Government
of
Papua New Guinea

Papua New Guinea's Enhanced Nationally Determined Contribution 2020

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Published by the Climate Change and Development Authority
Port Moresby, Papua New Guinea
December, 2020
ISBN: 978-9980-911-89-6

Executive Summary

Papua New Guinea signed the United Nations Framework Convention on Climate Change (UNFCCC) in June 1992 in Rio de Janeiro, Brazil, and became a Party after its ratification in March 1993. On 21st September 2016, PNG ratified the Paris Agreement in New York during the 72nd Session of the United Nations General Assembly. PNG is also a member of the Small Island Developing States (SIDS) and aligns itself with the Alliance of the Small Island Developing States (AOSIS) in the context of the UNFCCC. PNG is the current Chair of the Coalition for Rainforest Nations (CfRN), engaging in negotiations under the UNFCCC for its 52 member countries, especially on Article 6 of the Paris Agreement.

PNG established the Climate Change and Development Authority (CCDA) under its national Climate Change Management Act 2015 (CCMA), with the primary role of facilitating and developing appropriate policies, and regulatory framework to address climate change in the country. The Act is currently under review to ensure that it can effectively respond to the needs of and PNG's obligations under the Paris Agreement.

The Government of PNG (GoPNG) has shown its commitment to fulfilling its obligations under the UNFCCC. This includes mainstreaming climate change in its development priorities, as captured in the national long-term political vision, plans, and strategies of; PNG Vision 2050, the National Development Strategic Plan 2010-2030, and the Medium Term Development Plan III. These strategies are founded on the concepts of helping to strengthen and diversify the foundations of PNG's economic growth while taking action to both increase the country's resilience to climate change and take steps to further mitigate emissions. The most recent steps in developing these policy approaches have been the development of PNG's SDG 13 Climate Action Roadmap as well as the development of the National REDD+ Strategy (NRS).

The development of PNG's Nationally Determined Contributions (NDC) aligns with the national strategies noted above and builds on the first NDC submitted in 2016. This NDC further aligns with sectorial policies, plans, and strategies that stakeholders will implement in response, existing challenges and circumstances.

PNG's NDC sets out a comprehensive package of policies and measures, sectorial targets, and sector-specific actions that are tailored towards meeting defined contributions to addressing climate change through both immediate action and developing the enabling environment and technical capacity for an ongoing process of increased ambition. The document is, in compliance with the Enhanced Transparency Framework (ETF) requirements as stipulated under the Paris Agreement. The contributions outlined in this NDC are all conditional.

The NDC outlines key pathways towards sustainable economic development in line with the United Nations Sustainable Development Goals – in particular, Goal 13 on Climate Action. The central element of this is; maintaining PNG's high forest cover (currently reported at 78 percent[1]) and reducing emissions from both the AFOLU and Energy Sectors covering two (2) of the four (4) emitting sectors from PNG's first Biennial Update Report submitted in 2019.

Adaptation is a high priority due to the climate-related hazards that already pose significant risks to PNG today. PNG's commitment to adaptation for 2020-2030 will focus on four priority development sectors of agriculture, health, transport, and infrastructure. The PNG's National Adaptation Plan which is due for completion in 2021 will align with this enhanced NDC.

The commitment here seeks to ensure a gender-responsive and human rights-based approach in all related planning, programming, and implementation. This includes the participation of men, women, youths, and vulnerable groups in consultations, planning, decision making and implementation in the identified sectors, as well as ensuring men, women and youths have opportunities to develop sustainable low-carbon livelihoods.

1. Forest and Land Use Change in Papua New Guinea 2000 – 2015. (2019).

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Glossary

Adaptation	Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Afforestation	Planting of new forests on lands that historically have not contained forests.
Agriculture, Forestry and Other Land Use (AFOLU)	One of the four main anthropogenic greenhouse gas emitting sectors according to the 2006 IPCC Guidelines concerned with land. This integration recognizes that the processes underlying greenhouse gas emissions and removals, as well as the different forms of terrestrial carbon stocks, can occur across all types of land. It recognizes that land-use changes can involve all types of land
Base Year	Starting year of the inventory.
Biomass fuels or biofuels	A fuel produced from dry organic matter or combustible oils produced by plants. These fuels are considered renewable as long as the vegetation producing them is maintained or replanted, such as firewood, alcohol fermented from sugar, and combustible oils extracted from soy beans. Their use in place of fossil fuels cuts greenhouse gas emissions because the plants that are the fuel sources capture carbon dioxide from the atmosphere.
Capacity building	In the context of climate change, the process of developing the technical skills and institutional capability in developing countries and economies in transition to enable them to address effectively the causes and results of climate change.
Carbon dioxide equivalent (CO_2 eq)	A measure to compare different greenhouse gases based on their contribution to radiative forcing. The UNFCCC currently (2005) uses global warming potentials (GWPs) as factors to calculate carbon dioxide equivalent.
Census	Data collected by interrogation or count of an entire population.
Coalition for Rainforest Nations	A voluntary grouping of largely developing nations with rainforests which addresses issues surrounding environmental sustainability specific to tropical rainforests. Participation does not necessarily imply that countries adhere to any specific domestic policies or negotiating positions within the international context. At September 2011, the group included Argentina, Bangladesh, Belize, Cameroon, Central African Republic, Chile, Congo, Costa Rica, Cote d'Ivoire, DR Congo, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, El Salvador, Fiji, Gabon, Ghana, Guatemala, Guyana, Honduras, Indonesia, Jamaica, Kenya, Lesotho, Liberia, Madagascar, Malaysia, Nicaragua, Nigeria, Pakistan, Panama, Papua New Guinea, Paraguay, Samoa, Sierra Leone, Solomon Islands, Suriname, Thailand, Uruguay, Uganda, Vanuatu and Vietnam. Countries participate on a voluntarily basis primarily through unified negotiating positions, workshops and collaborative programs.

Country – specific data	Data for either activities or emission that are based on research carried out on sites either in that country or otherwise representative of that country.
Deforestation	Is the conversion of forest land to any non-forest land. Primary deforestation is the conversion of primary forest. Secondary deforestation is the conversion of degraded forest.
Forest degradation	Is the conversion of primary forest to disturbed forest
Energy Sector	One of the four main anthropogenic greenhouse gas emitting sectors according to the 2006 IPCC Guidelines concerned with the combustion of fossil fuels, fugitive emission and carbon.
Green Climate Fund (GCF)	At COP 16 in Cancun in 2010, Governments established a Green Climate Fund as an operating entity of the financial mechanism of the Convention under Article 11. The GCF will support projects, programs, policies and other activities in developing country Parties. The Fund will be governed by the GCF Board
Greenhouse gases (GHGs)	The atmospheric gases responsible for causing global warming and climate change. The major GHGs are carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O). Less prevalent but very powerful greenhouse gases are hydrofluorocarbons (HFCs), perfluorocarbons (IMOs) and sulphur hexafluoride (SF6).
Intergovernmental Panel on Climate Change (IPCC)	Established in 1988 by the World Meteorological Organization and the UN Environment Program, the IPCC surveys world-wide scientific and technical literature and publishes assessment reports that are widely recognized as the most credible existing sources of information on climate change. The IPCC also works on methodologies and responds to specific requests from the Convention's subsidiary bodies. The IPCC is independent of the Convention.
Kyoto Protocol	An international agreement standing on its own, and requiring separate ratification by governments, but linked to the UNFCCC. The Kyoto Protocol, among other things, sets binding targets for the reduction of greenhouse-gas emissions by industrialized countries.
Land cover	The type of vegetation, rock, water, etc. covering the earth's surface.
Land use	The type of activity being carried out on a unit of land.
Land use, land-use change, and forestry (LULUCF)	A greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use, land-use change and forestry activities.
Loss and damage	At COP 16 in Cancun in 2010, Governments established a work program in order to consider approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change as part of the Cancun Adaptation Framework.
Mitigation	In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere.

Measurement, reporting and verification (MRV)	Measurable, reportable and verifiable. A process/concept that potentially supports greater transparency in the climate change regime.
National Adaptation Programmes	Documents prepared by least developed countries (LDCs) identifying urgent and immediate needs for adapting to climate change.
National Communication	A document submitted in accordance with the Convention (and the Protocol) by which a Party informs other Parties of activities undertaken to address climate change. Most developed countries have now submitted their fifth national communications; most developing countries have completed their first national communication and are in the process of preparing their second.
National Determined Contribution (NDC)	According to Article 4 paragraph 2 of the Paris Agreement, each Party shall prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.
Party	A state (or regional economic integration organization such as the European Union) that agrees to be bound by a treaty and for which the treaty has entered into force.
Population	The population is the totality of items under consideration. In the case of a random variable, the probability distribution is considered to define the population of that variable.
Removals	Removal of greenhouse gases and/or their precursors from the atmosphere by sink.
Sink	Any process, activity or mechanism which removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas from the atmosphere. (UNFCCC Article 1.8) Notation in the final stages of reporting is negative (-) sign.
Source	Any process or activity which releases a greenhouse gas, an aerosol, or a precursor of a greenhouse gas into the atmosphere. (UNFCCC Article 1.9) Notation in the final stages of reporting is the positive (+) sign.
Time series	A time series is a series of values which are affected by random processes and which are observed at successive (usually equidistant) points in time.
Trend	The trend of a quantity measures its change over a time period, with a positive trend value indicating growth in the quantity, and a negative value indicating a decrease. It is defined as the ratio of the change in the quantity over the time period, divided by the initial value of the quantity, and is usually expressed either as a percentage or a fraction.
IPCC Revised1996	Guideline for estimating emissions and (removals) of particular gases from the five (5) anthropogenic greenhouse gas sectors. Energy Sector, Industrial Processes Sector, Agricultures, Land Use, Land-Use Change and Forestry Sector and Waste Sector
IPCC 2006	Guideline for estimating emissions and (removals) of particular gases from the four (4) anthropogenic greenhouse gas sectors. Energy Sector; Industrial Processes and Product Use Sector; Agricultures, Forestry and Other Land-Use; and Waste Sector.

Verification	Verification refers to the collection of activities and procedures that can be followed during the planning and development, or after completion of an inventory that can help to establish its reliability for the intended applications of that inventory
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Acronym

ABM	Australia Bureau of Meteorology
AD	Activity data
AFOLU	Agriculture, Forestry and Other Land Use
AOSIS	Alliance of the Small Island States
BUR	Biennial update report
CCDA	Climate Change and Development Authority
CCDA NDC TWC	Climate Change and Development Authority Nationally Determined Contribution Technical Working Committee
CCMA	Climate Change Management Act
CfRN	Coalition for Rainforest Nations
CH_4	Methane
CHARM	Comprehensive Hazards and Risk Management
CO_2	Carbon Dioxide
COP	Conference of Parties
DNPM	Department of National Planning and Monitoring
EF	Emission factor
ETF	Enhanced Transparency Framework
FAO	The Food and Agriculture Organization of the United Nations
FRDP	Pacific's Framework for Resilient Development Plan
FRL	Forest Reference Level
GCF	Green Climate Fund
GEF	Global Environment Facility
Gg	Giga gram
GHG	Greenhouse gas
GoPNG	Government of Papua New Guinea
ICCAI	International Climate Change Adaptation Initiative
INC	Initial National Communication
INDC	Intended Nationally Determined Contributions.
IOC	International Ocean Commission
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial processes and product use

KRA	Key Result Area
LNG	Liquefied Natural Gas
LULUCF	Land use, land-use change and forestry
MTDP	Medium-Term Development Plan
MRV	Measurement, reporting and verification
N_2O	Nitrous Oxide
NAP	National Adaptation Plan
NC	National Communication
NCCDMP	National Climate Compatible Development Management Policy
NDA	National Designated Authority
NDC	Nationally determined contribution
NEC	National Executive Council
NRS	National REDD+ Strategy 2017–2027
NSO	National Statistical Office
PNG	Papua New Guinea
REDD+	Reducing Emissions from Deforestation and, Forest Degradation and the role of conservation, sustainable forest management of forests, and enhancement of forest carbon stocks
RFIP	REDD+ Finance and Investment Plan
SIDS	Small Island Developing States
SNC	Second National Communication
STaRs	Strategy for the Responsible Development for PNG
STWC	Sub-technical Working Committee
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

The Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) is the cornerstones that bind international obligations on climate change globally. The Paris Agreement specifically challenges Parties under Article 3 to take robust climate action, through what has become known as the Nationally Determined Contributions (NDC). Papua New Guinea (PNG) like all other Parties is required to communicate its ambitious targets and report on progression overtime on how PNG through national action is contributing towards achieving the long term temperature and adaptation goals set under Article 2 of the Paris Agreement.

The NDC is an articulation of PNG's mitigation and adaptation contributions. It sets out targets and identifies measures and actions to be pursued towards achieving these targets. It contains five (5) chapters which outline the following:

- **Chapter 1 (National Context)** provides a general synopsis of PNG, setting out information on the country's geography; climate; population; an overview on economic development; an assessment of the impacts and vulnerabilities; and an outline of key climate change policies, institutions, and regulatory frameworks.

- **Chapter 2 (Summary of Information on Clarity, Transparency and Understanding)** establishes the reference point, period of implementation, methodology, scope and sector coverage, and a summary of targets.

- **Chapter 3 (Papua New Guinea's Mitigation Contribution)** focuses on mitigation targets and potential actions and measures to be taken in sectors identified: Energy Sectors and LULUCF sub-sector;

- **Chapter 4 (Papua New Guinea's Adaptation Actions)** covers adaptation planning, priorities, data gaps, and outlines the adaptation actions and targets; and:-

- **Chapter 5 (Means of Implementation)** discusses matters pertaining to implementation. The chapter contains a needs assessment which covers general support, finances and capacity building.

NATIONAL CONTEXT 1

GEOGRAPHY & CLIMATE

PNG is an island country in the South Pacific Region, located between the Equator and the Tropic of Capricorn. It shares the international land border with Indonesia to the west, and maritime borders with Australia to the south, the Solomon Islands to the east, and the Federated States of Micronesia to the north. It has a total land area of (46.13 million hectares), 97 percent[2] of which is customarily owned by local indigenous people, while 3 percent is alienated land owned by the State.

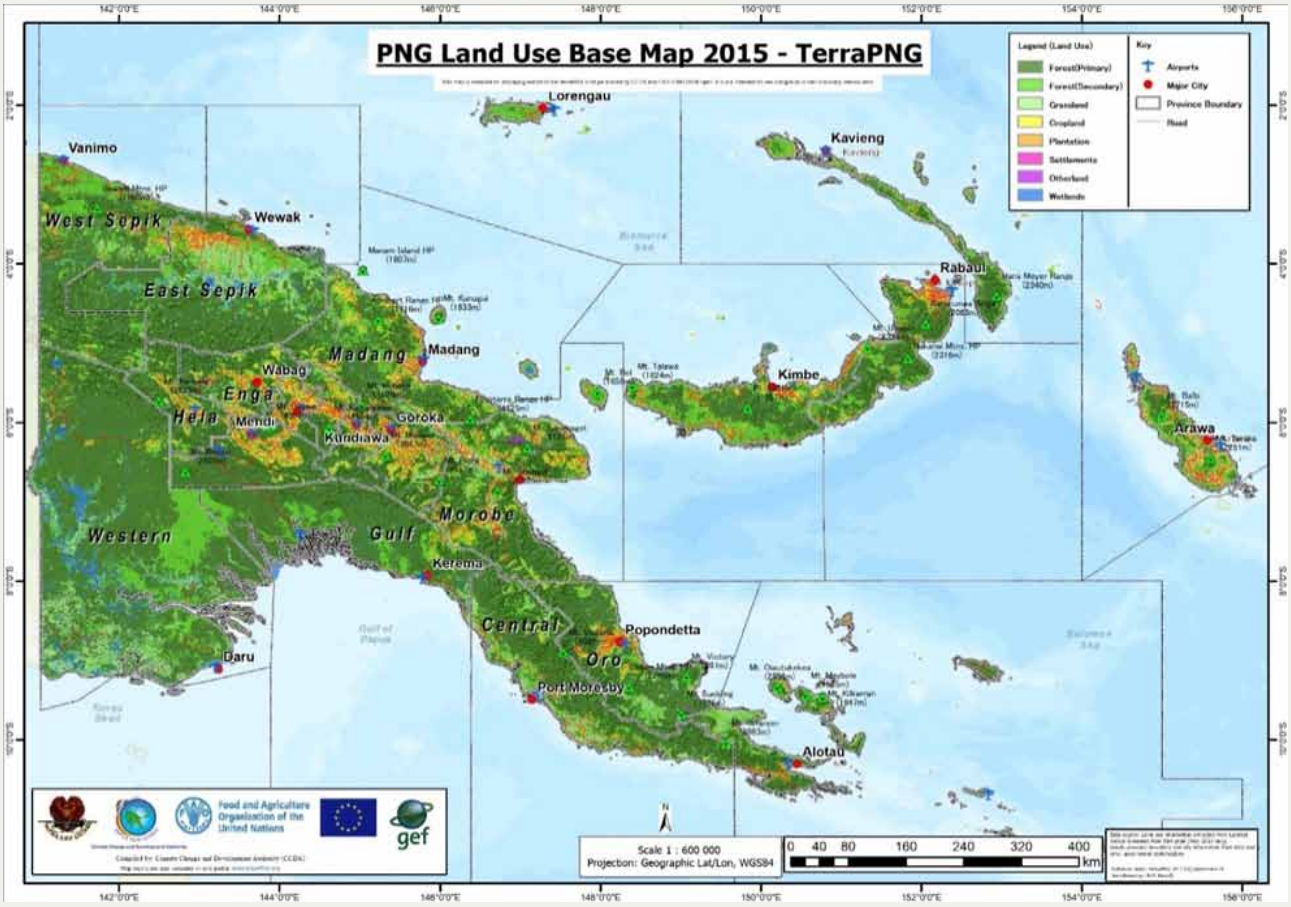


Figure 1 Map of Papua New Guinea. Source CCDA

Owing to its geographical proximity to the northward moving Australian continental plate and the northwest moving Pacific plate, PNG is located in one of the most tectonically active areas in the world, also known as the ring of fire. The country is bestowed with remarkable diversity and extraordinary landscapes, terrestrial ecosystems, rich flora and fauna with accommodating climatic conditions.

PNG's climate is classified as an 'Af climate' according to Koppen –Geiger Classification with hot, humid tropical climate experienced all year round[3]. The country experiences two distinctive seasons: wet and dry - whereby the wet season occurs from December to March, and the dry season from June to September. PNG's average monthly rainfall ranges between 250mm – 350mm, with average temperatures between 26 – 28 degrees Celsius. Humidity is relatively high in PNG, ranging between 70 - 90 percent[4].

2. Papua New Guinea First Biennial Update Report .(2019).
3. Australian Bureau of Meterology and CSIRO. (2011). Climate Change in the Pacific. Scientific Assessment and New Research. Volume 2. Country Reports
4. Australian Bureau of Meterology and CSIRO. (2011). Climate Change in the Pacific. Scientific Assessment and New Research. Volume 2. Country Reports

IMPACTS & VULNERABILITY

PNG is ranked as the tenth most vulnerable country in the world to the risk of climate change[5]. PNG's highlands region is susceptible to extreme weather such as heavy rainfall, which may increase the occurrence of landslides and inland flooding. The coastal regions, the islands and the low-lying atoll areas are mostly vulnerable to extreme weather events, storm surge, sea-level rise, and coastal inundation.

With more than 75 - 80 percent of the population living in rural areas[6], the risk of exposure to natural hazards is very high. PNG's rural populations are mostly subsistence farmers that rely on subsistence farming for their livelihoods, with limited capacity to protect themselves from climate-induced natural disasters. The rugged mountainous terrain as well as limited access to basic infrastructures such as roads and bridges has hindered rural communities to access health care, education and broader development opportunities. Women are particularly vulnerable due to the lack of access to land, income, credit and other resources. This lack of access impedes their ability to cope with climate stresses and disasters.

About 60 percent of PNG's population is under the age of 25 years[7]. Much of this group experience poverty as a result of lack of access to education and employment opportunities. The literacy rate for young men is 67 percent, and for young women, 79 percent[8]. Approximately 28.4 percent of young people (between the ages of 15-24) are not employed or otherwise participating in educational or vocational training opportunities[9].

PNG's climate is projected to change as shown in Table 1 below. According to the Commonwealth Scientific and Industrial Research Organization (CSIRO), there is a high confidence level of different climate variables increasing over the course of the 21st century.

Table 1 Climate Projections for Papua New Guinea

Climate variable	Projection	Confidence level
Surface air temperature	Projected to increase	Very high confidence
Sea surface temperature	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 decrease	Moderate confidence
Frequency of tropical cyclones	Projected to decrease	Moderate confidence
Ocean acidification	Projected to continue	Very high confidence
Mean sea-level rise	Projected to increase	Very high confidence

These projections are expected to raise exposure levels and increased vulnerability to shifting climatic conditions and will impact the growing population and economic development.

5. World Risk Report. (2016).
6. Papua New Guinea's Voluntary National Review 2020- Progress of Implementing the Sustainable Development Goals. (2020).
7. Papua New Guinea Young People. (2018).
8. Education for All 2000 – 2015: Achievements and Challenges. (2015)
9. International Labour Organization. Youth Labour Statistics. (2020).

POPULATION

According to the PNG's national population census 2011, the country's population has grown from 3.8 million in 1990 to 7.3 million. The 2000 and 2011 censuses[10] acknowledged that around 12 percent of PNG's population lives in urban areas while the rest of the population lives in rural communities. These rural communities maintain traditional village structures and depend on subsistence farming, supplemented by cash cropping. Thirty nine percent of the overall population live in the Highlands region, 26 percent in the Momase region, with the Southern and New Guinea Islands regions totalling 20 percent and 15 percent of the population respectively.

SUSTAINABLE ECONOMIC DEVELOPMENT

Sustainable economic development is a priority agenda for the Government of Papua New Guinea (GoPNG), and is reflected as a long-term goal in the PNG Vision 2050 (Vision 2050), for PNG to be a "Smart, Wise, Fair, Healthy and Happy Society". To implement the Vision 2050, the PNG Development Strategic Plan 2010-2030 was developed and endorsed by the National Executive Council (NEC), which sets out key targets and more detailed strategies. This serves as the building block to achieving the requirements of the Vision 2050. To ensure that the priority pillars of the Vision 2050 are met, a 5-year plan called the Medium-Term Development Plan (MTDP) was developed with specific sector targets and indicators.

PNG is a developing country and has a dual economy, consisting of both the formal and informal economy. The formal economy is made up of the large-scale extractive mining and petroleum sector, and the primary industries sector including; forestry, fishing, and commercial agriculture. It employs 15 percent of the total workforce. The informal economy on the other hand supports 85 percent of the population through subsistence agriculture[11] and is dominated by women.

Despite the abundance of natural resources and economic growth recorded since 2013, PNG's economy faces numerous challenges. The rugged terrain and the high costs of infrastructure hamper the exploitation and development of natural resources, and consequently, the formal and informal economies which support it. The GoPNG, with the support of development partners and investors, aims to pursue economic activities to realize sustainable economic development.

10. National Population and Housing 2011. (2013).
11. Papua New Guinea, First Biennial Update Report. (2019).

CLIMATE CHANGE POLICY, INSTITUTIONS & REPORTING HISTORY

Papua New Guinea is a signatory to the UNFCCC since 13th June 1992 and has been engaged in international climate change negotiations. PNG ratified the UNFCCC on 16th March 1993. In 2015, the Paris Agreement was adopted, and PNG ratified the agreement on 21st September 2016. In 2016, PNG enacted the United Nations Paris Agreement Act 2016, which gives domestic effect to the Paris Agreement and provides a legal basis under which the NDC is administered in PNG, together with the Climate Change Management Act, 2015.

The Climate Change and Development Authority CCDA is the National Designated Authority that coordinates all climate change-related matters in PNG. CCDA is also the focal point to the UNFCCC. As the coordinating agency, CCDA works in collaboration with stakeholders, with the objective of providing a coordination mechanism at the national and provincial level for research, analysis, and development of the policy and the legislative framework to move towards a low carbon economy and achieving climate-resilient development in the country.

To comply with the reporting obligations under the UNFCCC, PNG prepared and submitted its First and Second National Communication (NC) in 2002 and 2014, respectively. The report captures Papua New Guinea's Green House Gas emissions and removals including the country's actions to mitigate and adapt to the effects of climate change. The Revised 1996 IPCC Guidelines were used for the First NC and Second NC and the categories were estimated using Tier 1 methods. The 2006 Good Practice Guidance was also used in the Second NC.

PNG then submitted its First Biennial Update Report (BUR1) to the UNFCCC in 2019. The BUR1 contains updated information of PNG's GHG emissions and removals as well as mitigation actions and support received. The 2006 IPCC Guidelines was used in the BUR1 GHG Inventory and most categories were estimated using Tier 1 method while certain categories in the Agriculture, Forestry and Other Land Use (AFOLU) and the Waste sector was estimated using the Tier 2 method. The time series reported in the GHG Inventory for the BUR1 was 2000 to 2015, which is an updated version of the Second NC. The BUR1 contains the results achieved by PNG from reducing emissions from deforestation and forest degradation and enhancement of forest carbon stock (REDD+) initiatives in the AFOLU sector as a Technical Annex. The Third National Communication (Third NC) and BUR2 are planned to be submitted by 2021 which will provide an update of the Second NC and BUR1. Further improvement will be needed to comply with the Enhanced Transparency Framework (ETF) as per Decision 18/CMA.

PNG submitted its NDC on 24th March 2016 in which its contributions and pledges were declared conditional and subject to relevant technical and funding support made available by the developed countries through relevant international funding sources. It proposed that PNG's main contributions will come from the existing REDD+ initiatives under the Agriculture Forestry and Other Land Use (AFOLU) sector, and a 100 percent renewable energy target set for 2030 as well as promotion of energy efficiency uses in all appliances from the energy sector. The other important component of the contributions would be from climate-resilient development in the country and enhancing adaptation in the livelihood of the rural population which amounts to 75 – 80 percent[12] of the 8.25 million[13] people in PNG.

PNG's NDC in 2016 was prepared in line with the national strategies and plans. The commitments were adduced from the National Climate Compatible Development Management Policy (NCCDMP), under which PNG aspires to reduce its emission to 50 percent by 2030 and to be carbon neutral by 2050.

Specific to the forest sector, PNG developed its National REDD+ Strategy which was approved by NEC in May 2017. The National REDD+ Strategy outlines the key action areas across the sectors. These are addressed further within the section on LULUCF

PNG's Forest Reference Level (FRL) was submitted to the UNFCCC on 15th January 2017 which shows the historical annual emissions from the LULUCF sub-sector of 31,000 Gg CO2 eq per annum, and it predicts an ongoing increase in the emissions levels in the sector. However, should there be any reduction

12. Papua New Guinea's Voluntary National Review 2020- Progress of Implementing the Sustainable Development Goals. (2020)

13. Papua New Guinea's Voluntary National Review 2020- Progress of Implementing the Sustainable Development Goals. (2020)

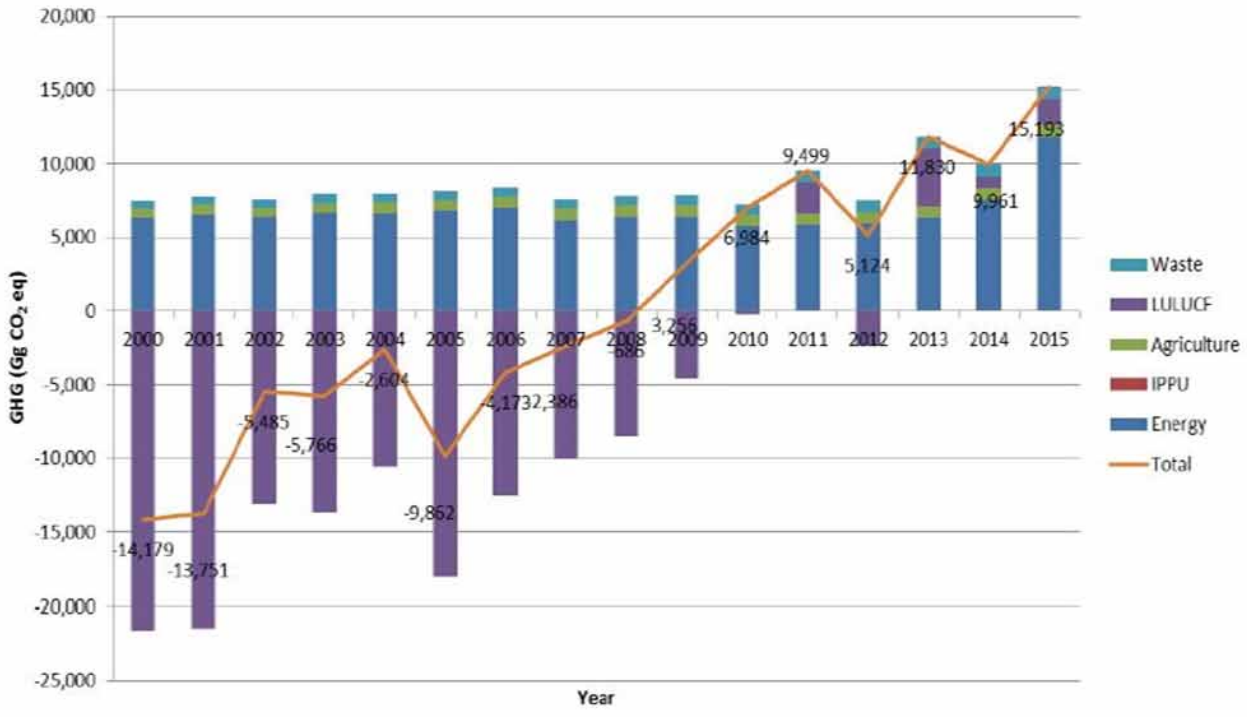
below this level; PNG will become eligible for result based payments (RBP). All four design elements of the Warsaw Framework (National REDD+ Strategy[14], National Forest Monitoring System, SIS and FREL/FRL were developed with technical assistance of the United Nations Development Programme (UNDP) and the Food and Agriculture Organization of the United Nations (FAO). This allowed PNG to prepare a submission for RBP to the Green Climate Fund (GCF) and other donor agencies.

SUMMARY OF EMISSIONS AND REMOVALS FOR PNG

According to the BUR1, the total net Greenhouse Gas Emissions in 2015 amounted to 15,193 Gg CO2 eq compared to the emissions in 2000 which was -14,179 Gg CO2 eq. Therefore, PNG went from a net sink in 2000 to a net source in 2015. Below are emissions from each sector:

- Energy Sector amounted to 11,806 Gg CO2 eq in 2015 an increase of 5,532 Gg CO2 eq when compared to 2000.
- Industrial Process and Product Use amounted to 35 Gg CO2 eq in 2015 an increase of 1.4 Gg CO2 eq when compared to 2000.
- Agriculture sector amounted to 796 Gg CO2 eq in 2015, an increase of 114 Gg CO2 eq when compared with the year 2000.
- Land Use, Land-Use Change and Forestry (LULUCF) sector historically acted as a sink. However, the sector has evolved into a smaller sink over time due to the decrease in forest lands over time. The net emissions from the LULUCF sector amounted to 1,716 Gg CO2 eq in 2015 compared to - 21,636 Gg CO2 eq in 2000 which is a total decrease of removals amounting to 23,370 Gg CO2 eq.
- Waste sector amounted to 873 Gg CO2 eq in 2015, an increase of 354 Gg CO2 eq when compared to 2000.

Figure 2 Time Series of PNG's Total Emission and Removals



14. Papua New Guinea, National REDD+ Strategy 2017-2027. (2017).

SUMMARY OF INFORMATION ON CLARITY, TRANSPARENCY & UNDERSTANDING

2

REFERENCE POINT

The current Enhanced NDC utilizes 2015 as the base year for all emission targets with information being based on PNG's current Greenhouse Gas Inventory Report for Papua New Guinea of that year.[15] The targeted GHG for this NDC is carbon dioxide (CO_2).

No reference point is provided for the Adaptation Targets due to the diverse adaptation interventions at different levels of development.

IMPLEMENTATION PERIOD

The NDC Implementation Period is from 2020 to 2030. This is based on the accompanied decisions to the Paris Agreement adopted in 2015[16].

PAPUA NEW GUINEA'S NATIONALLY DETERMINED CONTRIBUTION INSTITUTIONAL ARRANGEMENT & PLANNING PROCESS

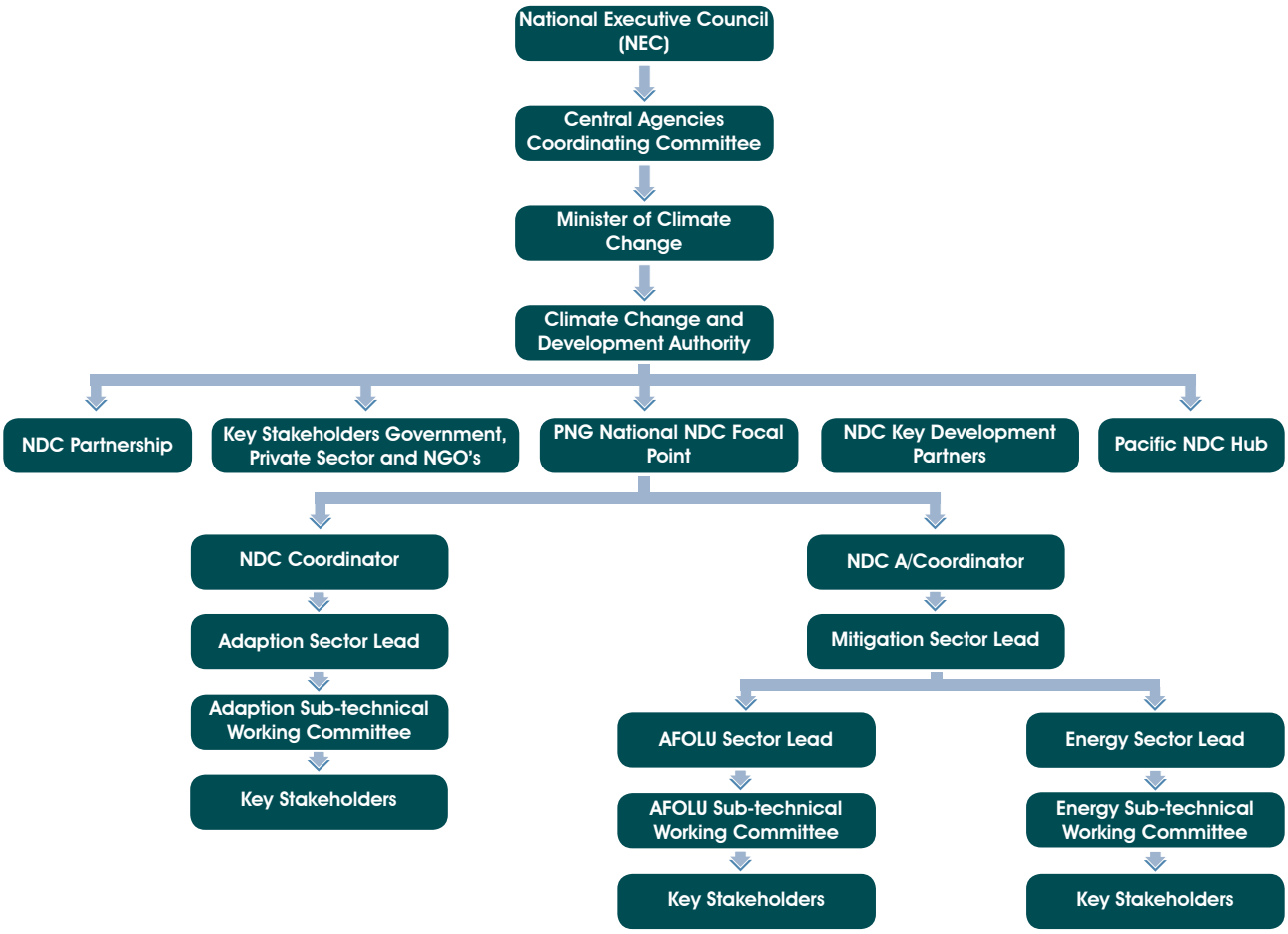
The Climate Change and Development Authority is the National Designated Authority of Papua New Guinea that is responsible to implement the Paris Agreement and commitments under the UNFCCC, in close collaboration with line agencies. CCDA provided a coordination mechanism at the national level for the PNG Enhanced NDC through existing institutional frameworks and newly created to best support the successful revision of the NDC.

The coordination by CCDA with Development Partners and Stakeholders is well outlined in Figure 3.

15. Papua New Guinea's First Biennial Update Report. (2019).

16. Paragraph 23 of decision 1/CP.21 "Requests those Parties whose intended nationally determined contribution pursuant to decision 1/CP.20 contains a time frame up to 2025 to communicate by 2020 a new nationally determined contribution and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Agreement."

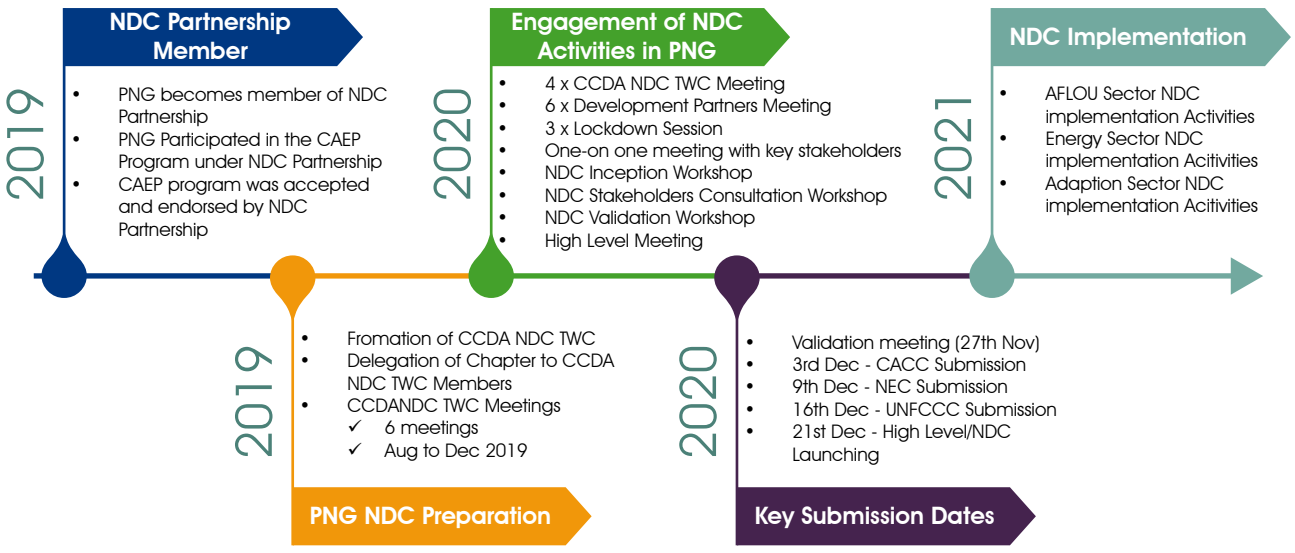
Figure 3 PNG's NDC Institutional Arrangement



In planning for the revision of the enhanced NDC, CCDA has ensured the following necessary steps were taken to ensure better coordination through National Consultation and NDC Coordination through various steps outlined in Figure 4;

- NDC Partnership Members
- PNG NDC Preparation
- Engagement of NDC Activities in PNG
- Key Submission Dates
- NDC Implementation

Figure 4 PNG NDC Preparations and Planning



DEVELOPMENT METHODOLOGY

The NDC is consistent with the methodologies used in the preparation and development of the BUR1 using the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

PNG adopted the baseline method in the determination of contributions and in compiling its NDC. Whilst there are existing laws, policies, measures, and initiatives that will guide actions going forward, effective implementation will require structural adjustments to the domestic regulatory framework, institutional measures, financing, and additional action (including projects). Hence, the NDC will be assessed against the identified baselines, as opposed to considering the contributions and targets as "business as usual".

CONSIDERATION OF NDC BEING FAIR AND AMBITIOUS

PNG's emissions account for a minimal percentage of global emissions. Despite this, PNG has made significant commitments to address the impacts of climate change, with the proposed targets considered to be very ambitious as assessed against PNG's levels of development, its status as a Small Island Developing State (SIDS) and its emissions profile.

The NDC is in line with PNG's Vision 2050 as well as the Climate Compatible Development Management Policy accords. The policy outlines the government's commitment, to be 50 percent carbon neutral by 2030, and be entirely carbon neutral by 2050.

The NDC commits to ensuring gender-responsive and human rights-based approach in all related planning, programming, and implementation. This includes the participation of women, youth and vulnerable groups in consultations, planning and decision making in the sectors, as well as to ensure women and youth have opportunities to develop sustainable low-carbon livelihoods.

SUMMARY OF CONTRIBUTIONS INCLUDING SCOPE AND COVERAGE

Mitigation

Papua New Guinea reported a net emission in 2015 of 15,193 Gg CO2 eq which is a significant increase from the -14,179 Gg CO2 eq reported for 2000[17]. PNG, therefore, went from a net sink in 2000 to a net source in 2015. The increasing trend was due to the reduction of removals from the AFOLU sector which decreased from - 20,972 Gg CO2 eq in 2000 to 2,512 Gg CO2 eq in 2015, a decrease of 23,484 Gg CO2 eq[18]. The Energy sector also had an impact on this increasing trend where emissions increased from 6,274 Gg CO2 eq in 2000 to 11,806 Gg CO2 eq in 2015, an increase of 5,532 Gg CO2 eq[19].

Within the AFOLU sector, the LULUCF sub-sector was one of the biggest contributors to GHG emission in PNG accounting for net emission of -21,654 Gg CO2 eq in 2000 and 1,716 Gg CO2 eq in 2015.[20] Within the Energy sector, the Energy industries sub-sector was the biggest contributor which accounted to 1,023 Gg CO2 eq in 2000 and 4,128 Gg CO2 eq in 2015[21].

As such this Enhanced NDC Focuses on targets and actions within these two sectors specifically the LULUCF sub-sector and Energy Industries sub-sectors, while also noting opportunities for action within the transport sub-sector and a commitment to enhance ambition in the way that PNG collects and manages data within them and across all emitting sectors to allow for further refinement and enhancement of ambition within future updates.

Key targets within these areas include:

17. Papua New Guinea's First Biennial Update Report. (2019).
18. Papua New Guinea's First Biennial Update Report. (2019).
19. Papua New Guinea's First Biennial Update Report. (2019).
20. Papua New Guinea's First Biennial Update Report. (2019).
21. Papua New Guinea's First Biennial Update Report. (2019).

Energy Sector

PNG is committing to a headline target of carbon neutrality within the energy industries sub-sector.

This will be achieved by:

- Increasing levels of renewables in the energy mix for on-grid connection – through increasing the share of installed capacity of renewable energy from 30 percent in 2015 to 78 percent in 2030. The target of 100 percent renewable energy by 2030 in the previous NDC was revised due to the influence of liquefied natural gas (LNG) into the energy mix and existing agreements with Independent Power Producers that extend beyond 2030.
- Reducing energy demand - through adoption and implementation of Minimum Energy Performance Standards and Labelling (MEPSL) Regulations as well as enhancing public awareness of energy use and means of reducing energy use.
- Establishing a framework for fossil fuel emission offsetting – PNG remains committed to an energy transition but also recognizes that a full transition will take time given PNG's complex geographies and dispersed population as well as a growing economy. As such a framework for offsetting of emissions from fossil fuels will be introduced to support economic incentives for the transition while also helping to finance domestic nature-based solutions in particularly reduced emissions and enhanced removals from the forest sector.
- Enhanced data collection – PNG will establish a framework for the enhanced data collection on energy use and associated emissions to support improved policy and regulation to manage emissions.

Also, PNG will continue to review appropriate options and approaches to reduce emissions from the transport sub-sector.

LULUCF Sub-sector

By 2030, the annual emission from deforestation and forest degradation due to agriculture expansion and commercial logging will be reduced by 10,000 Gg CO2 eq comparing to 2015 level. This will result in the LULUCF sub-sector moving from a net GHG source (1, 176 Gg CO2 eq) in 2015 to net GHG sink (-8,284 Gg CO2 eq) by 2030 to mitigate emissions from other sector

This will be achieved by a 25 percent reduction in both the area of annual deforestation and annual degradation against 2015 levels (equating to a reduction of 8,300 ha of annual deforestation and 43,300ha of degradation) as well as an increase in the areas of forest planted.

ADAPTATION

The enhanced NDC will focus on four (4) development sectors impacted by the nine (9) priority areas. The development sectors include agriculture, health, infrastructure, and transport which are in line with the development of the PNG National Adaptation Plan. The adaptation targets are measured against beneficiaries for the agriculture and health sectors, and the value and number of assets for the transport and infrastructure sector and are summarized below:

i) 100 percent of PNG's population to benefit from introduced health measures to respond to malaria and other climate-sensitive diseases;

ii) 6 million people (70 percent of the population) benefit from improved early warning information to respond to climate extremes;

iii) 10 percent of the total population (0.8 million beneficiaries (25 percent are women) have increased resilience of food and water security, health, and well-being in PNG; and

iv) US$ 1.7 billion value of transport, building and utility infrastructure and assets is built and or rehabilitated according to climate-resilient codes and standards.

PAPUA NEW GUINEA'S MITIGATION CONTRIBUTION 3

ENERGY SECTOR

The energy sector is the largest net emitting sector in Papua New Guinea, emitting approximately 87.7 percent of the total emissions (excluding LULUCF) in 2015. The total emission from the energy sector in 2015 was 11,806 Gg CO2 eq, which was an increase of 5,532 Gg CO2 eq (88.2 percent) from 2000[22]. The GHG makeup of the emissions sees CO2 as 68 percent of the total sector emissions, CH4 was 31 percent and N2O was 0.4 percent[23]. This increase in emissions was a result of an increase in economic activities in the country. To achieve the mitigation contributions in the energy sector, efforts will be directed towards the energy industries and transport sub-sectors that will build on existing policy directives of the implementing agencies.

Energy industries, manufacturing industries and construction account for 5,596 (47 percent) Gg CO2 eq in 2015[24] and include emissions from on and off-grid electricity generation and operation of the LNG plant. The on-grid generation that is managed by PNG Power Limited (a state-owned entity) and off-grid generation is from the minerals and agricultural industries that produce their own electricity.

The lack of access to reliable and clean energy is restricting economic development, affecting health, and constraining access to education, health and other services in rural areas. Development of renewable energy small to medium-sized enterprises (SME), such as small-scale solar power, can provide green livelihood alternatives to subsistence agriculture. Access to electricity or affordable renewable energies will improve the livelihood of women and young people in particular through decreased workloads, improved cooking, processing of food and Non-Timber Forest Products (NTFPs), increased safety and security from reliable lighting, engaging in home-based businesses and educational activities in the evenings, and reducing air pollution.

The transport sub-sector contributed approximately 2,007 Gg CO2 eq (17 percent) of the total sectoral emissions in 2015[25]. This sub-sector is a growing source of emissions, particularly with the expansion of urban towns and cities, the population contained in these towns and cities mainly rely on fossil fuel-run vehicles for commuting. Availability of safe, affordable, energy-efficient transportation will increase access to employment, markets, education, health, and other services.

Other Sectors contributed 459Gg CO2 eq (4 percent) of the sectoral emissions in 2015[26], especially from the residential and commercial buildings. PNG does not have much experience with energy efficiency in the residential and commercial building sub-sector; hence the lack of energy efficiency measures to date or energy efficiency projects, which may generate a high return on investments. Thus, energy efficiency in PNG presents the potential for win-win results, reducing greenhouse gas emissions while at the same time providing financial returns via reduced power bills and improving health and economic opportunities for citizens.

Remaining emissions from the energy sector in 2015 came from fugitive emissions of oil and natural gas production which contributed 3,784 Gg CO2 eq (32 percent)[27]. Irrespective of PNG's efforts in reducing GHG emissions, PNG stands as a developing country and the economy relies on oil and natural gas production. Hence future GHG emissions are predicted to take place that potentially will come with the development of oil and natural gas production.

The GHG information presented above is reflective of quantitative data uncovered as a result of the BUR1 GHG inventory. Since PNG does not have a National Energy Balance table, the Asia Pacific Economic Cooperation (APEC) energy balance table was used to estimate emissions from the energy sector in the BUR1. While some of the data used to develop the APEC energy balance table were from actual sources in PNG, most of the information was based on estimates. Due to these uncertainties, it was decided not to include quantified GHG targets for the energy sector in this NDC. The appropriate technical and financial support will be necessary to build the capacity of relevant agencies to manage and analyze data to enable the setting of GHG targets in PNG's forthcoming NDCs.

22. Papua New Guinea First Biennial Update Report. (2019).
23. Papua New Guinea First Biennial Update Report. (2019).
24. Papua New Guinea First Biennial Update Report. (2019).
25. Papua New Guinea First Biennial Update Report. (2019).
26. Papua New Guinea First Biennial Update Report. (2019).
27. Papua New Guinea First Biennial Update Report. (2019).

CONTRIBUTIONS

PNG is committing to a headline target of carbon neutrality within the energy industries sub-sector. This will be achieved by:

Non - GHG Quantitative Targets

As part of PNG's energy transition, the country is targeting a transition in its energy mix in the energy industries for the share of installed capacity of renewables from 30 percent in 2015 to 78 percent in 2030 for on-grid connection managed by PNG Power Limited. This target is conditional and based on the availability and timing of international support. The National Electricity Roll-Out Plan and PNG Power Limited's 15-year power development plan were used to establish this target and will also be used to monitor the progress of this target.

This target represents a decrease from PNG's original target of 100 percent renewable by 2030. This revision is based on:

- Enhanced information on existing and planned projects and the time lag to operationalize larger generation projects.
- The expansion of PNG's LNG sector and its increased role in electricity generation – which while allowing for removal of or avoidance of higher emission energy sources from the grid do not present a renewable energy resource.

Non - GHG Action Based Targets

1. Reducing electricity demand through energy efficiency

Increased efficiency of energy use will play a key role in mitigating the growth in PNG's demand for energy linked to a growing economy and population. Central to this approach will be the adoption and implementation of Minimum Energy Performance Standards and Labelling (MEPSL) Regulations as well as enhancing public awareness of energy use and means of reducing energy use. In-depth work in the areas of building energy efficiencies such as evaluating the performance of installed air conditioning and refrigeration systems and developing recommendations to improve such systems as retrofits or in industrial energy-efficiency audits and retrofits will require financial and technical support. The draft MEPSL is intended to be fully implemented by 2030. Limited data on existing energy use and potential trends currently prohibits placing a quantified target on the impact of these actions.

2. Fossil fuel off-setting from the energy industries sub-sector through nature-based solutions

PNG remains committed to an energy transition but also recognizes that a full transition will take time given PNG's complex geographies and dispersed population as well as a growing economy. As such, a framework for offsetting of emissions from fossil fuels will be introduced to support economic incentives for the transition while also helping to finance domestic nature-based solutions in particular, reduced emissions and enhanced removals from the forest sector.

3. Enhanced data collection

PNG will establish a framework for enhanced data collection on energy use and associated emissions to support improved policy and regulation to manage emissions.

ACHIEVING ENERGY INDUSTRIES SUB-SECTOR TARGETS

The above targets are fully in line with existing national policy and strategy documents as well as industry action plans. Key strategies linked to these targets and central to their achievement include:

- National Energy Policy 2017 - 2027
- The National Electrification Roll-Out Plan
- PNG Power 15 Year Power Development Plan
- The Medium-Term Development Plan III Key Result Area 2: Goal 2.1
- Papua New Guinea's Sustainable Development Goal 13 Roadmap: The four key energy actions:
    1) Carbon neutral gas and minerals sector
    2) Renewable-based rural electrification
    3) Resilient, reliable and efficient electricity grids
    4) Energy-efficient government and private sector

Priority renewable energy projects for investment set out in PNG's Country Programme for Green Climate Fund finance

Several major programs are already being implemented that will contribute to achieving the targets, and they include:

- PNG Electrification Programme
- Pawarim Komuniti – PNG Off-grid Electrification Program
- Town Electrification National Program (TEP)
- Rural On-grid Electrification Program (ROGEP)

The Climate Change (Management) Act 2015 is being reviewed to provide a stronger link between the energy sector and emissions reductions and to create a framework for improving energy data collection.

POTENTIAL ENERGY MEASURES

Papua New Guinea aims to further enhance its ambitions on taking action within the Energy sector. One of the areas is the transport subsector which aims to promote clean fuel technology regulations to set standards for the GHG emissions, and economic incentives for fuel-efficient vehicles. Actions from the transport subsector are contained in the National Transport Strategy, the Medium-Term Transport Plan II 2019-2022, National Energy Policy 2017-2027, and National Climate Compatible Development Management Policy but will need financial and technical support for them to be implemented by 2030. These measures include the following:

- Reduce vehicle-miles through more compact development patterns;
- Encourage the introduction of fuel-efficient transport equipment;
- Encourage sustainable substitution of fossil fuels with biofuels;
- Monitor vehicle fleet-weighted fuel and CO2 efficiency;
- Eliminate high emission vehicles;
- Establish low carbon fuel standards;
- Encourage the introduction of hybrid and electric vehicles

LAND USE, LAND-USE CHANGE & FORESTRY SUB-SECTOR

The Land Use, Land-Use Change and Forestry (LULUCF) sub-sector is one of the biggest contributors to GHG emissions in PNG. Nevertheless, the sector also has the highest potential for removal. The sector has evolved into a smaller sink over time due to a decrease in forest lands. The net emissions from the LULUCF sector amounted to 1, 717 Gg CO2 eq in 2015 compared to -21, 636 Gg CO2 eq in 2000 which is a total decrease of removals amounting to 23,370 Gg CO2 eq[28].

Most of the emissions in the sector occurred as a result of deforestation and forest degradation. Almost all deforestation was due to land-use conversion from forest land to cropland, in particular, subsistence agriculture (68.8 percent) and for oil palms plantation development (24.4 percent). Logging was the major driver of forest degradation, accounting for over 90 percent of the total degraded forest in PNG. Hence, the primary mitigation effort of the sector lies in reducing emission from deforestation and forest degradation due to commercial agriculture, subsistence agriculture and commercial logging.

Sustainable forest management practice is the cornerstone of the current forest policy in the management and utilization of the nation's forest resources. This is now being strengthened by the approval of several national government policy instruments in 2020, including; the National Reforestation and Afforestation Strategies, National Strategies on Domestic Processing of Forest Produce, Revised PNG Logging Code of Practice 2nd Edition, and the PNG Timber Legality Standard. These policy instruments are crucial to facilitating orderly management and development of the forest resources, with the view of giving significant recognition to mitigate against climate change effects.

The REDD+ Finance and Investment Plan (RFIP) which is integral part of the NDC Implementation Plan identified areas within the AFOLU sector to mitigate GHG Emissions . The RFIP sets out the potential opportunities that scaling up actions in line with PNG's National REDD Strategy (NRS) could deliver. These include emissions reductions of more than 60 million tonnes of CO2e over the coming decade, while also delivering significant economic, social and environmental co-benefits. This information is intended to help inform decision makers and potential investors of the potential to deliver tangible returns from upfront investments in REDD+ in PNG.

Progress in the sector is influenced by the following:

- **(i)** coordinated planning on how forest land can be cleared and utilised in a sustainable manner;
- **(ii)** development and implementation of legislation to manage forest resources for its multiple values, and
- **(iii)** effective support to rural development.

Landholders and communities are in need of access to basic services and development opportunities. Many communities and landholders are faced with rapid transition into a global cash-based economy, without the appropriate awareness, skills, and support for sustainable management of resources. Hence, they are indirectly increasing the deforestation and degradation of the forest cover.

Achievement of proposed action areas in the enhanced NDC will be critical in helping transform the livelihoods of PNG's rural communities, safeguard biodiversity and progress PNG towards establishing a sustainable and climate smart economy capable of meeting the Sustainable Development Goals while also helping to deliver sustainable deforestation free agricultural commodities to international markets.

28. Papua New Guinea First Biennial Update Report. (2019).

CONTRIBUTIONS

Papua New Guinea reported the GHG emissions in the LULUCF sub-sector from 2000 to 2015 in the country's BUR1 in 2019[29]. PNG's emissions in LULUCF sub-sector have been increasing steadily during the reporting period due to increases in deforestation and forest degradation caused predominantly by the expansion of agriculture and commercial logging. Actions noted within this NDC will transform this upward trend into a downward trend over the next 10 years (by 2030) as shown in Figure 4.

PNG will reduce the area of annual deforestation and annual degradation by 25 percent against 2015 levels (equating to a reduction of 8,300 ha or annual deforestation and 43,300ha of degradation), and increase the area of afforestation, reforestation, and ecosystem restoration. It will reduce 10,000 Gg CO2 eq of the net emission from the LULUCF sub-sector by 2030.

PNG is a High Forest cover Low Deforestation (HFLD) country with 78 percent forest cover and average annual deforestation rate of 0.05 percent between 2001 and 2015[30]. Increase of deforestation and forest degradation in recent years is largely owing to the rapid population growth (3.1 percent per annum) and fast-growing economy (6.7 percent average annual constant GDP growth between 2009 and 2016)[31]. This trend is expected to continue as well as the increasing trend of emissions in the LULUCF sector as shown in Figure 45. PNG will shift to a downwards trend mainly by promoting REDD+ activities such as enhancement of land use planning and monitoring, promoting climate-friendly agriculture, strengthened monitoring of FCA permits, enhancement of timber legality, and promoting reforestation and ecosystem restoration. PNG will continue improving the monitoring capacity of LULUCF sub-sector by enhancing its National Forest Monitoring System for more accurate monitoring of forest and land-use change, and assessment of GHG emissions in LULUCF sub-sector. The NDC targets and the activities in the LULUCF sector are listed in Table 2.

There were no emissions reduction targets set for the Agriculture sub-sector under the AFOLU sector due to unavailability of country-specific activity data and insignificant emission results. However, there is greater potential for livestock and agriculture development in the country; as such it will be a potential sector that will attract mitigation actions in the future.

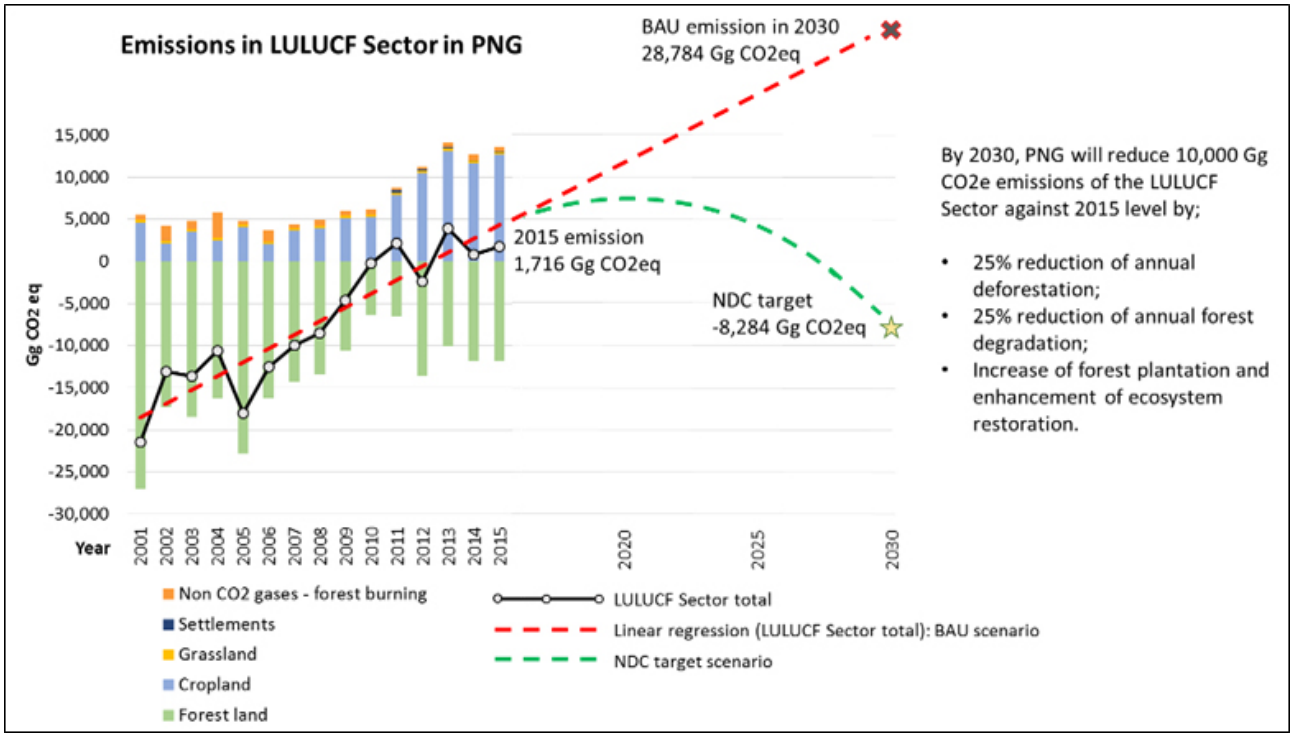
The LULUCF GHG and Non-GHG targets are determined based on the sector's primary mitigation efforts as well as capacity needs to address the sector's monitoring capacity. There are options to improve monitoring and accounting to better address sustainable management of forests and conservation of forest carbon stocks but current data does not allow for this, which PNG would like to improve on in the near future.

29. Papua New Guinea's first Biennial Update Report (2019)

30. PNG Forest Authority (2019) Forest and land use change in Papua New Guinea: 2000-2015

31. National Statistical Office | Papua New Guinea [Internet]. [cited 2020 Aug 30]. Available from: https://www.nso.gov.pg/index.php

Figure 5 PNG's annual GHG emissions and removals between 2001 and 2015, the future emissions prediction under the business as usual scenario and the NDC target from the LULUCF sub-sector.



GHG - Absolute Target

- By 2030, annual net emission from deforestation and forest degradation due to agriculture expansion and commercial logging is reduced by 10,000 Gg CO2 eq comparing to 2015 level.

GHG - Relative Target

- LULUCF will be converted from net GHG source (1,716 Gg CO2 eq) in 2015 to net GHG sink (-8,284 Gg CO2 eq) by 2030 to mitigate emissions from other sectors.

Non-GHG Quantitative Targets

- The area of annual deforestation is reduced by 25 percent of 2015 level by 2030 (Equating to a reduction of 8,300 ha of annual deforestation).
- The area of forest degradation is reduced by 25 percent of 2015 level by 2030 (Equating to a reduction of 43,300 ha of annual degradation).
- The area of planted forest and forest restoration is increased.

Non-GHG Actions Based Targets

- Enhanced land use planning
- Promoting climate-friendly agriculture
  - Oil palm platform
  - Cacao platform
  - Coffee platform
  - Enhancing community level agriculture productivity
  - Certification system for climate-friendly agriculture products
  - Enhancing value chain of climate-friendly agriculture products
  - Strengthened monitoring of FCA permits
- Enhancement of timber legality
- Promoting REDD+
- Promoting downstream processing
- Promoting the Painim Graun Planim Diwai initiative and planting 10 million trees initiative.
  - Setting up detailed strategic action plans based on scientific and socio-economic analysis

SUMMARY OF TARGETS

Overarching target in LULUCF sector: PNG will shift the upward trend of GHG emission in the AFOLU sector due to the increase of deforestation and forest degradation to a downward trend in the next 10 years (by 2030).

Table 2 LULUCF Area of Influence

GHG TARGETS		NON-GHG TARGETS	
Absolute	Relative	Non-GHG quantitative targets	Action-based targets
By 2030, annual net emission from deforestation and forest degradation due to agriculture expansion and commercial logging is reduced by 10,000 Gg CO2 eq comparing to 2015 level.	AFOLU will be converted from net GHG source (1,716 Gg CO2 eq) in 2015 to net GHG sink (- 8, 284 Gg CO2 eq) by 2030 to mitigate emissions from other sectors.	The area of annual deforestation is reduced by 25% of 2015 level by 2030 (Equating to a reduction of 8,300 ha of annual deforestation).	■ Enhanced land use planning ■ Promoting climate-friendly agriculture o Oil palm platform o Cacao platform o Coffee platform o Enhancing community level agriculture productivity o Certification system for climate-friendly agriculture products ■ Enhancing value chain of climate-friendly agriculture products ■ Strengthened monitoring of FCA permits
		The area of forest degradation is reduced by 25% of 2015 level by 2030 (Equating to a reduction of 43,300 ha of annual degradation).	■ Enhancement of timber legality ■ Promoting REDD+ ■ Promoting downstream processing
		The area of planted forest and forest restoration is increased.	■ Promoting the Painim Graun Planim Diwai initiative and planting 10 million trees initiative. o Setting up detailed strategic action plans based on the scientific and socio-economic analysis.

Activities/actions on improving NDC monitoring:

- **Completing National Forest Inventory for;**
  - More accurate emission factor;
  - More accurate post-disturbance forest growth;
  - A better understanding of biodiversity.
- **Re-vitalizing Permanent Sample Plot for;**
  - Understanding the rate of carbon sequestration of regrowth forest;
  - More accurate post-disturbance forest growth;
  - Understanding the carbon sequestration of the primary forest;
  - A better understanding of forest recovery for better forestry planning and policymaking.
- **Assessment of forest and land use prior to 2000 for;**
  - More reliable estimation of GHG removal of forest degraded prior to 2000.
  - Understanding of longer historical trend of forest and land-use change in PNG.
- **Improving the monitoring of logging concession for;**
  - More precise emission data from logging, which is the far most significant GHG emission source in PNG;
  - Enhancement of timber legality system by implementation of Near-Real-time Deforestation and Degradation Alerts Monitoring System for PNG at relevant government institutions and agencies

POTENTIAL POLICIES AND MEASURES

The Papua New Guinea National REDD+ Strategy (2017 - 2027), has identified priority areas and measures to achieve PNG's emissions reduction targets, it will require action that cuts across government sectors and stakeholder groups, at every level (National, Provincial, Local and Ward), which will not halt economic and social development but ensure responsible and sustainable development and deliver long term benefits to the people of PNG. The policies and measure needed that will address the direct and underlying drivers of forest cover change[32] will be based on the following outlined;

a) Strengthening Land Use & Development Planning

The main drivers of emissions are forest degradation and deforestation (forest land converted to other land use). As logging was the main driver for 90 percent of forest degradation between 2011- 2015, strategies on Reducing Emissions from Deforestation and Forest Degradation and Enhancement of Carbon Stocks (REDD+) must be implemented effectively.

b) Stronger Environmental Management, Protection & Enforcement – Degradation Potential

The action area will be concentrated on the development and implementation of a system of developing land-use planning that is both consistent with and able to promote the concepts of StaRS while also supporting the strengthening of the development and land use planning frameworks. It is intended to secure the importance of communities and landholders as the custodians of their land, including directing resources to support strengthened forest management and protection by women and youth.[33]

c) Enforce Economic Productive & Sustainable Livelihoods

There is a rapid increase in land clearing for commercial agriculture due to the demand for investment in rural areas. This is supported by government policies that promote agricultural expansion for increasing food security and expanding agricultural exports. However, this does not link with actions to support staple food production within family agriculture or clear guidance on the environmental and social standards. The NRS, therefore, targets actions to strengthen food security and develop a sustainable commercial agriculture sector to be able to respond to changing international standards.

32. Papua New Guinea National REDD+ Strategy (2017 – 2027). (2017).
33. Papua New Guinea National REDD+ Strategy (2017 – 2027). (2017).

PAPUA NEW GUINEA'S ADAPTATION ACTIONS

4

Adaptation is a high priority due to the climate-related hazards that already pose significant risks to Papua New Guinea considered highly vulnerable to the effects of climate change.[34] Addressing this high vulnerability to climate change involves a breadth of measures,[35] to which adaptation is integral. PNG's Second NC describes the extremely exposed status of this island nation and its vulnerability to the negative impacts of climate change.

The country's tropical climate is changing rapidly and exposure to climate change-related hazards such as inland flooding, coastal flooding, inland frosts and droughts, coastal erosion and inundation, soil salinization, and coral reef degradation have resulted in a severe toll to both the people of PNG and the national economy. Climate change is predicted to exacerbate some of these event-driven hazards and introduce new hazards due to gradual shifts in climatic conditions – most prominently, an increase in malaria penetration into the highlands changed agricultural yields and further damage to coral reefs. These event-driven hazards in turn cause damage to assets and infrastructures, destroy livelihoods, endanger cultural and ecological treasures, and kill or injure people.

The GoPNG, through the CCDA, has emphasized the significance of adaptation through its reporting on national projects and specific activities. CCDA also coordinates and monitors projects that support specific adaptation solutions that protect people against the risk of climate change. Adapting to the impacts of climate change is integral to PNG and, therefore, included in this NDC. Vulnerability and risk exposure to climate change impacts exacerbate human development challenges and social issues.

The last recorded total net GHG emissions for PNG were 15,193 Gg CO2 eq; tailored adaptation measures are necessary to adapt to this climate change influencing trend into the future.

PNG is one of the countries that mention loss and damage in terms of finances. According to a report by the United Nations Office of Disaster, USD 23 million was lost due to the severity and intensity of disasters occurring between 2005 and 2014. In terms of adaptation, a 2013 report by the Asian Development Bank revealed that the annual adaptation cost ranged between 0.14 percent -1.52 percent of the GDP. The economic cost to climate change is projected to reach 15.2 percent of GDP by 2100. Observation from investments made in climate change adaptation however has seen positive implications towards climate resilience.

The PNG National Disaster Centre launched the National Disaster Risk Reduction Framework (NDRRF) 2017-2030, in 2017, with the assistance of the United Nations Development Programme (UNDP). This framework comprises of four priority areas: i) Understanding Disaster Risk; ii) Strengthening Disaster Risk Governance to Manage Disaster Risk; iii) Investing in Disaster Risk Reduction for Resilience; and iv) Enhancing Disaster Preparedness for Effective Response and to "Build Back Better" in Recovery, Rehabilitation, and Reconstruction.

The addition of adaptation into this Enhanced NDC builds upon the initial NDC report by expanding on identified priority areas and including subsections on adaptation planning, defining adaptation targets and providing an overview of the implementation process.

34. Options for Strengthening Climate Finance Coordination and Accessibility in Papua New Guinea.(2019)

35. Green Growth Potential Assessment. Papua New Guinea Country Report. (2019).

36. PNG GCF NAP Readiness Support Proposal. (2020)

ADAPTATION PLANNING

Adaptation planning is guided by PNG's international agreements, regional commitments, and strategic framework of national plans designed to meet the country's climate change goals in the immediate to long-term. As a party to the UNFCCC, the Paris Agreement, and the Sendai Framework, PNG is ultimately committed to achieving the United Nations Sustainable Development Goals, in particular, Goal 13 on Climate Action.

PNG commenced adaptation planning with its Initial National Communication (INC) to the UNFCCC in 2000, followed by its Climate Compatible Development Strategy in 2010. Regionally, PNG's goals are strategically positioned with the Pacific's Framework for Resilient Development Plan (FRDP) confirmed through robust engagement with regional partners. The adoption of Climate Change Management Act 2015 and the Paris Agreement Implementation Act 2016 provide the foundational legislative framework to guide the adaptation activities of PNG.[37]

Additionally, the Vision 2050, the Development Strategic Plan (DSP), the Strategy for the Responsible Development for PNG (STaRs), and the National Climate Compatible Development Management Policy (NCCDMP) set a strong foundation for adaptation planning. PNG takes an inclusive and responsible and sustainable development approach to adaptation planning guided by the 21 principles for inclusive green growth outlined in STaRs. The strategic focus of the GoPNG to address climate change adaptation is outlined in the Medium Term Development Plan (MTDP III) 2018-2022 Goal 7 Key Result Area (KRA) 7.2, which is to 'adapt to the domestic impacts of climate change and contribute to global efforts to abate greenhouse gas emissions.'

The Government has identified twelve overarching adaptation strategies to help meet its strategic adaptation focus. One of the strategies is 'to establish and strengthen national and sub-national climate change and development strategies', which the Government aims to achieve through the development of the PNG National Adaptation Plan (NAP). The NAP aims to advance effective adaptation planning with an overall objective to strengthen institutional and technical capacities and integrate climate change adaptation into national and sub-national planning and budgeting processes.

37. Papua New Guinea and the Green Climate Fund. Country Programme.(2020)

ADAPTATION NINE PRIORITY AREAS

This subsection identifies PNG's priority actions in the face of climate challenges while interlinking them with the country's key policy and strategy documents, verified through robust stakeholder engagement and national validation workshops.

Nine adaptation priority areas have been identified and prioritized in key national documents, including the Intended Nationally Determined Contribution (INDC), the Climate Change Management Act of 2015, the National Communications, and the GCF Readiness Support for NAP Project for PNG, the CCDA Climate Change Corporate Plan, and the GCF PNG Country Programme.

The nine adaptation priority areas influence key priority development sectors and the linkages between them are summarized below.

1. Coastal Flooding and Sea Level Rise

Coastal flooding and sea level rise continue to affect the coastal regions of Papua New Guinea. The sea level surrounding PNG has risen by approximately 7mm per year since 1993, which is higher than the global average of 2.8-3.6mm per year.[38] Projections anticipate a continued rise. Under a high emissions scenario, the sea is expected to rise between 4cm - 15cm by 2030.[39] This will impact storm surges and flooding to coastal regions.[40] Risk of flooding (both coastal and inland flooding) is ranked amongst the highest level of climate risks in PNG. Approximately 1 percent of the country's total landmass is experiencing flooding.[41]

Coastal flooding is anticipated to increase, particularly in PNG's northern areas.[42] In rural coastal lowland areas, mangroves, estuaries and coral reefs are impacted as a result of the heavy silt and debris deposited from flood events. Rising sea levels are having an impact on agricultural crops grown on coral atolls, including swamp taro and coconut, where the freshwater lens is being intruded by saltwater resulting in a loss of production and an impact on livelihoods.[43]

This priority area is linked to the transport, infrastructure, agriculture, urban development, natural resources and environment, and water and sanitation sectors.

2. Inland flooding

Driven by heavy irregular rainfalls, inland flooding regularly affects valleys and wetlands in both the lowlands and the highlands. Most of PNG experiences flooding during the monsoon season. This impacts most rural livelihoods, which are highly reliant on agriculture.[44] As referred to above under Priority Area 1, the risk of flooding (both coastal and inland flooding) is ranked amongst the highest level of climate risks in PNG. Approximately 18 percent of the country's total landmass is experiencing flooding. In August 2017, flooding in the Morobe Province resulted in 150 homes being swept away by floodwaters in a single day and 500 people becoming displaced.[45] [46]The effects of inland flooding are amplified by steep inclines and deforestation. Inland flooding is projected to increase in wetlands and valleys in highlands and lowland areas.[47] [48]

This priority area is linked to the transport, infrastructure, agriculture, urban development, and water and sanitation sectors.

38. International Climate Change Adaptation Initiative. Pacific Climate Change Science Program. Current and Future Climate of Papua New Guinea. (2013).

39. International Climate Change Adaptation Initiative. Pacific Climate Change Science Program. Current and Future Climate of Papua New Guinea. (2013)

40. Green Climate Fund Papua New Guinea Country Programme. (2020).

41. Green Climate Fund Papua New Guinea Country Programme. (2020).

42. Green Climate Fund Papua New Guinea Country Programme. (2020).

43. Impact of Climate Change on Agriculture in Papua New Guinea.(2018).

44. Green Climate Fund Papua New Guinea Country Programme. (2020).

45. National Adaptation Plan process in focus: Lessons from Papua New Guinea.(2018).

46. Green Climate Fund Papua New Guinea Country Programme. (2020).

47. UNFCCC PNG Second National Communication. (2014).

48. Green Climate Fund Papua New Guinea Country Programme. (2020).

3. Food Insecurity

Variability in agricultural yields affects many of PNG's agricultural regions. The highland regions are particularly sensitive to variability in agricultural yields as a result of a change in climatic conditions. Sweet potato, coffee and cocoa are examples of climate-sensitive crops. Subsistence farmers are affected the most and may need to look for alternative crops.

This priority is linked to the agriculture sector.

4. Cities & Climate Change

Papua New Guinea is experiencing an increase in rural to urban migration. Climate change exacerbates existing urban development challenges and vulnerabilities, such as poor health, inadequate housing, and lack of access to infrastructure, basic services and social safety nets. Urban areas on the coast are under threat of storm surge and sea-level rise, and, in PNG, cities are often located in hazard-prone areas in the coastal zone.[49] [50]

This priority area is linked to the transport, infrastructure, health, urban development, and water and sanitation sectors.

5. Climate-Induced Migration

Climate change affects patterns and rates of internal migration and urbanization within PNG, particularly for communities residing in climate-vulnerable areas and reliant on natural resources for livelihoods and well-being. Vulnerabilities faced by rural communities, exacerbated by climate change, are a key driver for rural to urban migration within PNG. The drivers for migration, which are often aggravated by the impacts of climate change, include access to employment, access to education, access to health services, access to socio-cultural networks, access to financial services, access to telecommunications, and access to clean water, sanitation and electricity.[51] [52] Key hotspots, where rates of climate change-induced migration are high, include urban areas, outer islands and atolls, and coastal, delta and riverine communities, and communities prone to drought.[53] Both the Manam and the Carteret Islands in PNG have been impacted by environmental degradation and climate change hazards, which has resulted in the displacement of communities from these islands.[54] Resettlement of climate-induced migrants will be complicated by the requirement for access to land and resources, including the provision of sustainable livelihoods, housing, infrastructure and public services such as education and healthcare.[55]

This priority area is linked to the transport, health, education, urban development, and water and sanitation sectors.

6. Damage to Coral Reefs

As atmospheric CO2 concentrations continue to rise, oceans will warm and continue to acidify.[56] Under all three emissions scenarios, ocean acidification is projected to increase in the waters surrounding PNG.[57] Data shows that ocean acidification around PNG has slowly been increasing since the 18th century, impacting the growth of corals and organisms that require carbonate minerals to develop.[58] This damage will impact the health and viability of PNG's marine ecosystems, including the coral reefs that provide ecosystem services to communities.[59] [60] [61] There are 15 coastal provinces in PNG with a population of approximately 4.5 million that rely on food, shelter and livelihoods sourced

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49. Climate Change Vulnerability Assessment: Port Moresby, Papua New Guinea. (2014).

50. Green Climate Fund Papua New Guinea Country Programme. (2020).

51. Urban Life, Internal Migration and Development: The Need to Re-Address Internal Migration as a Positive Nexus for Growth and Development in PNG. (2016)

52. Green Climate Fund Papua New Guinea Country Programme. (2020).

53. Climate Change and Migration Issues in the Pacific. United Nations. (2014).

54. Environmental Refugees? A tale of two resettlement projects in coastal Papua New Guinea.(2017).

55. Green Climate Fund Papua New Guinea Country Programme. (2020).

56. PACCSAP Country Report. (2014).

57. International Climate Change Adaptation Initiative. Pacific Climate Change Science Program. Current and Future Climate of Papua New Guinea. (2013)

58. International Climate Change Adaptation Initiative. Pacific Climate Change Science Program. Current and Future Climate of Papua New Guinea. (2013).

59. PACCSAP Country Report. (2014).

60. International Climate Change Adaptation Initiative. Pacific Climate Change Science Program. Current and Future Climate of Papua New Guinea. (2014).

61. Green Climate Fund Papua New Guinea Country Programme. (2014).

from coral reefs.[62] Not only do the reefs contribute to livelihoods, but also protect the coastlines from storms and loss of land.

This priority area is linked to the transport, infrastructure, fisheries, agriculture, natural resources and environment, and water and sanitation sectors.

7. Malaria and Vector-borne Diseases

Malaria in PNG is one of the top five health priorities presently challenging the health sector[63]. Malaria severely affects daily life in PNG, with 1.7m people infected every year. About 60 percent of the population lives in high-risk malaria regions. Once a disease found only in PNG's low-lying coastal regions, over the last 20 years climatic changes resulting in rising temperatures have worsened the effects of malaria with malaria vector mosquitoes carrying the malaria parasite establishing itself in the highlands where it was not previously present.[64] Migration of malaria to densely populated highland regions with no immunity is a high risk to the community. Poor environmental health management, poor waste management and poor water and sanitation management provide an environment for increased and optimal breeding conditions for malaria parasites.

This priority area is linked to the health, water and sanitation sectors.

8. Water and Sanitation

PNG's population is among those with the least access to safe water supply in the world. The GoPNG's Water, Sanitation and Hygiene (WASH) Policy 2015-2030 indicates that 89 percent of people in urban areas and 33 percent in rural areas have access to safe water, while 57 percent of urban dwellers and only 13 percent of the rural population have access to basic sanitation.[65] Climate change impacts from coastal and inland flooding and landslides risk increasing cases of malaria and vector-borne diseases, as well as contaminating drinking water.

This priority area is linked to the health, natural resources and environment, and water and sanitation sectors.

9. Landslides

Triggered by increased rainfall intensity and land-use changes in the mountainous rural areas of PNG, landslides frequently cause damage to vital infrastructure, homes and gardens, and upland forests.[66] PNG ranks 1st in global landslide hazard profiles, according to a World Bank Hotspot study.[67] In recent decades, landslides have caused considerable damage to road infrastructure and remote communities. Landslides have caused significant damage along the Highlands Highway, the sole lifeline for the highland communities and export businesses. Increases in rainfall and inland flooding as a result of climate change will increase the likelihood of landslide events.

This priority area is linked to the transport, infrastructure, health, natural resources and environment, water and sanitation sectors

Additional Priority Areas

PNG has determined additional adaptation priority areas as part of the 2019-2020 regional and sectoral consultations of the Green Climate Fund Readiness Support project's identification of climate change and investment priorities for the PNG GCF Country Programme. The additional adaptation priorities are not recognized under the current Climate Change Management Act 2015. The additional adaptation priority areas include Forestry and Land-Use, Waste, Fisheries, Extractive industries, Biodiversity and Tourism/Cultural. These priority areas are linked to the agriculture, health, natural resources, and environment sector.

62. National Statistical Office, Port Moresby.(2014)

63. PNG Health Sector Strategic Priorities 2016 – 2021. (2017)

64. Reducing the risk of disasters and Climate Variability in the Pacific Islands: A PNG Country Assessment. (2014).

65. Papua New Guinea Water, Sanitation and Hygiene (WASH) Policy 2015-2030. (2015).

66. Climate Change Knowledge Portal for Development Practitioners and Policy Makers.(2020).

67. Green Climate Papua New Guinea Country Programme. (2020).

ADAPTATION ACTIONS

Papua New Guinea's adaptation actions comprise tangible and intangible activities that aim to benefit targeted populations. These include smallholder farmers, micro, small and medium-enterprises in business, community-based organizations, clans, and villages, with particular focus on the most vulnerable groups, including women, children, young persons, the elderly, and people living with disabilities, members of underprivileged or less advanced groups, or residents of less advanced areas.[68]

This subsection provides information on the key adaptation actions to address PNG's above-described nine priority areas, both supported and unsupported, relative to the period 2021-2030. Supported adaptation actions are those that have been resourced and implemented in PNG by various stakeholders and partners, at different levels, through programs and projects. Unsupported actions have yet to be programmed or implemented. Unsupported adaptation actions provide entry points to build upon and implement future adaptation projects and programs, throughout PNG, at all levels of development intervention.[69]

Table 3 Summary of Supported and Unsupported Priority Area Adaptation Actions

	Adaptation actions	
Priority area	**Supported**	**Unsupported**
1. Coastal flooding and sea-level rise	• Mangrove planting • Coastal defence structures • Coastal rehabilitation and relocation/resettlement • Climate risk and vulnerability assessments across five provinces (New Ireland, Oro, Madang, East Sepik and Morobe)	• Scaling-up and replication of successful measures across coastlines country-wide • Climate-resilient physical planning standards and codes • No policy on climate-resilient infrastructure.
2. Inland flooding	• Climate risk, hazard and vulnerability assessments • Community-based flood simulation exercises • Early Warning System integration	• Scaling-up and replication country-wide • Hazard mapping • Soil stabilization • Climate-resilient planning physical planning standards and codes • Infrastructure and asset management plans
3. Food insecurity	• Climate-Smart Agriculture Policy is socially inclusive • Progress on food security is underpinned by the National Food Security Policy 2016-2027	• Scaling-up and replication of smallholder Climate Smart Agriculture infrastructure, technology, training and information and knowledge management to enhance food safety, security, nutrition and build the resilience of vulnerable farmers and have access to grant funding[70]
4. Cities and climate change.	• National Energy Policy 2018-2028, which underpins action on PNG's energy sector, affecting cities in the face of climate change impacts	• Action on low-emission transport options remain unsupported • Connecting farmers to markets in rural areas via climate-proofed infrastructure

68. National Constitution of Papua New Guinea. (1975)

69. UNDP Produce for Adaptation Planning/ NAP projects financed by the Green Climate Fund. (2020).

70. GCF PNG Country Programme. (2020).

	• Project support has been received to create a more climate-resilient transport sector	• Measures to increase infrastructure coastal defences, climate-resilient physical planning standards and codes • 'Greening' of urban development plans • Stormwater and drainage systems and waste management (sewerage, municipal, industrial) requires improvements (see 'Water and sanitation'
5. Climate-induced migration	• Indirect support for action on climate-induced migration, the 2015 IOM report Assessing the Evidence: Migration, Environment and Climate Change in PNG[71] provides an evidence base for action	• Relocation, resettlement, gender social inclusion assessments require exploration • Awareness-raising of impacts of climate change migration on customary land • A range of strategies and activities are also required to prepare for relocation, including comprehensive consultations with the climate-induced migrants and their host communities;[72] the NCCDMP states that supporting the relocation of people should be considered, including through local level government planning and construction of buildings and infrastructure[73]
6. Damage to coral reefs.	• Mangrove planting • Coral rehabilitation • Establishment of marine protected areas (MPAs), locally managed marine areas (LMMA) • Mangrove management • Marine awareness	• Establishment of marine protected areas • Planting of seagrass • Replanting of coral coordination • Response measures for marine disposal • Protection and promotion of biodiversity conservation through ecosystem-based adaptation (EbA) approaches.
7. Malaria and vector-borne diseases.	• Malaria is recognised as one of the top five 5 priority activities for the Department of Health • Action has been taken to destroy and reduce malaria-vector breeding • Environmental health management is under consideration • Climate Change Health Impact Policy is in draft	• Improve environmental health services. • Improve technology (i.e. bed nets). And distribution • Improve research on understanding impacts and responses • Increased access to safe drinking water and basic sanitation in rural areas leading to a decrease in malaria and other vector-borne diseases • Apply Healthy Islands concept

71. Assessing the Evidence: Migration, Environment and Climate Change in Papua New Guinea. (2015).

72. Assessing the Evidence: Migration, Environment and Climate Change in Papua New Guinea. Geneva, Switzerland. (2015).

73. GCF PNG Country Programme. (2020).

		• Improve the Health Sector's ownership in managing malaria and vector-borne diseases • The WASH Policy recommends community health posts consisting of 30 facilities across PNG • The WASH Program Management Unit (PMU) has yet to drive implementation
8. Water and sanitation.	• Establishment of the Water, Sanitation and Hygiene (WASH) Policy 2015-2030 • Development partners are now actively implementing the policy within provinces; the Department of National Planning and Monitoring (DNPM) oversees this activity, which has commenced in some provinces	• Increased access to safe drinking water and basic sanitation in rural areas leading to a decrease in malaria and other vector-borne diseases • Improvements in technological approaches • Improvements in water catchment • Desalination processes • Development of renewable energy initiatives to combat climate change-induced water insecurity[74] • Activities implemented under the WASH Policy need replication across all communities
9. Landslides.	• Identifying landslide risks using technology (GIS, LiDAR, and others) • Advisory support to engineer-design for road and infrastructure projects using development partner climate-resilient guidelines	• Improvements to engineer designs • Implement geo-hazards assessments • Improvements in stormwater drainage • Reforestation and soil stabilization
Other - Waste	• Promote solid and chemical waste management at the national level • Municipal waste management planning • Special waste (plastic, e-wastes, bulky, mining, etc.) management planning • Household waste awareness • Community awareness and education	• Urban growth has placed pressure on cities, in turn, placing stress on waste management services and urban sanitation services,[75] wastewater management is in its infancy in PNG and no formal waste management systems exist[76] • Improving the waste sector's capacity through knowledge, training, research and response • Biodiversity is also affected through ineffective waste management protocols where investment is needed in industrial and wastewater management

74. GCF PNG Country Programme. (2020).

75. Fifth National Report to the Convention on Biological Diversity. (2014).

76. Fifth National Report to the Convention on Biological Diversity. (2014).

Domestic budget constraints impede the progress of implementation of unsupported adaptation initiatives. The external financial and technical support received by the GoPNG through development partners to address climate change adaptation plays an important role in the planning and implementation of adaptation initiatives at all levels. As such, over the past few years, efforts have been made to strengthen institutional and technical capacity to design and implement adaptation projects to be climate-resilient.

Achieving PNG's adaptation goals requires the successful and timely implementation of adaptation actions, monitoring and regulation. Collective involvement of institutions creates the enabling environment to develop and implement effective adaptation policies. The NDC Implementation Plan provides guidance (see Annex 1).

ADAPTATION DATA GAPS

Data to inform climate change adaptation action is limited. Existing adaptation data and adaptation data gaps are listed against the nine priority areas in Table 4-2 below

Table 4 Adaptation Nine Priority Areas Data Gaps

Priority area	Summary of Data Gaps Assessment
1. Coastal flooding and sea-level rise	Weather, atmosphere, ocean current, and tsunami early warning data and information from 4,000 Argo floats from the International Ocean Commission (IOC) project in the Pacific and PNG waters have been available since 2000. Furthermore Australian-funded sea level and climate monitoring from 1991 to 2020, has aided in determining land movements and sea-level changes; and the Comprehensive Hazards and Risk Management (CHARM) Framework for PNG and the Pacific Island States has contributed to planning and management of sea-level rise since 1992. Data gaps exist however in the following ways: • Only four tide gauges exist in Milne Bay, Manus, Madang and Rabaul, scaling up and replication is required across all maritime provinces to improve data collection and determination • Where soft and hard defence structures have been implemented (i.e. Manus Province, East Cape Road in Milne Bay Province – there is not a collation of data that indicates the percentage of coastline prone to coastal flooding or shoreline erosion
2. Inland flooding	• Lack of monitoring tools to identify hazard areas in the country for flooding in highlands, coastal regions and islands • Mapping and planning to mitigate flooding is needed using a blended approach of traditional knowledge and modern infrastructure tools and methods • Promote the use of drone GIS mapping, artificial intelligence (AI) and internet of things (IoT) technology to mitigate flooding, both inland and islands. • Insurance and private sector support required
3. Food insecurity	• Further data on climate change and variability throughout the entire country to manage food supply is needed • Early warning and forecasting to all communities in the country is required. There is presently a lack of information on disaster impacts on agriculture and water etc. • Disaster risk management in agriculture (agriculture insurance, probing an indemnity insurance framework, weather index setup, linking with multi-hazard early warning systems, etc.) is needed. • Use of satellite forecasting requires further development and application to the planning and agriculture sectors

	• Need for research to develop climate-adaptive crops/food supply in the islands and hinterland • Application of Sustainable Land Use Policy in the country is needed
4. Cities and climate change	• Lack of policies and application in the towns and cities in PNG. city profiling only completed for three cities (Port Moresby, Kokopo and Goroka) • Monitoring and advice on ozone pollution, heat waves and bush fires in cities are needed. • Building codes introduced to mitigate climate change heat waves and cyclones is needed • Better water and waste drainage to be introduced • Greater awareness and development of information and communication strategy in cities on climate change and disaster and heatwaves etc. • Disasters and climate change policies need to be incorporated to support town development and planning in PNG
5. Climate-induced migration	• Lack of analysis of data and information on induced migration as a result of climate change • Articulation of induced migration drivers other than climate change to inform policymaking
6. Damage to coral reefs	• LMMA only covering 159,259 hectares; this requires replication and scaling-up • Lack of awareness on coral reef damage due to climate change versus traditional use of coral/lime budding/planting of corals in pristine water requires implementation; there are presently no programmes on budding/ planting corals in the country; there is an opportunity to introduce communities and schools to support this sector • Mining and waste sectors are causing damage to coral; regulation and awareness-raising need immediate attention
7. Malaria and vector-borne diseases	Department of Health keeps records of incidences of malaria and vector-borne diseases, however, monitoring of these diseases from the coast to the highlands is an issue that needs consideration
8. Water and sanitation	• Lack of tools/technology in the country to enable advancements in exploring desalination options • Lack of uptake and application of new technology for water resources in the country • Information and communication strategy is needed country-wide due to water shortage due to El Nino and dry spells • There is a need to introduce large water reservoirs to all isolated provinces/ LLG • Supply of medication for water treatment is required country-wide • Application of traditional knowledge in the country requires broader uptake and implementation
9. Landslides	The Geophysical Observatory of the Department of Mineral Policy and Geohazards Management (DMPGM) has seismographs located around the country which measure earthquakes continuously; the DMPGM also has linkages with the Rabaul Volcanological Observatory which monitors earth tremors leading to an eruption. Data gaps exist however in the following area: • While the earthquake and volcanic data exist, there is no linkage to the occurrence of landslides. GIS and Remote Sensing Tools could be used to ensure connectivity and linkages between landslides and rainfall patterns and intensity.

FOUR DEVELOPMENT SECTORS

PNG conducted sector consultations to develop its NAP Readiness Support Proposal to the Green Climate Fund (GCF) in 2017 and 2019 and identified four key development sectors for the NAP to develop and implement. The four key development sectors are agriculture, health, transport and infrastructure. During 2019 and 2020, PNG conducted regional and sector consultations to review and re-affirm its national and sub-national priorities on climate change. The consultations agreed to prioritize the four key development sectors to address the nine adaptation priority areas (Table 4).

The PNG Enhanced NDC 2020-2030 will report on PNG's four priority development sectors for adaptation. Through the process of developing the NAP, PNG commits to strengthening institutional, technical, and financial capabilities and integration of climate change adaptation into planning and budgeting processes.

In advancing PNG's National Adaptation Plan (NAP), climate change is being mainstreamed into regulatory and policy frameworks to address climate change adaptation and to increase awareness amongst key stakeholders at the national and sub-national levels.[77] The NAP is being developed with a specific focus on the development sectors of agriculture, health, transport and infrastructure. The NAP is due for completion in August 2021.[78]

Table 5 NAP Development Sectors Matrix for the Nine Key Adaptation Priority Areas

Priority Development Sector	Priority Areas (*Additional priority areas identified in the 2019-2020 regional consultations, which are not recognized under the current Climate Change Management Act.)	
Agriculture	• Coastal flooding and sea-level rise • Inland flooding • Food insecurity • Damage to coral reefs • Water and sanitation	• Landslides • Forestry and land-use* • Waste* • Fisheries* • Biodiversity*
Health	• Malaria and vector-borne diseases • Water and sanitation • Food insecurity • Climate-induced migration • Coastal flooding and sea-level rise • Inland flooding	• Cities and climate change • Landslides • Waste* • Extractive industries* • Biodiversity* • Tourism/cultural*
Transport	• Damage to coral reefs • Climate-induced migration • Inland flooding	• Cities and climate change • Landslides • Biodiversity*
Infrastructure	• Climate-induced migration • Coastal flooding and sea-level rise • Inland flooding • Cities and climate change	• Landslides • Waste* • Extractive industries* • Biodiversity*

77. Advancing Papua New Guinea's National Adaptation Plan. (2020).

78. Advancing Papua New Guinea's National Adaptation Plan. (2020).

ADAPTATION TARGETS

PNG aims to broaden and sustain the scope of its NDC to include adaptation in the current and subsequent NDCs. This subsection establishes a technical approach to defining PNG's national adaptation targets.

PNG recognizes that the more comprehensively the NDC's are defined, the better the priorities can be integrated into development partner operations and support programs.

The approach for defining PNG's adaptation targets was undertaken by conducting a series of surveys and workshops which included sub-national and sector vulnerability and adaptation assessments, data collection, and multi-criteria analysis. The adaptation targets are measured against beneficiaries for the agriculture and health sectors, and the value and number of assets for the transport and infrastructure sector. The adaptation targets for the four NAP development sector are provided in Table 6.

Table 6 Adaptation Targets

Priority Development Sector per the NAP	Adaptation Target 2030
Agriculture	10% of the total population (0.8 million beneficiaries (25% are women)) have increased resilience with respect to food and water security, health and well-being in PNG.
Health	100% of the population benefits from improved health measures to respond to malaria and other climate-sensitive diseases in PNG.
Transport	US$1.2b (PGK 4.2b) value of transport (air, sea, and land) infrastructure and assets built/rehabilitated according to climate-resilient codes and standards.
Infrastructure	6 million people (70% of the population) benefit from improved early warning systems/information to respond to extreme climate events. US$172m (PGK 608m) value of building and utility infrastructure assets built/ rehabilitated according to climate-resilient codes and standards.

IMPLEMENTATION OF ADAPTATION TARGETS

Section 4 of the NDC Implementation Plan (Annex) outlines PNG's Implementation Plan on adaptation). The Implementation Plan sets out the strategic adaptation outcomes that will be achieved by Government's twelve overarching adaptation strategies and objectives. The development of the NAP is one of the Government's key objectives, which will ultimately direct the implementation and delivery of PNG's adaptation actions.

The NAP will have in place short-, medium- and long-term targets to achieve the outcomes of its key priority development sectors of agriculture, health, transport and infrastructure. The NAP will include a list of implementing measures and establish mechanisms for coordination amongst Government agencies and national stakeholders with activities to generate the necessary investment and financing strategy to implement the adaptation plans at all development intervention levels.

MEANS OF IMPLEMENTATION 5

Papua New Guinea is fully committed to taking action on climate change. The targets identified within the NDC are fully in line with existing policy documents and commitments. As such the GoPNG will take a central role within the implementation of proposed actions while also working to create a positive environment for private sector investment and partnerships with other parties to the convention.

To commit to reducing GHG emission levels and to increase climate resilience, PNG will require the appropriate financial support, technology, capacity building, and a good means of coordination to drive the implementation of the Nationally Determined Contributions, as outlined in the implementation plan.

PNG's NDC Implementation Plan *is a living document and will be updated annually. It is annexed to the NDC and lists key actions and activities, and the respective resource requirements for each to ensure successful implementation.*

INFORMATION ON FINANCE

The projects and programs in the Implementation Plan outline the financial resources needed for implementation.

Technology transfer and capacity development cannot take place without sufficient financial resources made available to meet the targets. As a Small Island Developing State that is vulnerable to the impact of climate change, it is important to find the right balance in building the country's resilience, and implementing the necessary adaptation and mitigation measures, while supporting the day to day needs of the country.

Implementing the proposed actions could deliver significant emissions reductions that could be monetised through results based payments under a range of mechanisms including the Green Climate Fund, bilateral, market or non-market mechanisms under Article 6 of the Paris Agreement and PNG is looking forward to enforcement of the Article 6 on the ground.

INFORMATION ON TECHNOLOGY

A Technology Needs Assessment (TNA) must be conducted (if not yet carried out), which will clearly set out the specific needs of the identified sectors .

The need for innovation is crucial to ensure more efficient and cleaner technologies. The availability and transfer of technology that is environmentally sound and which support low carbon and climate-resilient development are paramount. As a SIDS these opportunities are not often readily accessible, hence the need for external support.

A TNA for the NDC needs to be carried out with relevant stakeholders at the national level. The TNA ought to be gender-responsive and should consider the local context.

INFORMATION ON CAPACITY BUILDING

As a SIDS, Papua New Guinea is faced with many challenges, including limitations on resources. PNG's economic growth and development are centered on institutional capacity building. GoPNG welcomes the support from development partners in areas of research and sectoral actions outlined in this Implementation Plan annexed to the NDC.

GENDER AND YOUTHS

Women in Papua New Guinea tend to rank well below men in almost all measures of health, education, employment, access to economic resources, and political voice. They make extensive use of forest resources for food, fuelwood, medicine and handicrafts. Resource use is gendered in that in most PNG societies women have use rights to cultivate the land, gather forest products and to fish for or collect marine and riverine resources. Regardless of whether they are members of matrilineal or patrilineal societies, women cannot enforce rights to land and property nor claim income from cash crops or land leases such as for mining, logging and infrastructure construction.[79] Subsistence agriculture in the informal economy supports 80 percent of the PNG population, a sector dominated by women[80] (DPNM, 2020). Women are particularly vulnerable to climate change impacts due to reliance on natural resources for their livelihoods and household well-being, lack of access to land, income, credit and other resources.

Sixty percent of PNG's population is under 25 years old, and they have limited education and employment opportunities. They are involved in environmental efforts at the local level, both through local Youth Councils that are linked to the National Youth Commission, as well as in non-governmental activities in conservation, tree planting, and other forms of environmental activism. It is important to ensure that youth have the resources and opportunities they need to develop low-carbon, environmentally sustainable businesses. They also need support in their environmental conservation activities such as tree planting and forest management.

Eighty-five percent of the population use fuelwood on at least an occasional basis for domestic and commercial cooking, even in urban areas. Rural women in Papua Guinea experience energy poverty differently than men. With effects on workload and health, due to distance travelled to collect biomass, safety concerns when travelling long distances, reliance on food that requires short or no cooking time; and indoor air pollution.[81]

Women and youth play an important role in management and production in forest lands, although they are not landholders. While they have use rights, women rarely have ownership rights over productive resources. When customary land rights are negotiated, women tend not to have the right to claim a direct share of leases, royalties or compensation payments[82]. The primary objectives of women's access to forests are to meet household needs for fuel, fodder, medicinal needs; however, once these needs are met, they become important vehicles through which income-generating opportunities and enterprises can be developed[83].

Given the importance of sustainable development of these resources, it will be important to work with local communities, youth and women to implement sustainable agricultural and agroforestry practices. Potential approaches include promoting socially-inclusive climate-friendly agriculture; promoting women's access to resources, information, and climate-smart technologies; enhancing the role of women and youth in agricultural value chains; and promoting inclusive forest rehabilitation and timber management.

79. CEDAW Shadow report on the status of Women in Papua New Guinea and the Autonomous Region of Bougainville. (2010)

80. Papua New Guinea Department of National Planning and Monitoring. (2020).

81. United Nations Industrial Development Organization and United Nations Women (2014).

82. Papua New Guinea Country Gender Assessment. (2012)

83. Country gender assessment of agriculture and the rural sector in Papua New Guinea. (2019)

Subsistence agriculture in the informal economy supports 80 percent of the PNG population, a sector dominated by women[84]. According to the Food and Agriculture Organization (FAO), more than 50 percent of the female labour force in Papua New Guinea is engaged in agriculture, and women comprise nearly 35 percent of the economically active population in the sector. Rural women play a prominent role in subsistence food production, agricultural value chains and rural livelihoods. They actively participate in livestock and poultry production and in fish farming and sell surplus produce to generate income for the household.[85] Increasing rates of migration to urban centres by young people[86], the movement of men to the logging and extraction industries for employment, and women's consistent exclusion from employment in these sectors (FAO, 2019), mean that women will continue to make up at least half of agricultural producers in the country. Women are also responsible for family and child health, including water and sanitation management.

Actions should also take into account the gender digital gap and differing access rates of youth and remote communities to information and early warning systems (see GSMA, 2020 and Mehrabi et al, 2020).

84. Papua New Guinea Voluntario National Review. (2020)

85. Country gender assessment of agriculture and the rural sector in Papua New Guinea. (2019)

86. Papua New Guinea Voluntario National Review. (2020)

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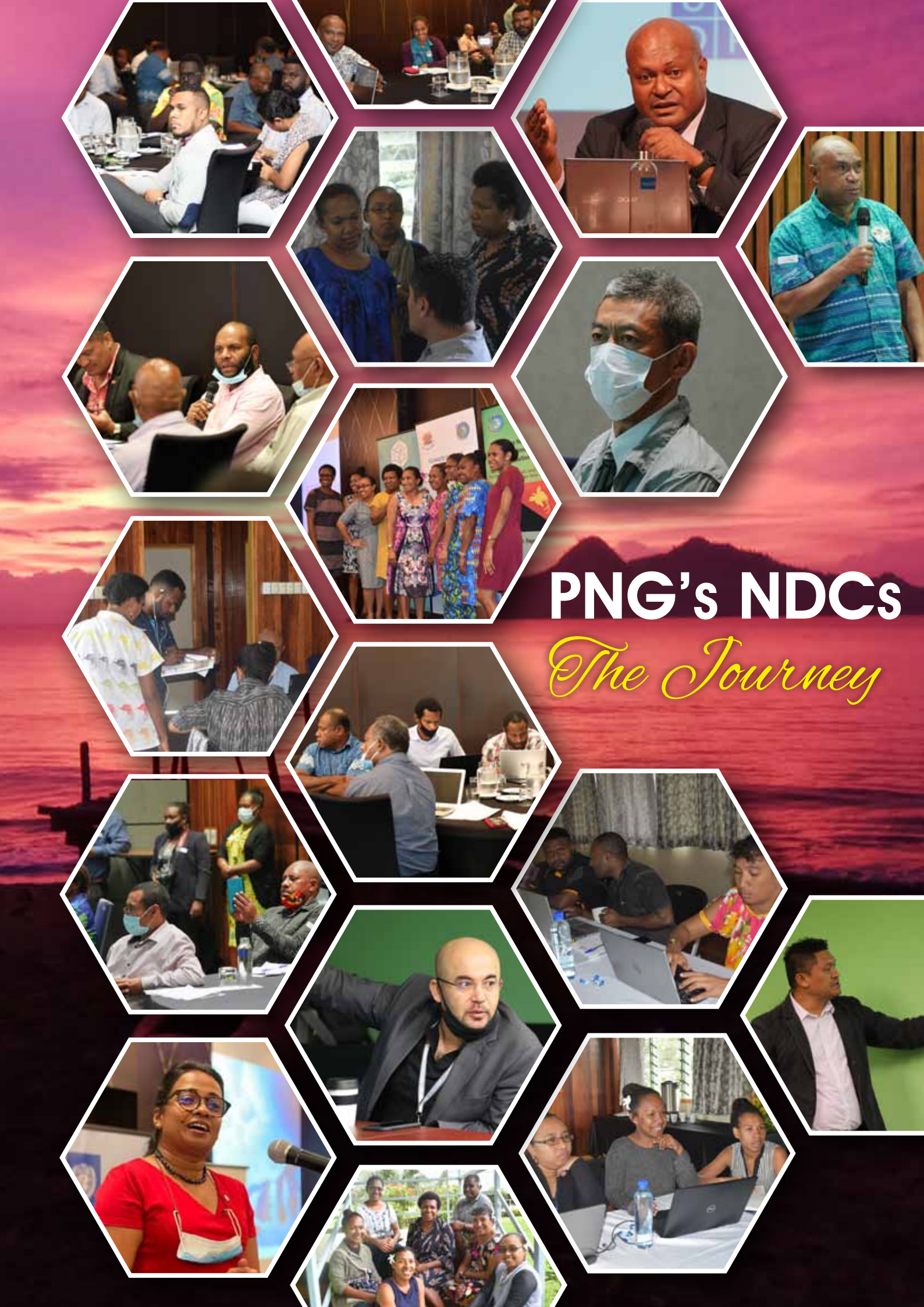
Acknowledgements

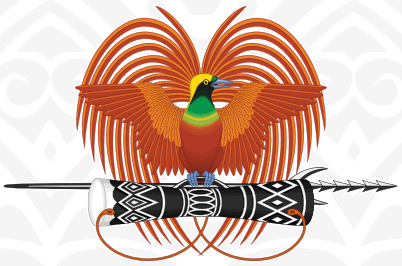
The development and production of PNG's NDC has been led by the Climate Change and Development Authority (CCDA) through its Measurement, Reporting and Verification and National Communications Division. This product is a result of extensive consultations with stakeholders from the relevant government agencies, civil society institutions and the private sector. Its development was made possible by the strong contributions of the members of Inter-agency Sub-Technical Technical Working Groups on AFOLU, Energy and Adaptation. Special thanks also go to a number of development partners including the NDC Partnership, UNDP's Climate Promise, FAO, Global Green Growth Institute (GGGI), UNEP, Regional Pacific NDC Hub composed of GIZ, SPC, SPREP and GGGI, German Development Corporation implemented by GIZ, UK Government, New Zealand Government, Government of Australia, USAID Climate Ready, and IRENA for invaluable support in the development of this product.

It should be noted that the views expressed in this publication are those of the authors and do not necessarily represent those of the supporting partners.



PNG's NDCs

The Journey



Government
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Papua New Guinea

Annex to PNG's Nationally Determined Contributions:

Papua New Guinea NDC Implementation Plan 2021 - 2030 (A Living Document)

INTRODUCTION

This Implementation Plan outlines the mitigation actions/activities that will be undertaken to achieve the emission reduction targets in the AFOLU and Energy Sectors, and the priority measures for Adaptation that have been listed in PNG's NDC. The targets, as provided in the NDC, are summarized below:

- AFOLU: PNG aims to reduce an estimated emission of 10,000 GgCO2eq by 2030 from deforestation and forest degradation due to commercial agriculture expansion and commercial logging.
- Energy: PNG will work towards a carbon neutral energy industries sub-sector by 2030
- Adaptation: to identify and implement adaptation actions aimed at reducing vulnerability and building climate resilience across different parts of the country.

In determining the necessary actions to be taken, the Sub-Technical Working Groups (STWG's) identified existing national policies, strategies and plans, and developed the measures to ensure alignment with these existing efforts. A detailed narration is contained in the NDC.

OVERVIEW OF THE IMPLEMENTATION PLAN

The Implementation Plan seeks to address the five key modules: Mitigation; Adaptation; Governance; Measurement, Reporting, and Verification (MRV); and finance. These are set out in Implementation Schedules below. Elements of the Finance module have been incorporated into each of the other four modules.

The Implementation Schedules are designed to clearly outline the activities, and their respective operational elements to guide implementation. The Implementation Schedules set out the following information, as they relate to the specific reported sector targets:

- the activity/action that will be introduced, or enhanced, relative to the established target;
- the indicators that will be used to track progress during implementation, and for monitoring and evaluation;
- listing of the lead and supporting government agencies;
- timeframes, including the start/end dates for each of the activities; and
- the budget estimates for each activity, and sources of funding, including potential sources of funding.

The Climate Change & Development Authority (CCDA) as the mandated authority responsible for coordination of climate change initiatives of the Government, and acting as the focal point to the UNFCCC, will collaborate with key stakeholders to ensure fulfillment of the implementation plan.

The implementation plan will be supported with an Intra-Governmental Memorandum of Understanding on the Implementation of PNG's Nationally Determined Contribution (MOU) that will, among other things, formalize the commitment of the implementing agencies and establish a platform for dialogue. Further activities identified include a review of the existing and legislative and regulatory framework to support the mitigation and adaptation targets.

In order to monitor implementation of the activities listed in the Implementation Schedules, the mechanism for monitoring will be based on the MRV Framework. The Implementation Plan obligates the implementing agencies to furnish regular reports; and a final evaluation report due in 2024.

PLANNING PROCESS

This Implementation Plan was developed in tandem with the NDC, using the following process:

1. Identifying team leads within CCDA, who were responsible for the gathering of data through the Technical Working Groups in the two mitigation reporting sectors (AFOLU and Energy), and adaptation;
2. Review and analysis of the data;
3. Determination of mitigation and adaptation targets in the NDC;
4. Identification of action items and activities that will be implemented towards the achievement of the respective targets; and
5. Validation workshop with key stakeholders.

MITIGATION

The Enhanced NDC covers two (2) of the five emitting sectors , as identified in PNG's most recent GHG Inventory: AFOLU & Energy . Taken together, the two sectors contributed to a total net of 13,522 Gg CO2-e of the total net emissions of the 2015 net of 15,192 Gg CO2-eq.

AFOLU

Implementation Schedule 2.0. Mitigation Actions/Activities – AFOLU

AFOLU Sector Target: PNG aims to reduce an estimated emission of 10,000 GgCO2eq by 2030 from deforestation and forest degradation due to commercial agriculture expansion and commercial logging.

Overall Objective: From the net GHG source from 2015 levels to net GHG sink by 2030

Action or Activity	Indicator	Status	Lead Implementing Agencies	Supporting Agencies	Time Frame	Budget (USD)	Funding Source (Existing/Potential)	Other Support
Sustainable Land-Use and Development Planning	- Policy and regulatory framework for sustainable land use and development planning are developed and implemented across concerned sectors.	- The Department of Lands and Physical Planning (DLPP) have taken steps to develop a draft Sustainable Land Use Policy (SLUP) that is currently under consultation and further development.	DLPP, CCDA	DLPP, DAL, PNGFA, DNPM, CCDA	2017-2027	1,132,000	Existing: UNDP Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
	A national central information system to store all data relating to land use in PNG is developed. A prototype to be in place before 2025.	The DLPP is developing a National Land Use Information System Porotype. Once fully developed, it will store all data relating to land use in PNG.	DLPP, CCDA	DLPP, DAL, PNGFA, DNPM, CCDA	2017-2027	3,076,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
	HCV and HCS methodology are adopted for more sustainable, agricultural practices by agri-businesses in PNG	HCV and HCS methodology tested using PNG data. A national scale map has been developed identifying all areas in PNG with high HCV and HCS value.	DLPP, CCDA	DLPP, DAL, PNGFA, DNPM, CCDA	2017-2027	1,500,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
Enhancing value chain of climate friendly agriculture products	A tracking system (e.g. a mobile app) for tracking production line from farmers' level to manufacturers is established.	This initiative has been discussed by relevant government agencies but is yet to be fully implemented	DAL	CCDA	2021-2027	150,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
Strengthening monitoring of FCA	PNG REDD+ and National Forest Monitoring Web-Portal is updated with latest FCA data.	Existing web portal does not have data and information on FCA. It only disseminate information Logging concession	PNGFA	CCDA, DAL	2021-2024	280,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support

		boundaries, Forest Base Map 2012, NFI pre-assessment (Collect Earth) and PSP.						
Promoting downstream processing of logs in the country.	Export of round logs in the country is reduced by more than 50% in 2025 through proper enforcement by PNGFA.	Necessary policy framework and legislation in place but slow enforcement.	PNGFA	CCDA	2021-2027	2,000,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
Enhanced application of timber legality standards and permitting processes – strengthened monitoring of timber concessions	Near-Real-time Deforestation and Degradation Alerts Monitoring System for PNG is established at all relevant government institutions and agencies by 2025 to enhance the PNG of timber legality system.		PNGFA, CCDA	DAL, DLPP, CEPA	2021-2024	355,000	Potential funding source: GCF RBP and other development partners	1. Technical Support 2. Capacity Building Support
Prepare strategic action plan based on detailed studies to scale up the Painim Graun Planim Diwai initiative	First draft action plan in place no more than 3 years after the submission of PNG's Enhanced NDC.	PNGFA has already established 60,000 ha of planted forest under the initiative.	PNGFA	CCDA, CEPA	2021-2027	420,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
Development and Encouraging agro-forestry initiatives in line with the National Reforestation Strategy and the National Agriculture Development Plan (NADP)	Agro forestry activities are implemented at community level throughout PNG by 2026.	Necessary policy framework for agro-forestry in place.	PNGFA, DAL	CCDA, CEPA, DLPP	2021-2027	1,000,000	Potential Funding Source: Development Partners	1. Technical Support 2. Capacity Building Support
Enhanced monitoring and reporting on regeneration by conducting Forest and land use change assessment prior to 2000 to enable more realistic calculations of the biomass gain of the forest degrade before 2020 and to determine long term historical forest and land use change trend.	System for generating LULUCF activity data on land use and land use change under REDD+ MRV is upgraded with new capacity accurately measure forest regeneration before and after 2000.	Land use and land use change assessment for the period 2016-2019 was conducted by PNGFA in 2020.	PNGFA,	CCDA	2021 – 2024	567,000	Potential Funding Source: Development partners	Technical assistance required to build capacity of PNGFA and CCDA officers.
Complete National Forest Inventory to Improving the country specific Emission Factor (EF) and to enable space borne forest carbon estimation and monitoring.	Country specific Emission Factors for all forest types in PNG are available before the submission of PNG's first BTR to UNFCCC.	Certain component of the current NFI is ongoing such as data analysis. However, funding is required to complete the remaining NFI sampling plots in the country for full determination of country specific data.	PNGFA	CCDA	2020 – 2024	4,133,000	Potential funding source: GCF RBP and other development partners	

Conduct PSP data and growth model update to enable estimation of post-disturbance CO2 sequestration of the forests, calculation of annual loss/gain and creation of Post disturbance forest carbon recovery model.	PSP data and growth model are updated by 2023	Several PSP plots have already been established in the country by Forest Research Institute	PNGFA, CCDA	PNG University of Technology	2020 – 2028	570, 800	Potential funding source: GCF, GEF and other development partners	1. Technical Support 2. Capacity Building Support
Improve forest concession monitoring to allow more accurate emission estimation from the logging operation (75% of emission in LULUCF) and to contribute timber legality verification system (TLVS).	All forest concessions areas in PNG are registered in the PNG's Near-Real-time Deforestation and Degradation Alerts Monitoring System for receiving activity alerts by 2023.	PNG's Near-Real-time Deforestation and Degradation Alerts Monitoring System prototype developed. Certain concession areas in PNG were registered and subscribed to for activity alerts on a monthly basis as a trial.	PNGFA, CCDA	CEPA, DLPP, DAL, UPNG,	2021-2028	1,900,000	Potential funding source: GCF RBP and other development partners	1. Technical Support 2. Capacity Building Support
Enhance ambition in PNG's 2025 NDC by including blue carbon ecosystems in the GHG inventory and UNFCCC reporting, including: - Identify pathways to incorporating blue carbon by build upon existing AFOLU and REDD+ capabilities - considering how to reflect mangroves and seagrasses in climate policies; - data collection, mapping and modelling	- PNG has technical capacity for blue carbon estimation and reporting, and policy making - Mangrove mapping - Carbon stock modelling and reporting - Mangroves incorporated in GHG inventory and BUR	Ongoing	PNGFA CCDA	Government of Australia; CSIRO; UPNG	2019-2023		Potential: Development Partners	1. Technical Support 2. Capacity Building Support

Implementation Schedule 2.0. Mitigation Actions/Activities – Energy Sector

Energy Sector Target
Electricity supply from the Energy Sector aims to increase the share of installed capacity of renewable energy from 30% in 2015 to 78% by 2030.

Overall Objective: Reduce unit cost of production and meet reliability

Non-GHG Targets

Action or Activity	Indicator	Status (ongoing/new proposal), and previous references	Lead Implementing Agencies	Supporting Agencies	Time Frame	Budget (USD)	Funding Source (Existing/Potential)	Other Support
Southern Region **Objective:** Reduce unit cost of production and meet reliability in Proposed Capacity (MW)								
Alotau								
Solar PV + ESS	1.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PNG Power Limited (PPL)	CCDA, Department of Energy (DPE)	2022-2023	8,100,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Gumini Hydro	1.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PNG Power Limited (PPL)	CCDA, Department of Energy (DPE	2022-2026	15,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Kerema								
Solar PV + ESS	0.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2022	2,700,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Murua Hydro	3	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2025-2027	24, 000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Daru								
Solar PV + ESS	0.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2022	2,700,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
New Guinea Islands Region **Objective:** Reduce unit cost of production and meet reliability in Proposed Capacity (MW)								
Arawa								
Bovo Hydro	1.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2022-2025	12,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation

Buka								
Ramazon Hydro	0.6	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2022-2026	24,000,000	Under ADB considerations for possible funding in trench 3 under Town Electrification Investment Program	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Lombrum								
Solar PV + ESS	1	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2024	5,400,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Lawes Hydro	2	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA,DPE	2025-2028	16,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Kavieng								
Solar PV +ESS	2	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2022	10,800,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Kimadan Hydro	1.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA,DPE	2023-2026	12,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Namatanai								
Sohun Hydro	250kW	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans, hence refurbishment is required to further upgrade or downgrade depending on head, water flow and latest technology improvements for turbines	New Ireland Provincial Government	PPL	2021-2022	2,400,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Kimbe- Bialla								
Lower Lake Hargy Hydro	2	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2022-2025	16,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Ru Creek 2 Hydro	2.5	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA,DPE	2023-2025	20,000,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation

MOMASE Region **Objective:** Reduce unit cost of production and meet reliability in Proposed Capacity (MW)								
Finschaffen								
Solar PV + ESS	0.3	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2022	1,620,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Butaweng Hydro	0.2	This is a project that is going to be developed and imple-mented in accord-ance to PPL's Infra-structure Develop-ment Plans	PPL	CCDA, DPE	2023-2026	1,600,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Aitape								
Solar PV + ESS	Proposed Capacity 0.25	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL	CCDA, DPE	2021-2022	1, 350,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation
Vanimo								
Daundo Hydro	1.5	This is a project that is going to be developed and imple-mented in accord-ance to PPL's Infra-structure Develop-ment Plans	PPL	CCDA, DPE	2022-2025	12,000,000	Development Partners	1. Capacity Build-ing 2. Technology Transfer 3. Research & In-novation
Wewak – Mprik								
Sausia Solar PV + ESS	10	This is a project that is going to be developed and imple-mented in accord-ance to PPL's Infra-structure Develop-ment Plans	PPL	CCDA, DPE	2021-2024	54,000,000	Development Partners	1. Capacity Build-ing 2. Technology Transfer 3. Research & In-novation
Damar/Mabam Hydro	3	This is a project that is going to be developed and imple-mented in accord-ance to PPL's Infra-structure Develop-ment Plans	PPL	CCDA, DPE	2025-2028	10,500,000	Development Partners	1. Capacity Build-ing 2. Technology Transfer 3. Research & In-novation
Highlands Region **Objective:** Reduce unit cost of production and meet reliability in Proposed Capacity (MW)								
Tari								
- Dauli Mini Hydro	0.4	This is a project that is going to be developed and implemented in accordance to PPL's Infrastructure Development Plans	PPL, Hela Provincial Government	CCDA, DPE	2021-2025	3,200,000	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research & Innovation

Transport Sector **Objective:** The E-mobility Policy will enable the development and implementation of green transport in PNG								
Green Transport - E-Mobility Policy for PNG	National E-Mobility Policy Developed and Endorsed	On-going	DoT	CCDA, DHERTS	2021-2030	Budget will be determined as per scope of support determined by Climate Technology Center and Network (CTCN)	Development Partners	1. Capacity Building 2. Technology Transfer 3. Research and Innovation
Policy and Regulation **Objective:** To enable the implementation of renewable energy targets								
National Renewable Energy Policy	A National Renewable Energy Policy Developed & Endorsed	On-going	National Energy Authority	PPL, DMPGHM, CCDA, DNPM	2021-2030	Need scoping to verify budget	Development Partners	1. Capacity Building 2. Technology Transfer
Policy and Regulation **Objective:** To enable the regulation of energy efficient appliances								
Minimum Energy Performance Standards and Labelling Regulation (MEPSL)	MEPSL Regulation Developed and En-dorsed	On-going	National Energy Authority	CCDA, NISIT,	2021-2022	Need scoping to verify budget	Development Partners	1. Capacity Building 2. Technology Transfer
Policy and Regulation **Objective:** Map out existing renewable energy projects in PNG for on-grid connections to determine whether the 78% by 2030 target is reached								
Renewable Energy Projects Mapping	Mapping Report Completed with en-dorsed recom-men-da-tions	To be Developed	This is an activity to be implemented through the Mitigation Roadmap under the Energy Sector	DPE	2021-2025	Need scoping to verify budg-et	Development Partners	1. Capacity Building 2. Technology Transfer

ADAPTATION

The NDC Implementation Plan focuses on the four (4) National Adaptation Plan (NAP) priority development sectors that are influenced by the 9 adaptation priority areas. These development sectors are Agriculture, Health, Infrastructure and Transport. The adaptation targets are measured against beneficiaries for the agriculture and health sectors, and the value and number of assets for transport and infrastructure sector.

Implementation Schedule 3.0. Adaptation Actions/Activities

Priority Sector: Agriculture

Quantifiable Targets: By 2030, 10% of the total population (0.8 million beneficiaries (25% are women)) have increased resilience of food and water security, health and well-being in PNG

Action or Activity	Indicator	Status (ongoing/new proposal), and previous references	Lead Implementing Agencies	Supporting Agencies	Time Frame	Budget (USD)	Funding Source (Existing/Potential)	Other Support
Application of Sustain-able Agri-culture Practices (ASAP) for Smallholder Farmers in the Southern Region (Western, Central and Milne Bay Province)	By 2025, at least 20% of total ben-eficiaries of 163,000 have increased capacity to apply climate-resilient farming practices	Green Cli-mate Fund (GCF) Sim-plified Ap-proval Pro-cess Con-cept Note	Department of Agri-culture and Live-stock (DAL)	Accredited Enti-ty (AE): Global Green Growth Institute (GGGI)	Dec 2022 – Nov 2027	10	Existing: GCF, GGGI, and oth-er Development Part-ners, GoPNG Potential: Development Part-ners	NDA supported Require international support
Climate Resilient Agricul-ture for Farmers and Ag-ricultural SMEs in Vulner-able Re-gions of Papua New Guinea	By 2025, at least 63,000 beneficiaries (20% are women) have improved ca-pacity to implement cli-mate resilient agricultural practices	GCF Simpli-fied Ap-proval Pro-cess Con-cept Note	DAL	AE: Food and Agriculture Or-ganization (FAO)	Jun 2022 – May 2029	12	Existing: GCF, FAO, and Other Development Part-ners, GoPNG Potential: Development Part-ners	NDA supported Require technical and partnership support
PNG Agriculture Commer-cializa-tion and Diversi-fication Project, World Bank, $40m (PGK136m), tar-geted beneficiar-ies: 20000	By 2025, at least 50% of direct ben-eficiaries have applied commercial and diversification planning in their agriculture business	Project ap-proved 2020	DAL	World Bank	April 2020 – December 2025	40	World Bank	Support committed
STREIT, EU 85m Euros, target beneficiaries: 250,000+ (25% are women) (July 2020, Issue No. 3)	By 2025, at least 20% of beneficiaries (20% are women) have increased capacity to conduct agricul-ture business	Ongoing	DAL	FAO, UNDP, UNCDF, UN Women, DNPM, NFA, Cocoa Board, Spice Board, Provincial gov-ernments in the Momase region.	Ongoing - 2025	340	European Union	Support committed

Priority Sector: Health **Quantifiable Target:** By 2030, 100% of the population benefit from introduced health measures to respond to malaria and other climate-sensitive diseases in PNG.								
Action or Activity	**Indicator**	**Status (ongoing/new proposal), and previous references**	**Lead Implementing Agencies**	**Supporting Agencies**	**Timeframe/ End Date**	**Budget (USD)**	**Funding Source (Existing/Potential)**	**Other Support**
Improve vector control measures, with a priority of all households having access to a long-lasting insecticidal net (LLIN).	By 2025, at least 95% of PNGs house-holds with at least one LLIN Proportion of children <5years sleep-ing under in-secticide treated nets (%)	Ongoing	NDOH	PNG Institute of Medical Re-search (IMR), Provincial Health Authori-ty (PHA)	Ongoing	-	Existing: GoPNG, WHO, The Global Fund Potential: Other Development Partners	Require resource support (financial, technical) and capacity support
Maximize access to prompt quality diagnosis and appropriate treat-ment for malaria.	Proportion of children <5 years with fever received treatment with antima-larial drugs (%)	Ongoing	NDOH	IMR, PHA, WHO	Ongoing	-	Existing: GoPNG, WHO, The Global Fund Potential: Other Development Partners	Require resource support (financial, technical) and capacity support
Maintain high coverage of LLINs and in-crease the utiliza-tion of appropri-ate malaria pre-vention measures.	- By 2025, at least 85% of [peo-ple/children<5/pregnant women] who slept under an LLIN the previous night - By 2025, at least 80% of districts have access to af-fordable WHOPES approved LLINs through retailer outlets.	Ongoing	NDOH	IMR, PHA, WHO	Ongoing	-	Existing: GoPNG, WHO, The Global Fund Potential: Other Development Partners	Require resource support (financial, technical) and capacity support
Strengthen ma-laria program management at all levels with district level as priority.	By 2025, 90% of District Activity Imple-mentation Plans (DAIP) with Malaria Control Act and funding allocated	Ongoing	NDOH	IMR, PHA, WHO	Ongoing	- -	Existing: GoPNG, WHO, The Global Fund Potential: Other Development Partners	Require resource support (financial, technical) and capacity support
Strengthen ma-laria ad-vocacy, communication, and social mobi-lization.	- By 2025, at least 80% of moth-ers and caregivers in home managed malaria (HMM) and Integrated Community-based Case Management (iCCM) vil-lages aware of diagnostic and treatment ser-vices available from trained volun-teers. - Percentage of eligi-ble villages with HMM/iCCM ser-vices	Ongoing	NDOH	IMR, PHA, WHO	Ongoing		Existing: GoPNG, WHO, The Global Fund Potential: Other De-velopment Partners	Require resource support (financial, technical) and capacity support

Priority Sector: Transport								
Quantifiable Target: By 2030, US$1.2b (PGK 4.2b) value of transport infrastructure and assets built / rehabilitated according to climate resilient codes and standards.								
Action or Activity	**Indicator**	**Status (ongoing/new proposal), and previous references**	**Lead Implementing Agencies**	**Supporting Agencies**	**Timeframe/ End Date**	**Budget (USD)**	**Funding Source (Existing/Potential)**	**Other Support**
Quantifiable Target for Air Transport: By 2030, US$90m (PGK 320m) value of 16 airports rehabilitated to international and climate resilient standards.								
Design and/or manage the re-habilitation of air-ports to inter-national and cli-mate resilient stand-ards in partnership with development partners	- Number of airports rehabilitated to in-ternational and climate resilient standards. - Number of laws, policies, strategies, plans or regulations addressing climate change (mitigation or adaptation) of-ficially proposed, adopted, or imple-mented.	Ongoing	NAC	DNPM	2021-2030	90	Existing GoPNG NAC Potential: Development Part-ners	Require technical advisory and funding support
Quantifiable Target for Sea Transport: By 2030, US$85m (PGK 302m) value of 4 wharves rehabilitated according to climate resilient codes.								
Design and/or manage-ment of the 4 wharves in partnership with develop-ment partners	GoPNG design and imple-ment at least 2 wharves.	Ongoing	PNG Ports Au-thority	DNPM	2021-2030	85	Existing GoPNG PNG PA ADB BRCC Potential: Development Part-ners	Require capacity and funding resource support
Incorporate cli-mate change adaptation goals into National Ports policies and support policy imple-mentation	Number of laws, policies, strategies, plans or regula-tions addressing climate change (mitigation or adap-tation) officially proposed, adopted, or implemented.	Ongoing	PNG Ports Au-thority	ADB BRCC, DNPM, UNDP	2021-2030	-	Existing GoPNG PNG PA Development Part-ners Potential: Development Part-ners	Require human capacity and resource support for implementation
Quantifiable Target for Land Transport (Green Transport): By 2030, US$20m (PGK 6m) value of low-emissions public transport services and infrastructure in urban centers in PNG								
PNG green energy trans-port project. Objectives: Green Trans-port Action Plan linked to Medium Term Transport Plan III, Electrified bus rapid transit systems in urban centers and cli-mate-resilient supporting infrastructure, Implemen-tation of pilot projects in Port Moresby and Lae	- Draft Green Transport Action Plan - Feasibility studies conducted for electrified bus rapid transit systems in urban centers and climate-resilient supporting infrastructure (such as flood proofing of bus stops)	Project idea: Country Programme pipeline	Department of Transport (DoT)	DoW, CCDA, CEPA, DNPM AE: tbc	TBC	20	GCF	Requires Accredited En-tity support

Quantifiable Target for Land Transport (National roads): By 2030, US$907m (PGK 3.2b) value of 2,838 km of national roads built / rehabilitated according to climate resilient codes.								
National roads built to climate resilient codes and standards	- Kilometers of na-tional roads built / rehabilitated to climate resilient codes - Number of climate resilient codes and standards policy addressing climate change proposed, adopted and ap-plied to national road projects - Number of nation-al road projects adopting climate resilient codes and standards in man-agement	Ongoing	Department of Works and Imple-mentation (DoW)	DNPM, ADB, WB	2021-2030	907	Existing GoPNG PNG PA ADB UNDP Potential: Other Development Partners	Require human capaci-ty, technology and re-source support for appli-cation, monitoring of climate resilient codes and standards
Quantifiable Target for Land Transport (Bridges and culverts): By 2030, US$104m (PGK 370m) value of 2,171 bridges and culverts built / rehabilitated according to climate resilient codes.								
Bridges and cul-verts built to cli-mate resilient codes and stand-ards	- Number of bridges and culverts built / rehabilitated to climate resilient codes - Number of climate resilient codes and standards policy addressing climate change proposed, adopted and ap-plied to bridge and culvert projects - Number of culvert and bridge projects adopting climate resilient codes and standards in man-agement	Ongoing	Department of Works and Imple-mentation (DoW)	DNPM, ADB, WB	2021-2030	104	Existing GoPNG ADB Potential: Other Development Partners	Require human capacity, technology and resource support for application, monitoring of climate resilient codes and standards
Quantifiable Target 1: By 2030, US$172m (PGK 608m) value of building and utility infrastructure assets built / rehabilitated according to climate resilient codes and standards. **Quantifiable Target 2:** By 2030, 6 million people (70% of population) benefit from improved Multi-hazard early warning information to respond to climate extremes.								
Infrastructure: Multi-Hazard Early Warning Systems **Quantifiable Target 1:** By 2030, US$48.9m (PGK 173m) value of multi-hazard early warning system assets built / rehabilitated according to climate resilient codes. **Quantifiable Target 2:** By 2030, 6 million people (70% of population) benefit from improved multi hazard early warning information to respond to climate extremes.								
Enhancing Adap-tation and Resili-ence Through Impact-Based Forecast-ing and End-to-End Early Warning (EARTH)	- Number of benefi-ciaries in High-lands, riverine and coastal communi-ties benefiting from multi hazard early warning infor-mation. - Multi hazard early warning sys-tem as-sets built / rehabili-tated according to climate resilient codes (USD, mil-lion)	SAP Con-cept Note (2020)	National Weather Service (NWS)	FAO	2023- 2027	10	Existing: GCF SAP, FAO, Go-PNG Potential: Other Development Partners	Require development partner support
Quantifiable Target for Land Transport (Bridges and culverts): By 2030, US$104m (PGK 370m) value of 2,171 bridges and culverts built / rehabilitated according to climate resilient codes.								
Rehabilitate and refurbish priority health infrastruc-tures identified to meet the Nation-al Health Service Standards	- Climate change in-corporated into Na-tional Health Ser-vice Standards - Number of Com-munity Health Posts constructed to meet climate re-silient standards and are fully oper-ational - Number of Climate Health pro-grams introduced at Ward level	Ongoing	NDOH	PHA, WHO	2020-2030	123	Existing: GoPNG, WHO, The Global Fund Potential: Other Development Partners	Require resource support (financial, technical) and capacity support

GOVERNANCE & MRV

The governance and MRV actions and activities will be pursued to develop the necessary regulatory and legal infrastructure to support the NDC implementation, and to build institutional capacity, to among other things, enhance MRV capabilities.
The Climate Change and Development Authority (CCDA) is mandated under the Climate Change (Management) Act 2015 with the responsibility to contribute toward global efforts in mitigating greenhouse gas emissions, through low carbon development that fosters economic growth and social welfare for the people's wellbeing and prosperity. The agency is the National Designated Authority that coordinates all climate change related matters in PNG as well as the focal point to the UNFCCC. CCDA works in collaboration with line agencies with an objective to provide a coordination mechanism at the national level.

Technical Working Committee;

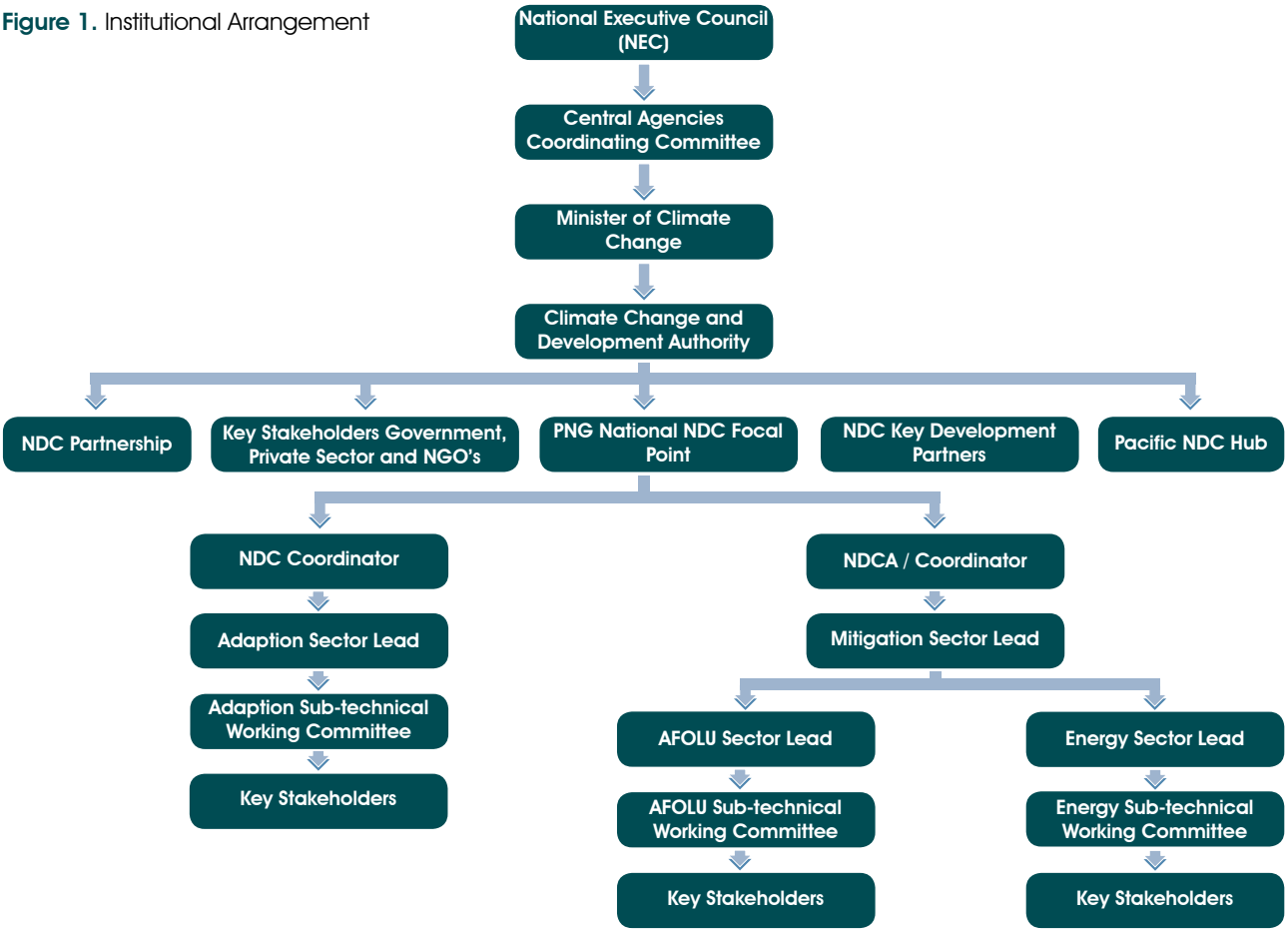
CCDA

- communicates and coordinates actions to achieve outcomes and activities outlined in the implementation plan
- Ensures relevant MRV data needs are conveyed with the appropriate government agencies
- Review and amend the Implementation Plan as deemed necessary

Government Ministerial Committee;

- Provide high level policy guidance
- Highlight, approve updates on the roadmap

Figure 1. Institutional Arrangement



The Implementation Plan Roadmap the will be developed by March 2021 will detail the Implementation Schedule of each activity in this Implementation Plan.

Monitoring and evaluation

Implementation will be monitored and evaluated based on the MRV framework. The table below describes the specific intervals of the reporting periods, and the institutions required to reporting.

Action	Timing	Responsible agencies
Status update for each activity	Biennially	Implementing government agencies and supporting development partners
Progress report	Bi-annual	CCDA, implementing agencies, and stakeholders.
Annual report	By December 2021, December 2022 and December 2023.	CCDA, implementing agencies, and stakeholders.
Interim Evaluation Report	January 2024	CCDA, implementing agencies, and stakeholders.
Final evaluation Report	January 2030	CCDA, implementing agencies, and stakeholders

A biennial update report shall be submitted by implementing government agencies and/or development partners supporting the implementation of these actions. These are submitted to CCDA, who will then be responsible to compile these status updates into a bi-annual progress report to be shared with stakeholders and an annual report submitted to Cabinet Ministers. At the end of the implementation period for the NDC Implementation Plan 2021-2030, a final evaluation report should be prepared by CCDA.

Government
of
Papua New Guinea