector** (including fishing) is prioritized in 4 of the adaptation priority areas. Given that approximately a quarter of GDP comes directly from the agriculture sector, food security and productive land and fisheries are a key focus (NAP 2023; PWC, 2022). In addition, PNG has defined specific capacity strengthening interventions aimed at improving women's access to extension services, inputs, and markets, as well as providing mentoring and support for women to develop small enterprises and access to microfinance opportunities.

Given PNG's many remote rural communities and underdeveloped land transportation networks, the NAP (2023) advocates that the **transportation sector** should consider future climate challenges when designing the construction and maintenance of key transport infrastructure. Efficient transportation

networks will be essential for moving goods (both food and non-food products) between locations that are confronted with a climate shock. Greater transportation infrastructure will also bolster rural markets and allow rural smallholders to diversify their labor portfolio away from purely subsistence agriculture that inherently incurs high risk to climate vulnerabilities.

PNG strives to build a climate resilient **infrastructure sector** in tandem with an efficient transportation network. The connection between the transport and infrastructure sectors is intricate and the benefits of one are likely to affect the other (NAP, 2023). Approximately 21 percent of PNG's population has access to electricity, and the country ranks among the lowest in the world for access to basic safe water supplies (World Bank Group, 2021). A primary focus within this sector will be to climate-proof existing infrastructure and build new climate-resilient infrastructure with a focus on urban and coastal infrastructure such as roads, bridges, jetties, wharves, and airstrips (NAP, 2023).

The **health sector** will benefit from the above sector investments via improved service delivery and aid distribution, particularly to rural areas. Similarly, a strengthened agriculture sector will decrease disease incidence related with food insecurity and poor nutrition, assuming that agricultural productivity increases, and healthy diets are mainstreamed. In addition, a concerted investment in the health sector will be crucial given projected increased temperatures, and potential increases in risk of diseases such as malaria that may arise in previously risk-free zones (NAP, 2023).

Within the 4 key priority sectors, the NAP outlined 9 adaptation areas aimed at addressing identified risks of climate change in PNG (Table 2). Each of the adaptation areas are mapped to the four specific sectors and are described in detail in the NDC, 2020.

Table 2. Links between priority sectors and adaptation priority areas

Adaptation priority areas	Priority Sectors			
	Agriculture	Transport	Infrastructure	Health
Coastal flooding and sea level rise	X	X	X	X
Inland flooding	X	X	X	X
Food security	X			X
Cities and climate change		X	X	X
Climate-induced migration		X	X	X
Damage to coral reefs	X		X	
Malaria and vector-borne diseases				X
Water and sanitation			X	X
Landslides		X	X	X

Source: Adapted from PNGs National Adaptation Plan (2023): https://unfccc.int/documents/628062

CLIMATE POLICIES AND PROGRAMS - PROGRESS AND GAPS

In 2015, PNG became one of the first countries in the Pacific to submit its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) and ratified the Climate Change Management Act. In March of 2016, PNG submitted its First NDC which aligns with the National Climate Compatible Development Management Policy, aimed at reducing greenhouse gas emissions by 50 percent by 2030. Later that year, PNG ratified the Paris Agreement on September 21st.

In 2020, PNG submitted its Enhanced NDC, and the Revised Enhanced NDC was submitted in 2021 to the UNFCCC. That same year, the CCDA published an NDC Implementation Roadmap for 2 priority areas: 1) Agriculture, Forestry, and other Land Use (AFOLU) and 2) the Energy sector, which set out actions to achieve the NDCs within the respective sectors. Given that the majority of greenhouse gas emissions in PNG come from land use change and forestry, the country has primarily focused on these areas for planning and financing documents.

The NDC implementation roadmap follows earlier strategic priorities set forth by the government of PNG through the Development Strategic Plan 2010-2030 and the Vision 2050 national strategic plan. Vision 2050 dedicates one of the seven strategic focus areas (pillars) to environmental sustainability and climate change. Simultaneously, the 5-year Medium Term Development Plans III and IV set out specific investment priorities towards meeting the 2030 and 2050 emission reductions goals. Similarly, the National Strategy for Responsible Sustainable Development (STARS) seeks climate green growth and resilience by shifting to long term planning in order to achieve Vision 2050 objectives.

While PNG has drafted a variety of policy documents and roadmaps to meet NDCs and comply with the Paris Agreement, the most developed policy and program for mitigation plans to contribute to the decline of climate change is the National Reducing Emissions from Deforestation, Forest Degradation (REDD+) Strategy (submitted in 2017 alongside the National Disaster Risk Reduction Framework). There are four design elements to implement the REDD+ Strategy, recognizing that PNG requires significant capacity to increase data collection, management and monitoring of forest systems within the country. These include the REDD+ Strategy, the National Forest Monitoring System, the Forest Reference Level, and the Safeguard Information System. Within each of these design elements, the National REDD+ Strategy outlines the activities needed to decrease national emissions from land use change and forestry. These plans include enhancement of forest cover through reforestation and forest rehabilitation, assessment of the drivers of forest cover change, support a shift in the way the country approaches economic and land use development, and support communities through actions that align with policies and measures for improved carbon management (National REDD+ strategy, 2017).

PNG recently published their proposal for their Second National REDD+ Forest Reference Level document in April 2023 which builds upon the earlier 2017 REDD+ Forest Reference Level. The 2023 document emphasizes the activities needed to address implementation gaps and updates predictions on carbon emission levels between 2019-2027. Some gaps that were addressed were the inclusion of a detailed explanation of the methodology used for the Forest and Land Use Assessment as well as the inclusion of a detailed uncertainty analysis of the emissions examined. Areas for further improvement include addressing recommendations provided by the REDD+ Technical Analysis Technical Report (TATR), the development of country-specific biomass growth data rather than crop-specific post-deforestation biomass growth rates, and the continued guarantee of transparency through periodical update reports (Second National REDD+ Forest Reference Level, 2023).

Most recently, in July of 2023, PNG published four new documents that make up the National REDD+ Safeguards Guidelines. The National REDD+ Development Guidelines are to become a mandatory reference document for all who wish to implement and/or become involved in REDD+. The National REDD+ Free Prior and Informed Consent Guidelines provide direction on how to obtain consent for National REDD+ Strategy related activities specifically towards the customary landholders in PNG. The National REDD+ Benefit Sharing and Distribution Guidelines aim to supply instruction for the distribution of REDD+ benefits and compensations in an effective and fair manner. The National REDD+ Grievance

Redress Mechanism Guidelines is led by the CCDA and outlines specific steps required for the mechanism to be effective.

While strategies and investment plans have been drafted to expand beyond the REDD+ mitigation and monitoring activities, a variety of stakeholders have suggested that the plans and financing are still in early stages. For example, while funding does exist, there are still large funding gaps and a need for more transparent processes for the distribution of funds into climate-related activities (NDC, 2020). The carbon credit market may be an attractive avenue for the country to explore. Currently, PNG remains at a nascent stage to effectively enter into the voluntary carbon market (Filer & Wood, 2012; Hunt, 2019). However, their recently published REDD+ Safeguards Guidelines package is a good step forward in organizing the necessary administrative and monitoring structures necessary to ensure all stakeholders' benefit. Further study to understand how the guidelines are interpreted and whether they are sufficiently comprehensive to ensure transparent processes within the carbon markets will help to inform program design and policy measures. In 2022 as the result of a scandal over a suspected fraudulent project proposal for carbon credits, the Government of PNG imposed a moratorium on all voluntary carbon market activity. As a result, the country is reviewing and developing procedures and infrastructure to support a stronger framework for future carbon market projects. Similarly, literature suggests that insufficient data to accurately project emissions and measure results from the REDD+ Strategy is an ongoing gap that should be reviewed (Hunt, 2019).

PNG recognizes the need for greater analysis capacity to be able to conduct research on under-studied areas such as the impact of climate change on agriculture, water, energy, and health sectors. The country estimates that by 2100 the annual investment in adaptation to climate change will range between 0.14 percent and -1.52 percent of its GDP (NDC, 2020).

Thus far, the following policies are guiding the current investments and activities that PNG is pursuing to decrease carbon emissions and adapt to projected climate change effects:

Policies

- National REDD+ Development Guidelines (2023)
- National REDD+ Free Prior and Informed Consent Guidelines (2023)
- National REDD+ Benefit Sharing and Distribution Guidelines (2023)
- National REDD+ Grievance Redress Mechanism Guidelines (2023)
- *National Adaptation Plan (2023)*
- *Revised Enhanced NDC Plan (2021)*
- *Enhanced Nationally Determined Contribution (2020)*
- *Medium Term Development Plan III 2018-2022*
- *Medium Term Development Plan IV 2023-2027*
- *PNG Vision 2050*
- *National Disaster Risk Reduction Framework (2017)*
- *Climate Change (Management) Act (2015)*
- *National Strategy for Responsible Sustainable Development for PNG (2014)*
- *National Climate Compatible Development Management Policy (2014)*
- *PNG Second National Communication (2014)*
- *Development Strategic Plan 2010-2030*

Programs

- *Second National REDD+ Forest Reference Level (2023)*
- *NDC Implementation Roadmap for AFOLU Sector (2021)*

- *NDC Implementation Roadmap for Energy Sector (2021)*
- *PNGs Sustainable Development Goal 13 Roadmap (2020)*
- *National REDD+ Strategy 2017-2017*

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