CFE-DM

PAPUA NEW GUINEA

Disaster Management Reference Handbook

August 2025

CENTER FOR EXCELLENCE IN DISASTER MANAGEMENT & HUMANITARIAN ASSISTANCE
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Letter from the Director

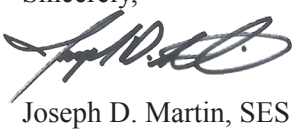
As Papua New Guinea (PNG) celebrates the 50th anniversary of its independence, the United States (U.S.) is proud to also mark 50 years of diplomatic relations between our countries.

Collaboration and cooperation between the people and leaders of PNG and the U.S. are vital for peace and security in the broader Asia-Pacific region. As a unit under the U.S. Indo-Pacific Command (USINDOPACOM), the Center for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) shares the mission of building a more resilient region through partnerships and shared experiences. We are increasingly seizing opportunities to work with PNG's government, military, and community stakeholders to enhance knowledge and skills to address security threats, especially those related to natural hazards.

PNG faces the risk of severe seismic, meteorological, and hydrological hazards that can devastate lives and livelihoods. While the U.S. government and military have responded and will continue to respond when called upon by the Government of PNG to help during a disaster, we also are committed to building capabilities and relationships before a disaster strikes. In the past two years, the CFE-DM has led or supported multiple disaster management workshops and exercises that bring together PNG and U.S. government, military, and community members, along with international experts. And we intend to build upon these successes in the coming years, especially as PNG transitions disaster management to the National Emergency Management Authority (NEMA), a body approved by the Government in March 2025.

This updated PNG Disaster Management Reference Handbook reflects CFE-DM's commitment not only to ensure that disaster management partners have the best information before, during, and after a catastrophe but also to grow the community of practice that is the foundation for a more secure and resilient region.

Sincerely,



Joseph D. Martin, SES
Director

About the Center for Excellence in Disaster Management & Humanitarian Assistance

Overview

The Center for Excellence in Disaster Management & Humanitarian Assistance (CFE-DM) is a United States (U.S.) Department of Defense (DoD) organization comprised of nearly 30 subject matter experts that provide academic research, civil-military coordination training, and operational insights to support decision making before, during, and after crises. The Center is designed to bridge understanding between humanitarians, civilian, and military responders. CFE-DM partners with a diverse group of governmental and nongovernmental actors, as well as academic institutions to increase collaborations and capabilities in humanitarian assistance and disaster response. While maintaining a global mandate, the Indo-Pacific region is our priority of effort and collaboration is the cornerstone of our operational practice. The Center is a direct reporting unit to U.S. Indo-Pacific Command (USINDOPACOM) and is located on Ford Island, Joint Base Pearl Harbor-Hickam, Hawaii.

Vision

Resilient Joint Forces, Allies, and Partners that are fully prepared to respond across the spectrum of humanitarian crises.

Mission

CFE-DM builds crisis response capacity in US, Allies and Partner militaries across the Indo-Pacific to save lives before, during, and after emergencies.

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EXECUTIVE SUMMARY

This handbook is intended to provide a baseline of understanding of how the government and people of Papua New Guinea (PNG) conduct disaster management (DM). Personnel planning for or executing a DM operation – training, exercise, or emergency response – alongside Papua New Guinean practitioners will find this resource useful for supporting engagement. This handbook delivers background on the country's geography, society, political system, and economic status and provides a profile of the hazard landscape and vulnerabilities that prevail. It also addresses the major institutional, legal, and practical foundations of disaster response as practiced at the national and subnational levels.

Exposure and Vulnerability

Over the past 25 years, PNG has recorded upwards of 60 major hazard events that disrupted lives and livelihoods and necessitated a large-scale coordinated response. The causes of these events are dominated by natural hazards, with hydrological and geophysical events being the most common. Nonetheless, the country is exposed to biological, climatological, meteorological, and anthropogenic hazards that can bring death and destruction. By some measures, the country is the most at-risk Pacific Island country and Southeast Asia's second most at-risk country.

A constellation of factors increases the vulnerability of the country's 12 million residents to major hazard events. With less than 15% of the population living in urban areas, a large percentage of communities are very remote. They not only lack infrastructural connections to other communities, but they also lack infrastructure within their community. Many communities are stricken by deprivation and marginalization, and communal conflicts are numerous and complex. There are millions of Papua New Guineans who do not have the ability to build individual, household, or community resilience to disasters. When education, health care, and livelihoods are disrupted for long periods after a disaster, the disadvantages of people living in these communities are exacerbated.

Building Resilience

PNG has taken steps to address disaster risk at the national level through the National Disaster Risk Reduction Framework (2017-2030) and through international and bilateral partnerships. While these DM frameworks provide a foundation for building coping capacity, it is through sustainable socio-economic development and partnerships that the national and subnational governments are building resilience. The National Disaster Centre (NDC) is the focal point of DM activities. Nested under the national government and headed by the Department of Defence, it has close inter-agency links as well as strong cooperation with United Nations (UN) agencies and non-governmental organizations (NGO) working in the country.

UN agencies and NGOs, especially faith-based groups, are also active at the local and provincial levels. Provincial administrations have set up Provincial Disaster Centres (PDC) through which they channel information about hazards and resources to respond to disasters. At the district and local levels where relief and major response operations are executed, the district disaster offices that have been established work with NGOs and churches, and they have the ability to coordinate with the PNG Defence Force (PNGDF) and Royal PNG Constabulary (RPNGC, the police) if those forces have personnel and assets in the affected area.

The NDC is integrated into the Disaster Management Team (DMT), co-chaired by the NDC Director and the UN Resident Coordinator (UNRC) in the country. Through this mechanism, international non-government assistance can be mobilized, even as the national government can request assistance directly from bilateral partners. The most frequent responding country is Australia. They are commonly joined by civilian and military responders from Japan, New Zealand, and the United States.

COUNTRY OVERVIEW

PNG, an island country in the southwest Pacific, faces a wide range of hazards, which have widespread impacts on semi-subsistence agriculture, the foundation of much of society and the economy, and on mining operations, a key portion of the formal economy. Decentralization of government authority has developed in a complex manner since local governments were established during the colonial period. PNG has tiers of government at national, provincial, district, and local levels, and this structure affects the country's approach to DM. Among the key DM-related challenges is displacement, most of which is caused by natural hazards, though communal violence also displaces people. High levels of insecurity and violence throughout the country hinder human security and development.

Geography and Environment

PNG is an island country that lies just south of the equator in the southwestern Pacific Ocean. It is the most populous Pacific Island country and is considered part of the Pacific's Melanesian region.[1] The mainland is on the eastern half of the island of New Guinea. PNG also encompasses New Britain, New Ireland, the Admiralty Islands, and other islands in the Bismarck Archipelago; Bougainville and Buka, which are part of the Solomon Islands chain; and smaller offshore islands and atolls. The capital, Port Moresby, is on the southeastern coast.[2] PNG's half of New Guinea is surrounded to the southwest by the Torres Strait (across which is Australia's northeastern tip), to the immediate south by the Gulf of Papua, to the southeast by the Coral Sea, to the east by the Solomon Sea, and to the north by the Bismarck Sea. The country has 5,152 kilometers (km; 3,201 miles [mi]) of coastline and shares a land border of 824 km (512 mi) with Indonesia, which shares New Guinea with PNG. The total land area is 462,840 km² (178,704 mi²).[3] Figure 1 depicts a relief map of Papua New Guinea, as made available by Blue Green Atlas.[4]

The terrain is mostly covered by dense tropical rain forest. There is a system of mountains running from the eastern end of the island to the western boundary with Indonesia. This mountainous interior is referred to as the Highlands. PNG is geologically young, as reflected in the mountains' precipitous slopes and sharp ridges. In areas, the mountains rise to 4,572 meters (m; 15,000 feet [ft]), and there are broad upland valleys at altitudes of 1,524-3,084 m (5,000–10,000 ft). The Central Depression lies between the northern and central mountain ranges and contains the Sepik, Ramu, and Markham River

Figure 1: Papua New Guinea Relief Map

valleys. The country has the world's 12th largest riverine network, The largest river is the Fly, which flows over 1,125 km (700 mi) from the mountains of western Papua and can be navigated for 800 km (500 mi) of its length. Near the coast, the terrain shifts to lowlands, rolling foothills, and wetlands. The delta plain of the Daru coast in the southwest forms one of the world's most extensive swamps, covering some 260,000 km² (more than 100,000 mi²).[5]

The climate is warm and humid year-round along the coasts and in the lowland plains, where humidity is around 80%,[6] average minimum temperatures are 23–24°C (73–75°F), and average maximum temperatures range 30–32°C (86–90°F). Conditions are cooler at higher altitudes in the Highlands. At 1,500 m (4,921 ft), daytime temperatures vary between 20°C and 21.5°C (68-70.5°F) throughout the year. Above 2,100 m (7,000 ft), frost commonly occurs at night, and above 3,500 m (11,500 ft), it can snow.[7]

Two principal wind directions influence rainfall patterns – i.e., southeast from May to October, and northwest from December to March. On the mainland, the mean annual rainfall varies from less than 2,000 millimeters (mm; 79 inches [in]) along the coast to more than 8,000 mm (315 in) in some mountain areas. Areas of southwestern PNG and the Markham Valley in the northeast receive less than 2,000 mm (79 in) of precipitation annually. The Port Moresby coastal area receives even less rain – i.e., <1,000 mm (39 in) per year. The island groups to the north and northeast of mainland PNG receive 3,000-7,000 mm (118-276 in) average annual rainfall.[8]

Society and Demographics

The total population, according to the 2021 national population estimate, was 11,781,559 people. Based on the same estimate, Figure 2 maps the population distribution by province, as published by the PNG National Statistical Office.[9]

PNG's population skews young, with half the population under 22 years of age. More than one-fifth of the population is 15-24 years of age.[10] In addition to its massive, youthful character, the population is also predominantly rural, though it is urbanizing. In 2018, the UN reported that approximately 13% of the population was urban, and that number was increasing.[11] Port Moresby is the largest urban area, with the 2019 national population estimate detailing the National Capital District as having 513,918 people. Lae is the second largest city (224,983 people) and the capital of Morobe Province.

PNG's ethnic composition is very complex.[12] There are over 600 distinct indigenous groups, each with its own culture and language. The largest ethnic categories are Papuan and Austronesian, but PNG also has Negrito (originally from the Philippines islands), Micronesian, and Polynesian communities. Major tribes include the Huli Tribe, who reside in the Highlands, the Trobriand Islanders in Milne Bay Province, and the Asaro Mudmen of the Eastern Highlands.[13]

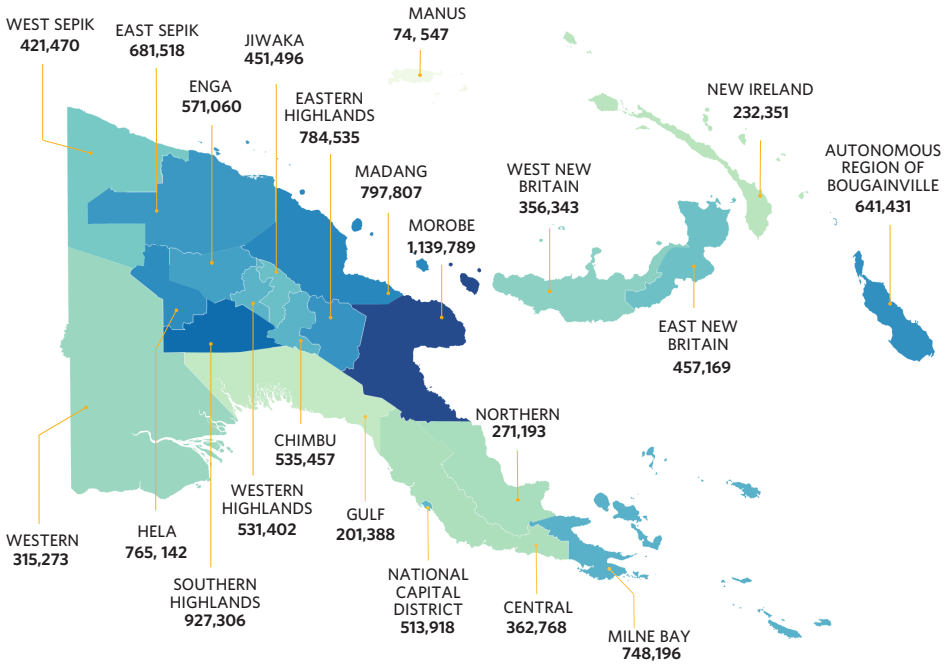

Figure 2: Map of Papua New Guinea Population Distribution, by Province

The official languages of the country are English, Tok Pisin, and Hiri Motu. English is the main language of government and commerce. Tok Pisin, the most widely spoken language in most daily contexts, may also be called Melanesian Pidgin or Neo-Melanesian; it is a creole combining grammatical elements of indigenous languages, some German, and some English, and it plays a key role as a lingua franca. There are more than 800 indigenous languages belonging to two very different language groups—Austronesian and Papuan. Speakers of the 200 or so Austronesian languages generally inhabit the coastal regions and offshore islands. Speakers of the roughly 550 Papuan languages comprise the great majority of the population and live mainly in the interior.[14]

Vulnerable Groups

Displaced People — There were an estimated 84,000 internally displaced persons (IDP) in PNG as of the end of 2024.[15] Disasters cause the majority of displacement in the country, although flareups of communal violence can also drive displacement. The majority of IDPs are displaced once, though some report being displaced multiple times.[16] Tribal conflict commonly occurs over land and is driven by complex land tenure relationships, overlapping rights, migration due to economic or environmental factors, and cultural differences. Duration of displacement is often at least one year, and sometimes much longer. Displaced women and girls are particularly vulnerable to violence and abuse. Figure 3 depicts numbers of IDPs in PNG from 2008 to 2021 and whether their cause of displacement is natural disaster or conflict.[17]

In 2024, a reported 214,342 individuals were affected by natural hazards and conflict in PNG, and a total of 30,970 individuals were newly displaced. Among the IDPs, 71% (21,878 individuals) were displaced by natural hazards and 29% (9,092 individuals) by conflict. Flooding was the main natural hazard reported as driving displacement in 2024 (38%, 11,835 individuals); landslides were the second most common driver of displacement at 6,135 individuals. Examples of the types of events that drive displacement include the 2024 Enga Province conflict and landslides. Violent conflict, which peaked in February and March, resulted in 2,718 IDPs, and more displacement followed catastrophic landslides in May 2024.[18]

Additional displaced people are refugees and asylum seekers. Some 2,500 refugees from Indonesia's West Papuan Province reside in PNG's Western province at Iowara (East Arwin Relocation Camp), where hardships include food insecurity, lack of access to justice, limited livelihoods, water

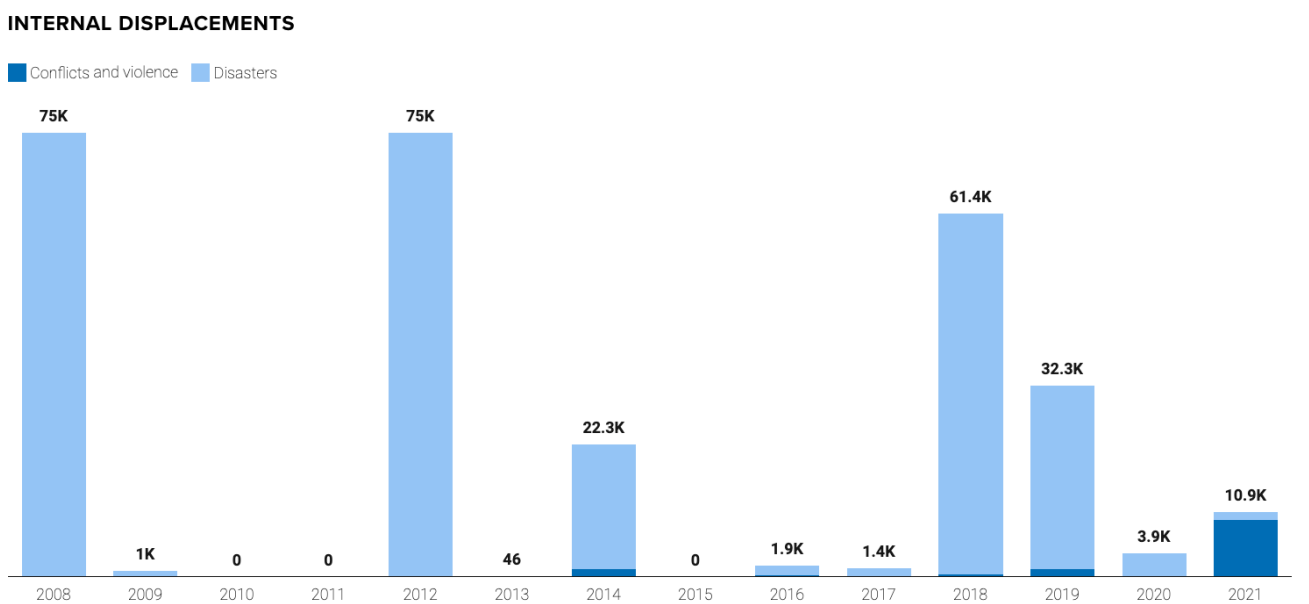

Figure 3: IDPs and Drivers of Displacement, 2008-2021

and sanitation concerns, road access issues, and tensions with local landowners.[19] Meanwhile, several dozen refugees and asylum seekers that were former detainees at a now-shuttered Australian Government facility on Manus Island remain in PNG, primarily around Port Moresby. While Australia struck a secret deal with PNG in late 2021 to fund basic services for those refugees, assistance was halted in November 2023.[20] The refugees, along with their families, face consistent threats linked to insecure housing and inadequate access to medical care, schooling, and food.[21]

Women and Girls — Annually, more than 1.5 million women and girls in PNG experience gender-based violence, which is linked to domestic abuse, communal conflict, political intimidation, sorcery accusations, and other causes. Violence is particularly high in Hela and Morobe Provinces, the latter of which is a hub of the oil industry. Domestic violence affects more than two-thirds of women and, in some areas, has become normalized. Survivors are often unable to seek help due to social stigma or economic dependence on the abuser, and there are few safe houses.

There are strong gendered impacts of communal violence, which often is conducted by clan or other social groupings over resources and rivalries. Women are often collateral damage in retaliatory violence and are subject to rape and other assault because they are seen as targets to humiliate male parties to the conflict. In Hela Province, an expanded cash economy, heightened inequality, and the availability of military-grade assault weapons and other firearms have exacerbated violence.[22]

Sorcery Accusation-Related Violence (SARV) — SARV is on the rise in PNG and involves perpetrators accusing an individual of practicing sorcery and assaulting or killing them. SARV occurs across PNG and at higher rates in the Highlands. Researchers estimate that every month, six people are killed and another 23 injured due to SARV.

Anyone can be accused of sorcery, but in some areas the accused are disproportionately women. Violence toward the accused is often gendered, with men more likely to be attacked with weapons like machetes and women more likely to be sexually assaulted, tortured, and burned. From 2016 to 2020 in the National Capital District and Enga, Bougainville, and Jiwaka Provinces, nearly 30% of accusations led to violence and involved 546 victims, of whom 57% were women.[23] Human rights defenders are also targeted when they assist a survivor of SARV.[24]

People with a Disability (PWD) — Estimates of the proportion of the population living with disabilities range from 13%[25] to 15%.[26] The only official data available was collected in 2009–2010, focused on physical mobility, and found that 9.8% of the population experience difficulty walking or climbing steps; it excluded intellectual, visual, and hearing impairments.[27] In PNG and much of the Pacific, organizations of PWD (OPD) play a key role in promoting the rights of PWD and advocating for their meaningful participation in society. A 2023 study, in cooperation with the PNG Assembly of Disabled People and other NGOs, identified three main barriers to the participation of PWD in decision-making and implementation:

1. Stigmatization and marginalization of PWD in PNG society
2. Lack of representation of OPDs in decision-making processes
3. Limited understanding of impacts of and progress toward advancing inclusion

However, it also found three key enablers that can help overcome barriers:

1. Decision-makers and communities are equipped with the knowledge and skills to protect the rights of PWD
2. Strong advocacy capacity of OPDs
3. Effective two-way information-sharing processes among PWD and OPDs and other decision-makers[28]

The establishment of the National Policy on Disability was an important milestone in supporting PWD in PNG. However, OPDs recommend a formal coordinated monitoring process to support policy implementation and transparency on resources

available during annual budget planning.

Children – Children in PNG are vulnerable to child labor. Around 19% of the country's labor force is comprised of child workers. Child labor can include mining work and coerced domestic work among children from rural areas and who are living with host families in cities. Trafficking of local and foreign women and children also occurs. Approximately 30% of PNG sex trafficking victims are under 18 years of age. Around 61% of children involved in commercial sex exploitation were living with immediate or extended family members. The government of PNG established the National Action Plan to Eliminate Child Labour 2017–2020 and the Decent Work Country Programme 2018–2022 to commit to protecting human dignity and working conditions. However, progress is unclear due to lack of data. A review of the Employment Act and the Informal Sector Control Management Act is underway to explicitly address child labor.[29]

Government

PNG is a parliamentary democracy under a constitutional monarch. As a Commonwealth realm, it is a sovereign state that voluntarily recognizes as head of state the British monarch, currently King Charles III, who is represented in PNG by a governor general. However, the head of government, who exercises practical governing and political power, is the prime minister.[30]

The unicameral National Parliament consists of 89 members elected from single-member open electorates (districts) and 22 governors elected from provincial electorates or the national capital. All 111 elected seats are held for five-year terms. Parliament nominates the governor general, who is then appointed by the British monarch. Parliament also elects the prime minister, who in turn recommends the ministers of the National Executive Council (NEC, the cabinet), who are appointed by the governor general. After an election, the political party with the most seats is invited by the governor general to form a government. Since the country's independence in 1975, all governments have been formed by a coalition as no single party has won enough seats to form a government alone.[31]

The Department of Provincial and Local-Level Government Affairs (DPLGA) is a key part of the country's decentralized governance system and is responsible for coordinating and supporting provincial and local governments to facilitate effective service delivery, good governance, and sustainable development.[32] PNG has a complex and evolving system of decentralization with four tiers of government. While PNG started out as a unitary state at independence, it has since provided constitutional recognition to another three tiers of representative government – provincial, district, and local. PNG's system relies heavily on provincial assemblies and district boards that are dominated by national politicians from that province or district.[33]

Administratively, PNG is comprised of 20 provinces, along with the Autonomous Region of Bougainville (ARoB) and the National Capital District. The 20 provinces are: Central, Chimbu, Eastern Highlands, East New Britain, East Sepik, Enga, Gulf, Hela, Jiwaka, Madang, Manus, Milne Bay, Morobe, New Ireland, Northern / Oro, Southern Highlands, Western, Western Highlands, West New Britain, and West Sepik.[34]

Economic Profile

The backbone of society is subsistence agriculture, which is exposed to multiple hazards – drought, flooding, etc. – while the formal economy is oriented toward natural resource extraction, a sector whose returns are subject to global supply and demand swings. The entire economy is highly vulnerable to natural hazards, as well as to anthropogenic and financial shocks.

PNG is a lower-middle income economy, a classification that means gross domestic income per capita is between US$1,136 and US$4,495, according to the World Bank.[35] Gross domestic product (GDP) growth has fluctuated wildly since independence; the long-term average is just greater than 3%.[36] From its last peak of 13.5% GDP growth in 2014, PNG has felt GDP contractions of 0.3% in 2018 and 3.5% in 2020, the first year of the Coronavirus Disease 2019 (COVID-19) pandemic.

After the pandemic, GDP has grown steadily, and in mid-2025, the International Monetary Fund projected a 4.6% GDP growth rate for the country for the year.[37]

The mining and energy sectors together account for more than 25% of GDP and for a large portion of export revenue. Social and geological factors influence how much output the country's mines and natural gas fields can produce. Due to their locations, many mining operations experience frequent disruptions from land- and mudslides, flooding, earthquakes, and conflict within the communities around them. Moreover, there is little room for growth in these sectors as many resource extraction operations are mature, and new ones are not being launched.[38]

The formal agriculture, forestry, and fishing sectors employ most (56%) of the labor force. However, a larger share of the labor force works in informal agriculture, as 90% of the population lives in a household that grows some crops, mostly for home consumption. Nonetheless, the agricultural sectors do contribute 17% of GDP. In fact, PNG is a net exporter of agricultural (food) commodities. Smallholder farms are even dominant in some commodity crops, and they produce 75% of coffee, 65% of cacao, and 66% of copra; only in oil palm are larger plantations dominant.[39] Production of and trade in all crops have shown significant growth in the past five years and are projected to sustain their acceleration based on largely untapped potential. Still, they are highly exposed to meteorological and climatological hazards, as well as to insecurity linked to communal conflict. In addition, value-added agricultural product development is limited by electricity shortages, insecurity, and a lack of skilled workers.[40]

Australia is the top importer of commodities from PNG at more than 30% of PNG's exports, and it is also the largest single source (nearly 36%) of commodities imported by PNG.[41] Trade with Australia is diversified across various sectors.

Meanwhile, trade with Japan – both a top export market and import source – is dominated by Japanese imports of PNG's liquified natural gas (LNG). Japan's appetite for PNG's LNG is a strong steadying force within PNG's export mix, which suffers regular swings in demand for and revenue from gold, copper, silver, nickel, and cobalt.[42]

Interest in PNG's stability and prosperity is high among the country's trade partners and other regional stakeholders, as they not only work to ensure sustained access to PNG's mineral wealth but also to avoid adversaries exploiting ungoverned spaces and disgruntled populations.

The country's government and business leaders continue to work to channel partners' investments into expanding infrastructure and human resources development, both of which are critical to building resilience to shocks. As part of its effort to reduce the poverty rate, which sits at 25%,[43] the Government of PNG (GoPNG) has specifically targeted the agriculture sector for growth because of its importance to rural communities. Formalization and modernization of agriculture are expected to support employment of young people, increase the development of value-added activities around farming and forestry, and increase demand for off-farm goods and services in rural communities.[44]

Geographic and cultural factors combine to make the extension of governance and infrastructure to remote areas very costly. This high cost means that integrating large swaths of the country into the formal economy is a perennial challenge. Consequently, the informal sector is massive. Faith-based groups and NGOs are common service providers and, therefore, common employers.

DISASTER PROFILE

PNG is one of the most disaster-prone countries in the world. Prevalent natural hazards include floods, landslides, volcanic eruptions, earthquakes, and drought. Disasters significantly affect food security, due to a reliance on subsistence agriculture and fishing. Ongoing violence has contributed to instability and led to access obstacles during disaster response. Moreover, access to affected people can be complex as a majority of the population lives in rural areas, and the country's rugged geography and limited transportation infrastructure make transit difficult. Natural hazards and communal conflict significantly drive displacement. The economic impacts of disasters are estimated at US$295 million (1.61% of GDP) in average annual loss.[45] Wider system losses compound individual and community losses as homes and infrastructure have not been built to withstand hazard events,[46] and high poverty levels mean low coping capacity.

Hazards

PNG is exposed to geological, hydrological, meteorological, biological, and anthropogenic or technological hazards. The country experiences earthquakes, tsunamis, volcanic eruptions, tropical cyclones and storms, river and coastal flooding, king tides, landslides, drought, and frost. Extreme weather events are projected to become more intense and frequent. The country also grapples with disease outbreaks including polio and diarrheal diseases, which often erupt following a disaster, and it also felt the impact of the COVID-19 pandemic. The country has faced anthropogenic disasters, most often related to mining accidents that can result in casualties and environmental damage.[47]

Earthquakes

PNG is located on one of the world's most tectonically active areas, between the Australian and Pacific plates, along the Pacific Ring of Fire.[48] PNG experiences small earthquakes daily, large earthquakes frequently, and a severely damaging earthquake every few years.[49] From 2014 to 2018, at least 10 earthquakes were recorded with a magnitude (M) above 7.0.[50] More recently, in March 2024, an M6.9 earthquake struck in a remote northern region where it caused devastation and compounded other ongoing disaster events.[51] Frequent earthquakes have led to growing landslide occurrence and risk, as seismic activity can destabilize slopes.[52]

PNG is among the top six countries in the world with the highest percentage of population exposed to earthquakes. While most of PNG experiences relatively frequent earthquakes, areas such as the National Capital District, Highlands, and Western Province, are locations classified as "stable," as they are located on the Australian craton. Northern areas are disproportionately exposed to earthquakes due to the proximity of fault zones. The collision zone of the Pacific and India-Australia Plates in PNG's east means a high risk of earthquakes, and this high risk is also present at the Ontong Java Plateau subduction zone at the Bougainville-Solomon Trench.[53]

Volcanic activity and tsunamis are hazards related to PNG's earthquake risk; they are all depicted in Figure 4, a UN OCHA map that overlays earthquake, volcano, and tsunami risk areas over provincial boundaries.[54]

Tsunami

Because of PNG's high exposure to earthquakes, tsunamis remain a concern, although only three major tsunamis have occurred in the past century – 1931, 1996, and 1998.[55] Known as the Aitape tsunami, the 1998 tsunami was triggered by an M7.0 earthquake off the northwest coast of PNG; three large tsunami waves with a maximum height of 15 m (49.2 ft) wiped out the villages of Sissano, Warapu, Arop, and Malomo on the country's north coast, where the waves killed an estimated 2,200 people and displaced more than 10,000 people.[56] Scientists have determined that a submarine landslide generated by the earthquake was the actual trigger for this tsunami.[57] It is also possible for a tsunami to be triggered by a volcano. Some island volcanoes – e.g., Manam volcano on Manam island – are at risk

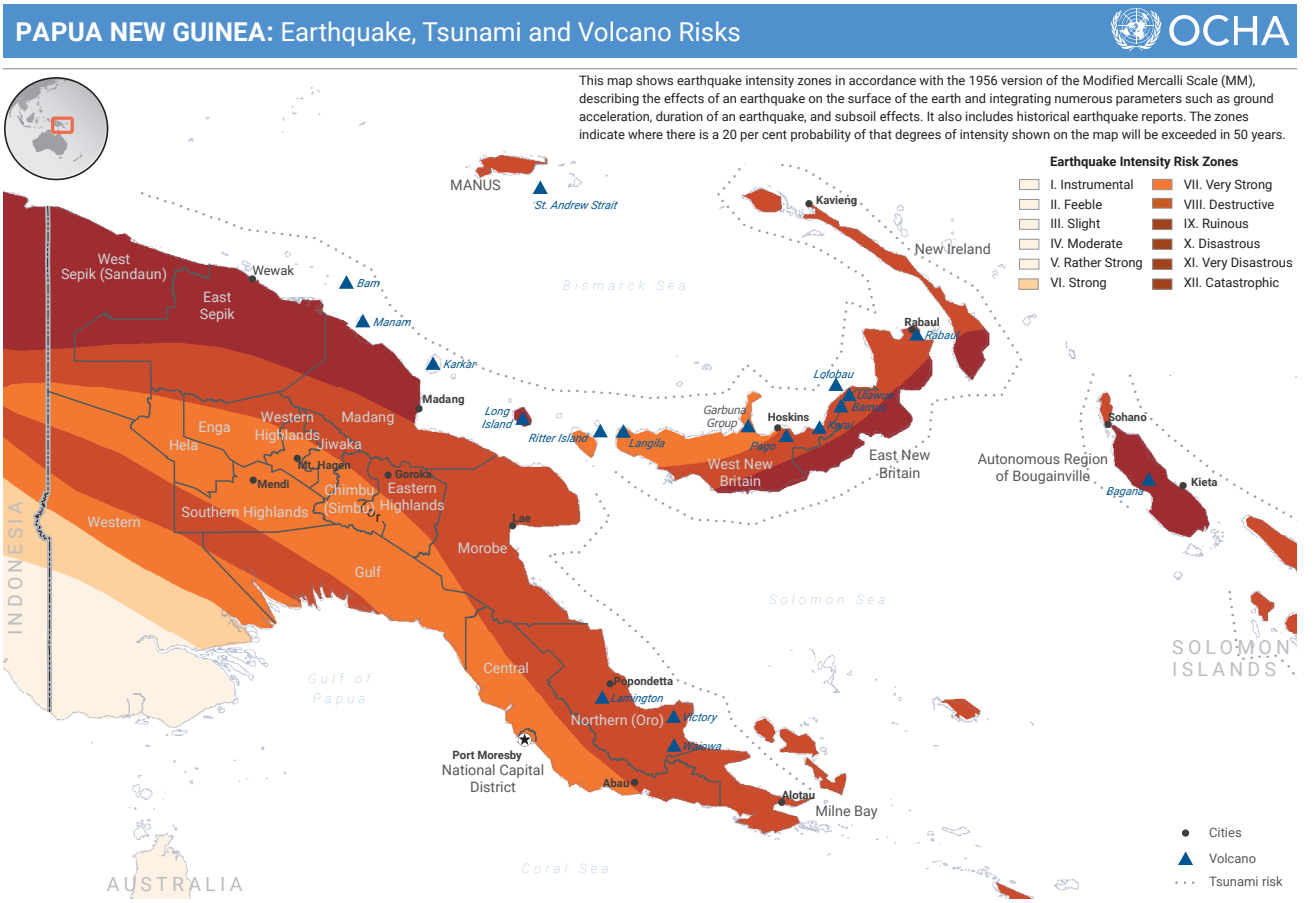

Figure 4: Papua New Guinea Map of Earthquake, Volcano, and Tsunami Risks

of an eruption or flank collapse that could trigger a tsunami.[58]

According to a recent tsunami risk analysis, high tsunami risk areas include the ARoB and Madang, East Sepik, and Milne Bay Provinces. Poor early warning system coverage in remote areas, insufficient evacuation routes in coastal areas, and removal of coastal vegetation have increased the vulnerability of coastal communities. Critical coastal infrastructure exposed to tsunami includes port facilities in Lae and Madang, roads, water and sanitation systems, and healthcare facilities.[59] Additionally, since large tsunami events are relatively uncommon, increased vulnerability may be the result of past events being forgotten by exposed populations.[60]

Volcanoes

PNG is home to the most active volcanoes in the southwest Pacific. According to the Rabaul Volcanological Observatory (RVO), there are 15 active volcanoes, five of which erupted in 2021 and two others within the last 10 years. The most active volcanoes include Bagana, Kadovar, Langila, Manam, and Ulawun.[61] Six are considered high-risk. They are Manam, Ulawun, Karkar, Pago (located in the Witori caldera), Rabaul, and Lamington. Most of these volcanoes are in the Bismarck volcanic arc, which extends along the northern coast of New Britain and west-northwest to the islands offshore from the mainland. There are also 22 dormant volcanoes.[62] More than 1 million people, or around 17% of the total population, live within 30 km (18.64 mi) of an active volcano.[63]

Significant past eruptions highlight the risk to the community. Thousands of people can be displaced as ash and lava destroy or contaminate large swaths of land. At the extreme, whole regions can be rendered uninhabitable. PNG's original capital, Rabaul, was destroyed following the eruption of Rabaul volcano

on 19 September 1994. It caused 80% of the town's buildings to collapse from ashfall. The eruption resulted in at least four deaths and up to 90,000 displaced people.[64]

Landslides

Landslides are a common occurrence in PNG and are often triggered by other natural hazards such as earthquakes, volcanic eruptions, rain, and flash flooding. They are especially common where ecosystems and soil are degraded.[65] According to a World Bank report, many smaller-scale landslide events go unreported, but deaths and infrastructure damage take place annually, and multiple medium- to high-impact events are reported during most years. Earthquakes can trigger landslides, especially when they occur in combination with heavy rainfall. One study suggests around 60% are triggered by rainfall. Due to the prevalence of all of these conditions, PNG's Highlands area is at high risk.[66] Landslides and slope failures are common there and in mountainous regions, with 61% of medium- to large-scale events happening there.[67]

Floods

Floods are a major risk. Between 1990 and 2015, floods affected almost 500,000 people.[68] River flooding, king tides, sea level rise, coastal flooding, surface flooding, and rainfall events all pose flooding risks, threatening lives, infrastructure, and livelihoods. In PNG, annual variation in rainfall can be high. Precipitation rates are influenced by the El Niño Southern Oscillation (ENSO), with El Niño events typically associated with lower-than-average annual rainfall or drought conditions, while La Niña events are generally associated with higher-than-normal rainfall.[69]

Inland flooding affects over 22,000 people yearly. On average, floods annually displace over 6,000 people and cause damage totaling over US$8 million. By 2030, both economic damage and the population affected by river flooding are numbers that are expected to double.[70] The UN Development Programme (UNDP) suggests that 18% of PNG's landmass is either permanently or regularly inundated. One study in the central Highlands found that 71% of villages have high or very high flood risk. It is projected that flash floods and coastal floods are also likely to intensify.[71] Extreme weather events and increased average rainfall will drive the impact of inland floods. According to a 2018 study, the population affected by an extreme river flood could increase by 35,000–56,000 people by mid-century due to environmental changes. The increased probability of river flooding and coastal flooding is likely to also degrade water quality, spreading salt contamination and water-borne diseases.[72]

Many areas are also highly vulnerable to sea level rise, with activities and development located in coastal areas or in areas along rivers. The Carteret Islands were among the first Pacific islands from which "environmental refugees" from sea level rise were documented. Sea level rise threatens coastal resources and biodiversity, including the north coast's mangrove forests that have been identified as vulnerable to submergence and loss.[73]

Drought

Droughts are common in PNG. They often coincide with El Niño effects of dry spells and heat. Based on the Centre for Research on the Epidemiology of Disasters (CRED) international disaster database (EM-DAT) data from 2000 to 2023, drought is the hazard that has affecting the most people in the country.[74] PNG is affected by two types of drought – meteorological (a precipitation deficit) and hydrological (deficit in surface and subsurface water flow, potentially originating in the wider river basins). In the absence of El Niño, PNG is one of the wettest countries in the world, but little water is collected and stored.[75]

An El Niño event usually delays the start of the monsoon season and brings drought conditions to the country, where the southern areas of the main island are the most impacted.[76] The effects of La Niña, while generally associated with wetter than normal conditions, results in dry spells in some areas. A recent La Niña brought dry spells to South Bougainville, East New Britain, and parts of New Ireland, which experienced critical drought

conditions in early 2024.[77] In one of the worst instances, in 1997–1998, an El Niño event led to drought and frost and over 1 million people facing food shortages.[78]

Droughts have also led to reductions in crop yields and wildfires.[79] Additionally, the resumption of rainfall after drought can lead to floods, crop pest attacks, and disease outbreaks.[80] As increased temperatures or heat waves are predicted to increase in frequency and severity, PNG's subsistence farmers (80% of the population) will contend with the food and water insecurity brought on by droughts.[81]

Frost

Frost is fairly common in PNG. Frost damage to crops can lead to food shortages and economic hardships. Like drought, frost is affected by El Niño events. In 2015-2016, an El Niño triggered a prolonged drought and frost in the Highlands, where 2 million people were affected.[82] Areas above 1,700 m (5,577 ft) are particularly at risk of crop destruction from frost. However, frost can also affect the lowlands and island areas.[83] Consecutive and repeated frost events can stop production of root crops for six months. Surviving crops are often weakened and more susceptible to pests and disease.[84] Severe frost events have historically led to populations migrating to lower-elevation areas. The 2015-2016 drought and frost event hit Eastern Highlands, Simbu, and Western Highlands Provinces. Populations from the Highlands migrated to lower altitudes, and some 300,000 of them were affected by food insecurity.[85]

Tropical Cyclones and Storms

Tropical storms and cyclones can bring strong winds, heavy rains, and storm surges to parts of PNG. Cyclones are not a frequent hazard, due to the country's proximity to the equator where they rarely occur. Even without direct landfall, passing cyclones can bring damage from wind and flooding. The ARoB, located east of the PNG mainland and closest to the Solomon Islands, has the highest exposure in the country to cyclones and intense tropical storms.[86] Milne Bay and Gulf Provinces are also considered among the most exposed.[87] According to a World Bank report, every decade, 15 tropical cyclones pass through PNG's exclusive economic zone, and some 25% of them are category 3 or stronger.[88]

Epidemic Disease

PNG has a history of outbreaks of polio, measles, chikungunya, cholera, and COVID-19. The country has a high prevalence of infectious and vector-borne diseases like pneumonia, tuberculosis, HIV/AIDS, malaria, typhoid, dengue fever, and diarrheal diseases. Many of these diseases can be worsened by natural hazard events, especially if people are displaced from their homes. Landslides, earthquakes, and flooding can increase health risks because of contaminated water, an increase in vectors such as mosquitoes, and increased exposure to contagious disease spread when displaced people are housed in temporary shelters.[89]

Recent polio outbreaks highlight the threat of communicable diseases. Although PNG was declared polio-free in 2000,[90] outbreaks in 2018 and 2025 led to declarations of national emergencies and the launch of nationwide vaccination campaigns.[91]

Limited access to safe drinking water and sanitation have resulted in large numbers of diarrheal diseases, including cholera. These types of diseases tend to increase with high rainfall and flooding in areas where sanitation is lacking. Exposure to diarrheal diseases in rural areas is high.[92] Around three in every 1,000 children die before the age of five as a result of diarrheal diseases, and these diseases cause around 5% of hospital admissions, mainly due to a lack of clean water and sanitation. Global research also links both flood and drought to increased incidence of diarrheal disease, according to the World Bank.[93]

Finally, food insecurity and lack of access to clean water result in malnutrition and an increased risk to diseases. Marginalized populations, including women, children, and those living in poverty, are disproportionately affected by diseases. This exposure is exacerbated by limited access to treatment services.[94]

Industrial Accidents

PNG has a history of mining-related disasters. The most catastrophic event occurred at the Ok Tedi Mine, operated by a subsidiary of BHP, a publicly traded, Australian-British multinational company. Every year from the mid-1980s to 2013 (when the GoPNG took ownership of the mine), Ok Tedi dumped tens of millions of tons of mine tailings (a fine sand of crushed rock and metals) into the Ok Tedi tributary of the Fly River. The result was an ecological disaster. By the early 1990s, fish were dying, turtles disappearing, and canoes running aground midstream as sedimentation raised riverbeds. The overflow destroyed food gardens in downstream communities and killed thousands of trees.[95]

More recently, a Chinese nickel mine operator accidentally spilled an estimated 200,000 liters (52,834 gallons) of toxic slurry into Basamuk Bay in Madang Province in August 2019. The plant operator, Ramu Nickel, is owned by the Metallurgical Corporation of China (MCC). The Madang provincial government and 13 landowners have sought legal action against the plant operator.[96]

Disasters by Numbers

The following assessment of data is intended to support planning for potential disaster responses by characterizing the most common types of hazard events, in what time of year they cluster, where their impacts are felt, and if there is a trend of increasing or decreasing frequency or severity.

The assessments in this section are based on a data set from the CRED EM-DAT. The data cover disasters in PNG for the period 2000 through 2025 (July). The set includes 63 disaster events. Of note, other data sets that utilize differing methods of reporting hazard events include upwards of 120 incidents in any given year, with most years having at least one hazard event that became a disaster – i.e., an incident that resulted in a coordinated government-humanitarian response.[97]

The EM-DAT classifies "disasters" as events resulting in 10 or more deaths, affecting 100 or more people, or triggering a declared state of emergency.[98] It should be noted that the data set does not include communal violence or major transnational events – e.g., the COVID-19 pandemic. Moreover, not all events may be included due to potential gaps in reporting from the country and its DM partners. Nonetheless, the EM-DAT data set was selected for use in this assessment based on its consistency with international organizations' practices for recording disaster events and their impacts across time and countries. As this publication focuses on the potential involvement of foreign military assets in a disaster response within PNG, the publisher has chosen the EM-DAT set based on the logic that any event that triggers foreign military assets' participation in a disaster response will be one that brings large-scale loss of or disruption to human lives and that results in a request for international assistance from the GoPNG.

For the period 2000 through 2025 (July), the EM-DAT recorded 63 disaster events in PNG. Of the total, 59 were linked to natural hazards, while anthropogenic or technological hazard events numbered four (all transport accidents). Of the natural hazard events, 28 were hydrological – 15 floods, 12 landslides, and one drought; 21 were geophysical – 12 earthquakes, eight volcanic eruptions, and one landslide; six were epidemics; and four were meteorological (storms). Figure 5 illustrates the variety of natural hazard events experienced as disasters in PNG in the past 25 years; it excludes the one drought.

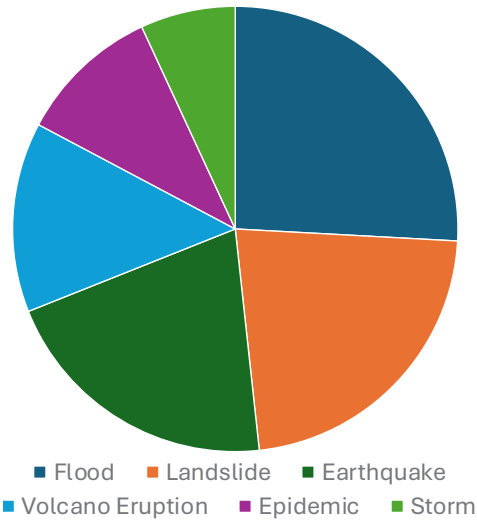

Figure 5: Chart of Disasters, by Hazard

While major flooding events cluster between December and April, other events are spread evenly throughout the year. There are indications of landslides occurring during or immediately after the wet season (December through May), but they may also be caused by seismic events or human activity any time of year. Earthquakes occur year-round with no observable clusters, and while volcanic eruptions appear to cluster between July and October, their small number and lack of direct links to weather or human activity rule out seasonality. Figure 6 shows the number of hazard events beginning in each month across all years.

More important than the seasonality of hazard events is the influence of geography on exposure to hazards. Flooding occurs across the country but is the most impactful hazard across the provinces of the Southern and Momase regions. Landslides are more common in the Highlands provinces, although Morobe, an area of stark topography on the northeastern coast, is also the scene of destructive landslides. Earthquakes and volcanic eruptions primarily occur in the Islands and northern coastal areas, but damaging quakes have been recorded in areas of the Highlands, and that region's unstable slopes mean seismic activity has the potential to drive large landslides. Figure 7 breaks down the dominant types of hazard events experienced by provinces and groups the provinces into regions. Not shown is the one drought recorded in the EM-DAT data set. The five-month, El Niño-driven dry and cold spell affected at least eight provinces across all regions.

It is noteworthy that several provinces recorded events related to several hazard types. Southern Highlands, Milne Bay, East Sepik, Madang, Morobe, Bougainville, and East and West New Britain all reported major hazard events driven by three or more hazard types during the surveyed period. The combination of these provinces' hydrometeorological and geophysical characteristics put their communities at higher risk and support more active risk mitigation strategies and investments.

An examination of frequency of hazard events across the entire period of the data set has the potential to illuminate trends. Over the surveyed period, flooding and landslides have been common occurrences. It is not unusual for a major flood event to occur somewhere in the country annually. Landslides are only slightly less frequent. There is some indication that flooding events are becoming more frequent, as the second half of the survey period shows more instances than the first half. However, the frequency of flooding is impacted not only by the rainfall regime and changes in it but also by improvements to or degradation of drainage or other changes in the built environment. Additional years of monitoring may help determine how on-going changes in the global water cycle will affect intense rainfall events that tend to drive flooding across PNG. Figure 8 illustrates the incidence per year of hazard events recorded in the EM-DAT.

Contrary to the relative consistency of hazard incidents across time (average of 2.4 events annually), the number of people affected by hazard events fluctuates wildly by year. Within the data set, more than 3.7 million people were affected by the 59 natural-hazard disaster events. Of this number, 2.5 million people were affected by the 2015 drought and are not counted in the following calculations.

Once the 2015 drought is excluded, the average annual number of people affected by a disaster event is just fewer than 50,000 people. Clearly, however, not every year notches a large-scale disaster recorded in the EM-DAT, and when years without a major event are removed from the total, the average number of people affected by disasters in years that recorded a disaster event tops 65,500 people. There are years with fewer than 10,000 people affected by disaster events and three years with more than 150,000 people affected. Figure 9 illustrates the numbers of people affected by hazard events between 2000 and July 2025; again, the 2015 drought is excluded for graph legibility.

A major tropical storm in 2007 (162,000 people affected), a massive flood event in 2012 (200,000 people affected), and an earthquake in 2018 (544,000 people affected) are obvious outliers across the 25-year period. However, consistent with its

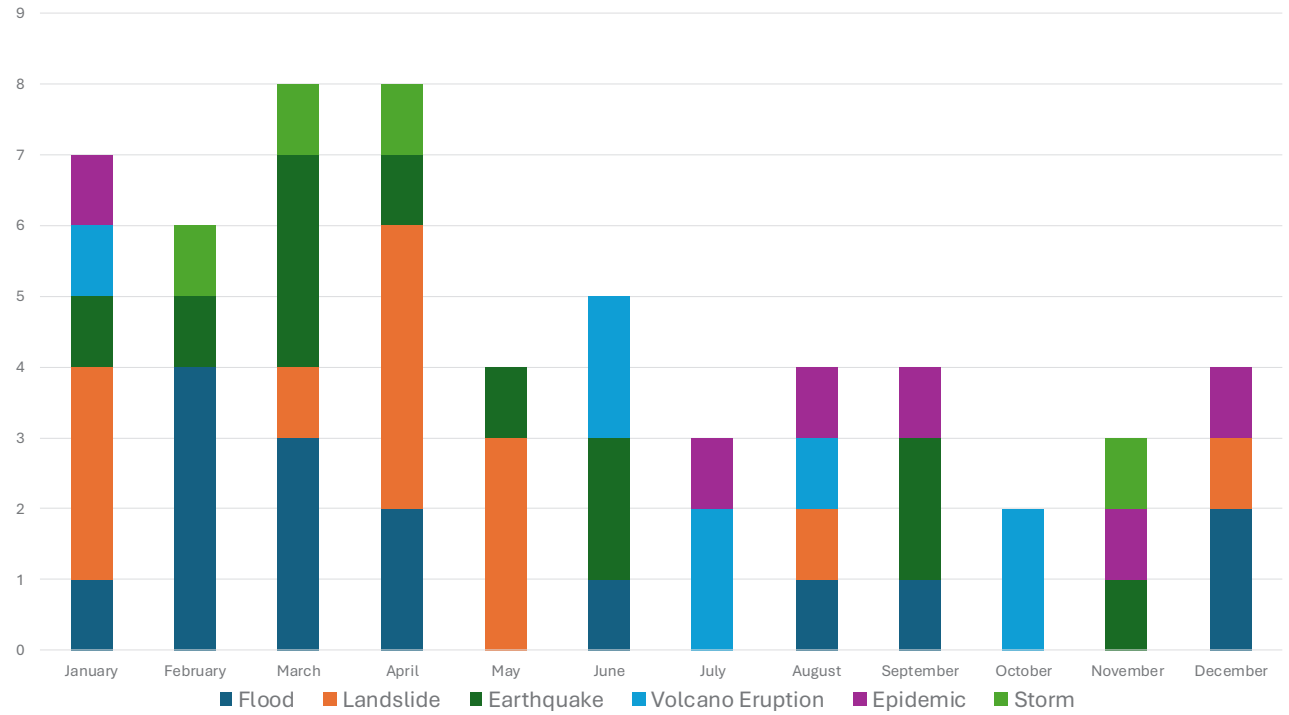

Figure 6: Hazard Events, by Monthly Occurrence

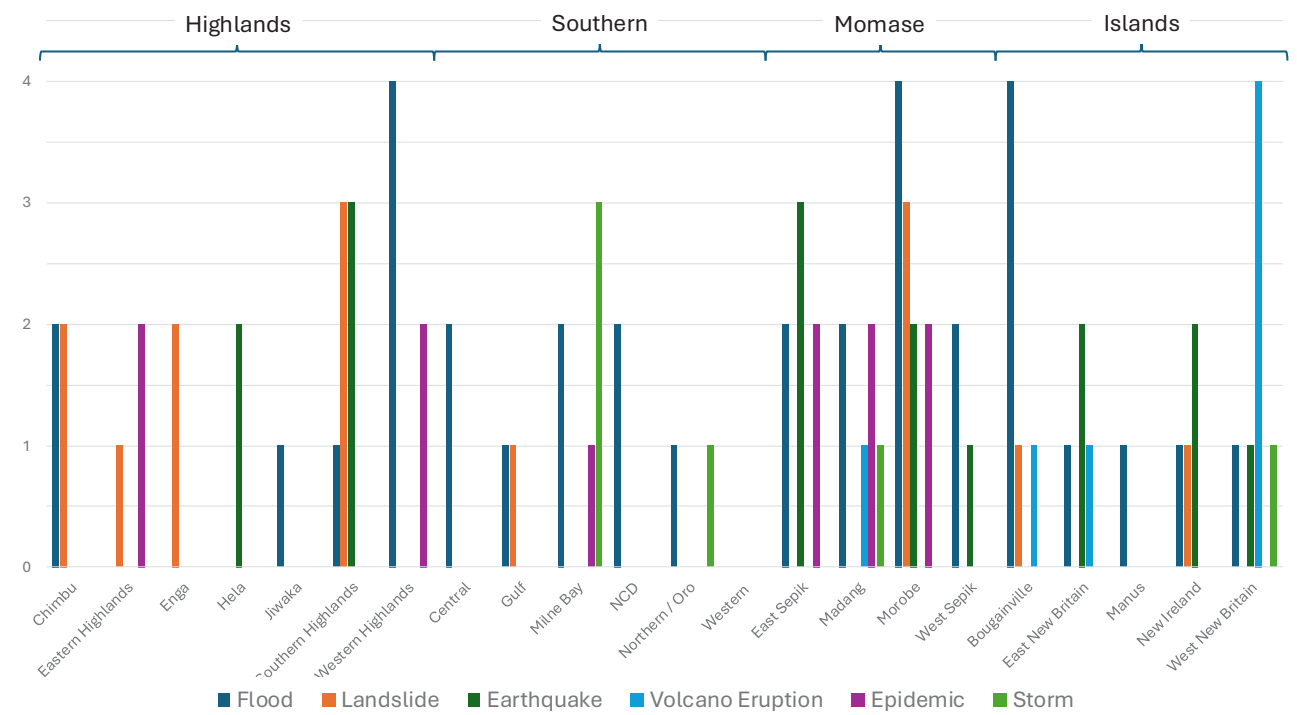

Figure 7: Geographic Spread of Disasters, by Province and Region

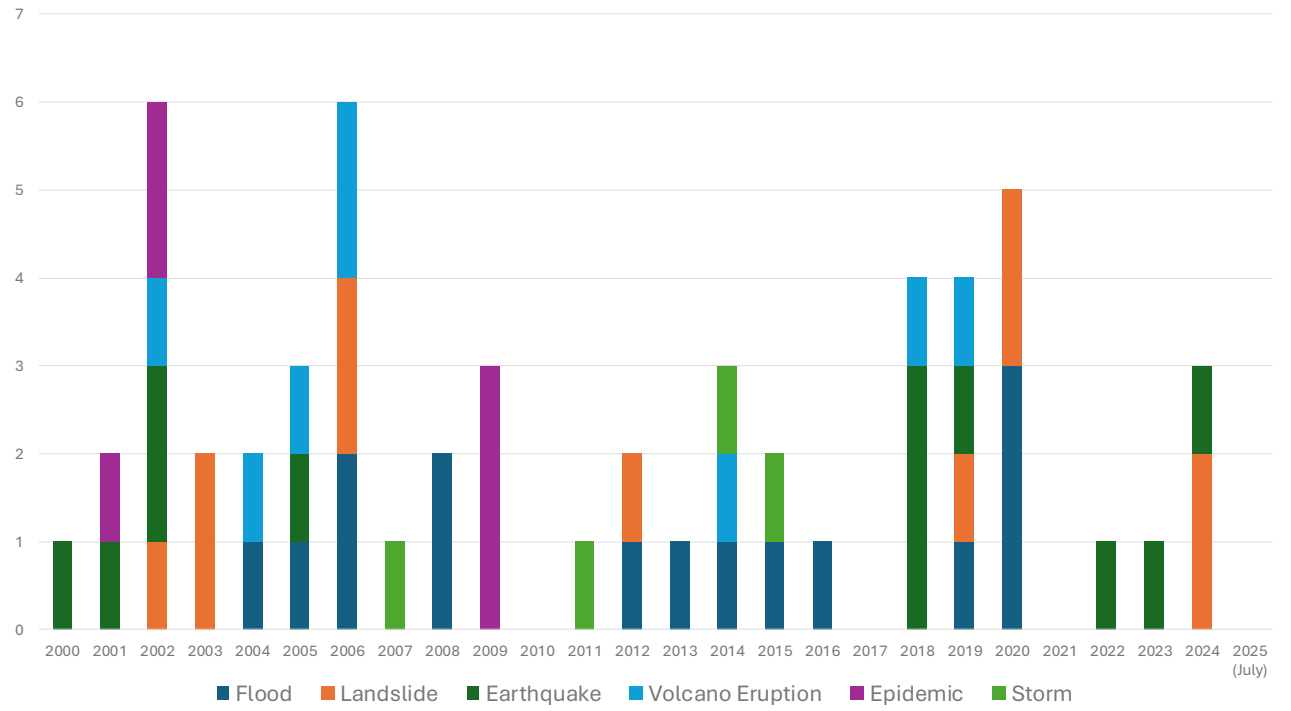

Figure 8: Hazard Events, by Year

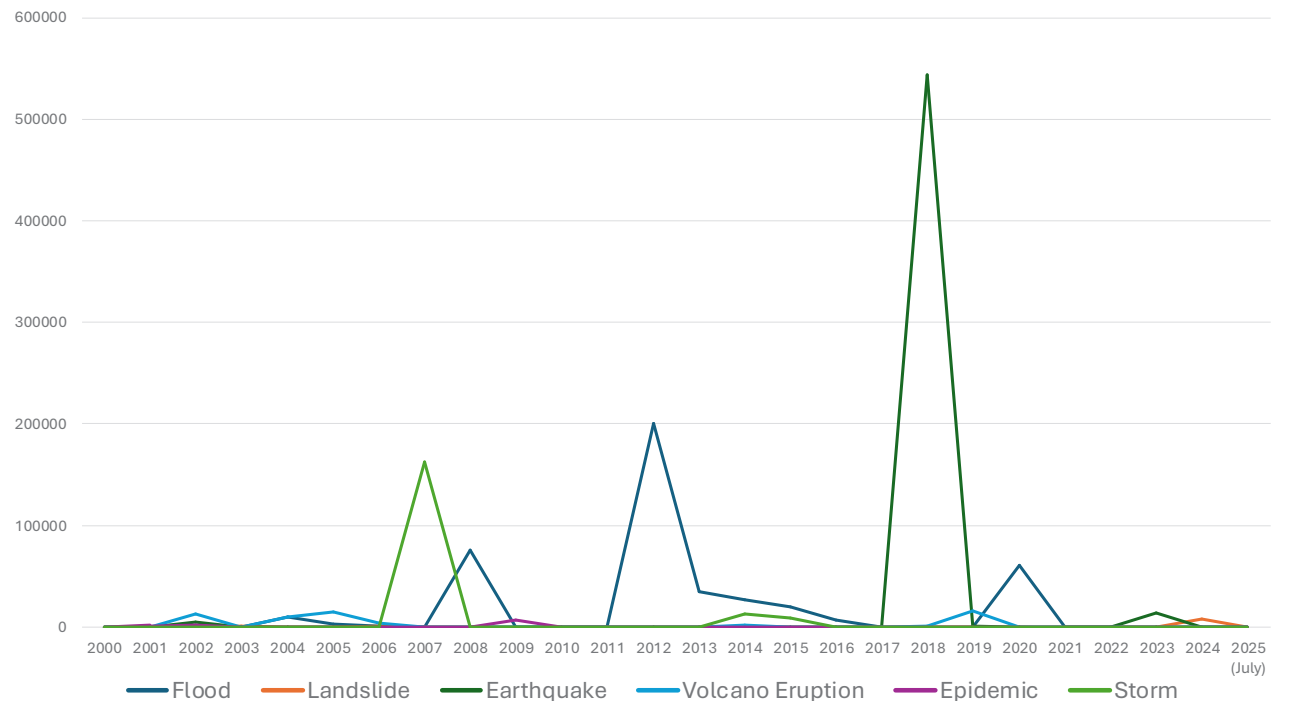

Figure 9: Number of People Affected, by Hazard and Year

position as the overall most common event, flooding has affected the greatest number of people (more than 437,000) over the surveyed period.

Geography and season appear to be the greatest drivers of exposure to natural hazards within PNG. Areas with stark relief, including mountainous zones and river valleys are the most consistently impacted by flooding and landslides, while areas with known volcanism or seismicity are regularly impacted by geophysical phenomena. Similarly, areas that regularly receive high rates of rainfall in one period of the year are more prone to flooding and landslide events.

The vulnerability of people in these areas to the predominant hazard is a separate issue. While many people and community assets may be exposed, their ability to withstand the effects separates a hazard event from a disaster. Where people are not able to avoid the hazard event, they are affected. None of the above graphs account for resilience or coping capacity as they do not examine how the communities or their governments responded to the hazard events.

Recent Disasters

The following is a list of some of the major natural disasters that have occurred in PNG from 2015 through 2025.

Southern Highlands Flooding – December 2024

Heavy rains began on 5 December 2024 and caused the Naru River to burst its banks. People in Det Ward, Poroma local-level government (LLG), Nipa-Kutubu District, Southern Highlands Province, were affected. Continual rains caused destruction of property, food gardens, and livestock, and they contaminated underground water sources. The floods affected at least 739 people across six villages.[99]

Drought – November 2024 – mid-2025

As of late June 2025, drought in Nissan Island and North Bougainville Atolls (Fead, Carterets, Mortlock, and Tasman Islands) had impacted 10,948 people. These areas had been feeling the effects of drought since November 2024.[100] The months-long drought severely depleted water supplies, as rain-fed water tanks ran dry, and affected populations reportedly resorted to drinking water from dug-out wells and coconuts and using sea water for cooking.[101]

Southern Highlands Flooding and Landslides – October 2024

An intense storm on 11 October 2024 brought heavy rainfall and strong winds. Landslides and flooding were reported across six council wards of Aiya Rural LLG in the Kagua Erave District in Southern Highlands Province. The floods and landslides affected 14,074 people and displaced 1,810 people. The severe weather caused significant damage to homes, food gardens, and water sources. According to the International Organization for Migration (IOM), residents noted that they had not previously encountered landslides and floods of this magnitude. People in the area had relied on creeks for drinking water prior to the disaster, and the flooding contaminated water supplies. Relief and recovery efforts were complicated by destruction of health facilities and essential services that had resulted from communal violence.[102]

Southern Highlands Floods – September 2024

Heavy rains over the Mendi River on 2 September 2024 flooded areas of Mendi village, the capital of Southern Highlands Province. The swollen river damaged properties, shelters, and food crops. An estimated 3,000 people from villages near Mendi were impacted.[103]

Morobe Floods – August 2024

Heavy rains triggered flooding in August 2024 in Lae, Morobe Province. Floods resulted in three deaths and the collapse of the Yalu River bridge, an important link to the regional airport at Nadzab. The floods were preceded by 3-4 months of uncommonly abundant rainfall.[104]

Enga Province Landslide – May 2024

On 24 May 2024, a massive landslide engulfed villages in Yambali Ward, Maip Mulitaka LLG,

Lagaip-Porgera District, in Enga Province. The landslip affected 9,952 people and left an estimated 1,680 individuals displaced. The landslip destroyed a portion of the main highway and impeded access to the affected village. The landslide also affected stability of nearby slopes. The PNG Red Cross noted several complications, which disrupted or halted distribution of relief supplies to the affected population. Security was a major concern due to continuing communal conflict. Land instability also resulted in access challenges, and the displaced people remained at host communities and evacuation centers longer than expected. Due to the extent of the damage and lack of official information regarding the total population in the affected area, even as of mid-2025, there was no confirmation on the total number of deaths, although it was believed to be in the hundreds. The PNGDF led search-and-rescue efforts and assisted with clean-up. Due to continued security concerns, officials paused some recovery efforts into the early months of 2025.[105]

Figure 10 shows the area affected by the 2024 landslide.

Highlands Floods and Landslides – March-April 2024

Heavy rains from mid-March continued into April. Across the Highlands, they triggered multiple floods and landslides. By 21 March, 23 people had been killed by three separate landslides in Chimbu Province.[106] As rains continued, an estimated 90,000 people across seven provinces were affected,[107] and more than 9,300 people were reported displaced in the worst-hit provinces of Chimbu, Eastern and Western Highlands, and Jiwaka. These areas suffered damage to homes, gardens, and infrastructure. Road blockages isolated communities and delayed relief efforts.[108]

East Sepik Earthquake and Flooding - March 2024

On 24 March 2024, East Sepik Province experienced an M6.9 earthquake that claimed the

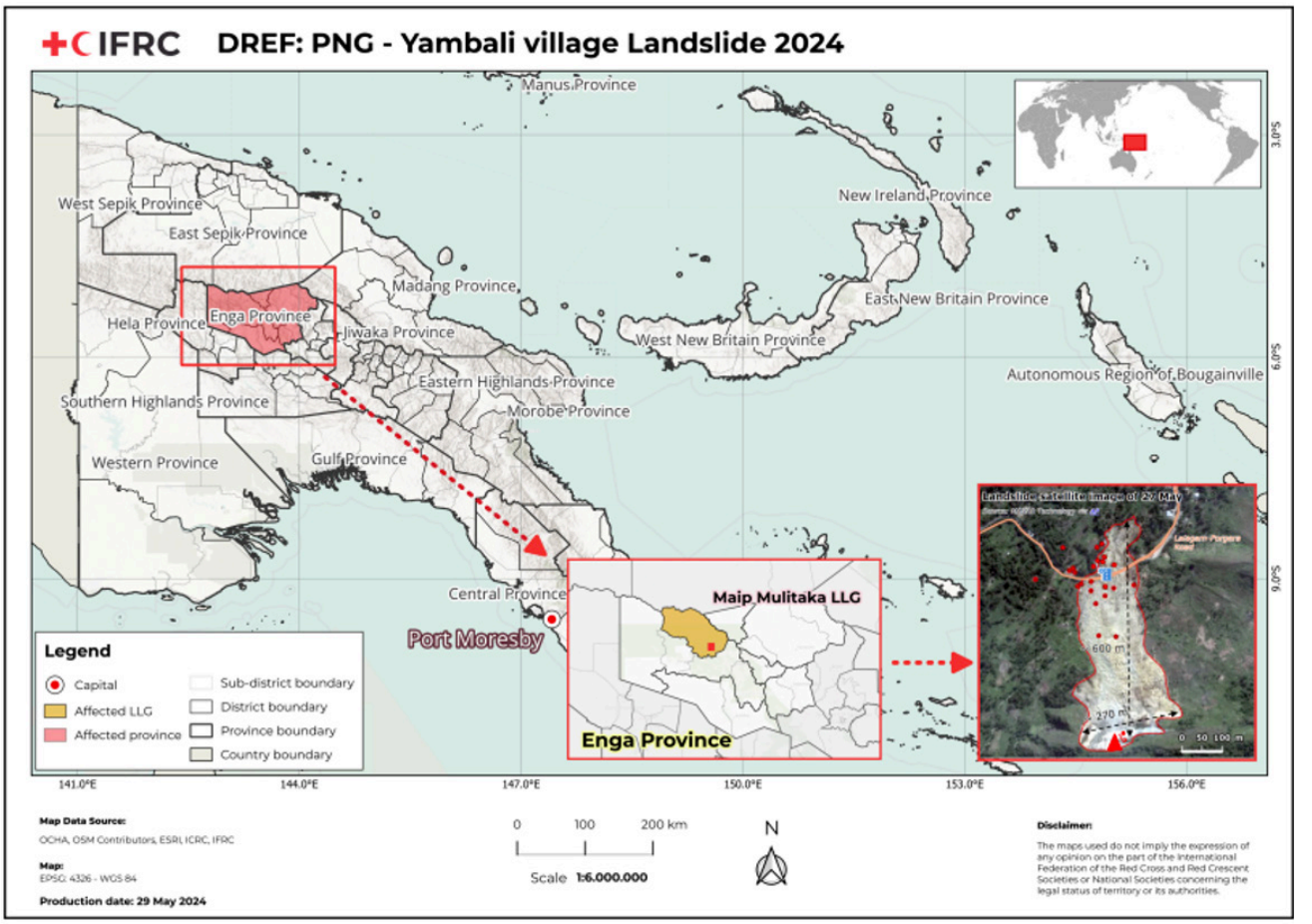

Figure 10: Map and Picture of Yambali Village Landslide

lives of at least three people. The quake affected 11,269 people and displaced 2,346 people. At least 200 houses were damaged or destroyed. The disaster was compounded by flooding that had impacted the area from January 2024. The floods hindered logistical access to affected areas.[109]

Mount Ulawun Eruption - November 2023

Mount Ulawun began a series of eruptions in November 2023. Ash plumes rose at least 15,000 m (49,212 ft) from the volcano, while lava flows and ashfall affected surrounding areas. The eruption left five people dead and affected over 24,000 people. Some 17,100 people in West and East New Britain Provinces were displaced.[110]

Madang Province Earthquakes – October 2023

On 7 October 2023, an M6.7 earthquake in Madang Province affected around 25,000 people. The earthquake was followed within an hour by two substantial aftershocks measuring M6.9 and M5.4. Over 150 villages felt the impacts. The quakes also damaged power lines and caused widespread power outages.[111]

Mount Bagana Eruption – July 2023

In July 2023, Mount Bagana, located on Bougainville Island in the ARoB, began erupting. It spewed an ash column that reached 16-18 km (9,942–11,185 mi) high. When the ash column fell, ash contaminated large areas of the ARoB. The eruption affected more than 12,000 people and displaced almost 4,000 people.[112]

East Sepik Earthquake – April 2023

An M7.0 earthquake occurred in the Chambri Lake area of Gawi Rural LLG, Wosera-Gawi District, East Sepik Province, on 3 April 2023. At least four people were killed, 17 people were injured, and 300 homes were destroyed.[113]

Markham Valley Earthquake - September 2022

In September 2022, an M7.6 earthquake originating in Markham Valley affected Morobe, Madang, and Eastern Highlands Provinces. In all, 21 people were killed and 30 injured. A total of some 3,211 people were affected. Additionally, 1,076 permanent, semi-permanent, and traditional houses were damaged or destroyed by the quake. Infrastructure such as water sources, power lines, public buildings, jetties, and roads were affected.[114]

Manam Volcano Eruption – April 2022

Between 16 and 18 April 2022, the Manam volcano on Manam Island, located 13 km (8.07 mi) off the northern coast of mainland PNG, erupted. The southern crater emitted ash plumes that reached 6,100 m (20,013 ft). According to the Madang PDC assessment, a total of 8,723 people were affected. At least three communities in Baliau, Kuluguma, and Yassa were affected by smoke and ashfall of about 3 centimeters (1 in). No casualties were reported, but the ashfall across the island damaged an unconfirmed number of houses and affected the gardens, cash crops (coconut, fruits), and water sources of all of the communities.[115]

King Tides – December 2021

In early December 2021, parts of PNG experienced a surge in king tides that flooded communities and displaced approximately 53,000 people. King tides are the highest predicted tides of the year. In PNG, king tides are becoming higher and reaching farther inland as climate change causes sea levels to rise. Flooding caused by king tides in coastal and island communities in ARoB, Manus Island, and East Sepik and New Ireland Provinces submerged schools, homes, gardens, water catchments, and cemeteries. Some homes were completely washed away.[116]

Chimbu Landslide – April 2020

The village of Kegesuglo, Kundiawa-Gembog district, Chimbu Province, near the base of Mount Wilhelm, was hit by a flash flood that triggered a landslide on 10 April 2020. The disaster claimed 10 lives and caused significant damage to homes, gardens, livestock, and fish farms. The landslide also damaged hydropower stations and disrupted water supplies.[117]

Morobe and Eastern Highlands Floods – April 2020

After days of heavy rain, floods affected areas of Lae, Morobe Province, on 1 April 2020. Around 1,000 settlers living in the vicinity of the Lae Tidal Basin project site were affected. Local residents said the rain caused the Busu River to overflow its banks, and water levels reached up to 3 m (9.8 ft) in some areas. The flood waters damaged food gardens and affected drinking water supplies. According to local media, the state of emergency and the 14-day lockdown in place due to the COVID-19 pandemic complicated relief efforts. Around the same time, nearly 500 homes were damaged or destroyed by flooding from the Zokozoi River in the Nupaha area of North Goroka, Eastern Highlands Province. Floods were triggered by continued rainfall. Local media reported that flood and landslide damage also affected the drinking water supply.[118]

Western Highlands Landslide - March 2020

A landslide triggered by heavy rainfall occurred in Tambul-Nebilyer, Western Highlands Province, on 21 March 2020. According to media reports on 23 March, 10 people died, and two people were missing. At least 1,000 people were affected as houses and crops were destroyed.[119]

COVID-19 Pandemic – 2020-2023

As with the rest of the world, PNG was affected by the COVID-19 pandemic. On 20 March 2020, the first positive case of COVID-19 was detected in the country. The same day, a state of emergency declaration halted all incoming flights and limited travel between provinces. By 10 March 2023, PNG had reported 46,825 confirmed cases and 670 deaths attributed to COVID-19. Around 724,578 vaccine doses were administered in the country, and 375,829 people (4.2% of the population) received at least one dose.[120]

Ulawun Volcano Eruption – June 2019

On 26 June 2019, the Ulawun volcano in East New Britain Province erupted and began emitting ash plumes up to 20,000 m (65,617 ft). An estimated 12,000 people in West New Britain and 4,000 people in East New Britain were affected. About 6,800 people were evacuated to two care centers in West New Britain.[121]

Manam Volcano Eruption – June 2019

Also on 26 June 2019, the Manam volcano in Madang Province began erupting. It emitted volcanic ash up to 4,572 m (15,000 ft), and pyroclastic flows marked its west and northeast slopes. According to the UN, up to 455 homes and many food gardens were destroyed. Around 7,318 people were displaced and temporarily housed at seven sites following the eruption.[122]

Manam Volcano Eruption – December 2018

Manam volcano erupted on 8 December 2018. It ejected an ash plume up to 13.7 km (8.5 mi) high and forced authorities to raise the aviation color code to "red" during the 20+ hours of the eruptive activity. Lava flow affected Bokure and Kolang, both in northeastern Manam Island.[123]

Southern Highlands Earthquake – February 2018

On 26 February 2018, Hela Province felt an M7.5 earthquake, at the time the strongest quake in PNG's modern history. The temblor caused 160 deaths, affected over 500,000 people, and caused US$140 million in damage. The quake was followed by hundreds of aftershocks including an M6.7 quake. Another significant aftershock of M6.3 struck the region on 7 April. The quakes affected people in Hela, Southern and Western Highlands, and Enga Provinces. An estimated 54,000 homes were damaged and around 43,000 people were displaced and forced to seek shelter in informal care centers or with host families. The GoPNG declared a state of emergency on 1 March and welcomed international aid. Communal conflict complicated access and relief efforts for months following the initial quake. The UN and the International Planned Parenthood Federation said they had to withdraw teams from Tari, the provincial capital of Hela, after violence on 28 March. In another incident, on 7 April, a group attacked a United Nations Children's Fund

(UNICEF) convoy returning to Mendi.[124]

Kadovar Volcano Eruption – January 2018

Kadovar Island's entire population (591 people), comprised of five community groups in the villages of Manot, Taragauo, Dong Sarakbano, Niukatnam, and Rumgio, were evacuated and relocated to Brup Brup Island when the Kadovar Island volcano became active in early 2018. The mild volcanic activity on the southeast side of the island covered 50-60% of the island in lava. The Prime Minister's Office provided initial provisions of food and water for the evacuees who were later resettled to the mainland for up to three years. The NDC developed a 4 million kina (PGK; US$1.21 million) response plan to meet the assessed needs of the Kadovar islanders at Dandan Care Centre for up to six months.[125]

Southern Highlands Landslide – November 2016

A massive landslide in November 2016 completely covered two villages in the Southern Highlands. It killed 40 people while they slept. The remote location of the landslide and lack of aid available to perform rescue meant that reportedly only three or four people were able to escape. Heavy rain in the area as well as a possible blast at a nearby quarry are thought to have contributed to the landslide.[126]

Floods - February 2016

Between 10 and 15 February 2016, heavy rain caused flooding and landslides across large parts of the country. In both Western Highlands and Chimbu Provinces, landslides killed at least three people and displaced hundreds of households. In West New Britain Province, several bridges collapsed. According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), a months-long drought affecting much of the country had caused the terrain in most areas to not properly absorb the sudden heavy rains. Infrastructure, food gardens, and water sources across several provinces were affected. The Highlands and Momase regions experienced extensive damage.[127]

Drought and Frost – 2015/2016

In 2015, an El Niño event triggered a prolonged drought and frost in the Highlands, where up to 2 million people were affected. The event forced Enga and Southern Highlands Provinces to declare a state of emergency, and thousands of people reportedly migrated to lower altitudes to escape the drought and frost conditions. The drought and frost severely impacted food supplies, with the destruction of gardens, food, and cash crops. Up to 1 million people were thought to have been affected by food insecurity. Some deaths were blamed on the prolonged event, with the Chimbu PDC attributing 24 confirmed deaths to the drought.[128]

Tropical Cyclone Pam and Tropical Cyclone Nathan – March 2015

Parts of PNG experienced flooding and landslides due to the combined effects of Tropical Cyclones Pam and Nathan in mid-March 2015. Around 8,750 people in West New Britain and 210 people in Madang were affected, and 239 people in the National Capital District felt effects.[129]

DISASTER MANAGEMENT POLICY, PLANNING, AND RESPONSE

The foundations of DM lie in the 1984 Disaster Management Act, but operationalization remains only broadly outlined in disaster risk mitigation (DRM) and disaster risk reduction (DRR) frameworks and plans. Moreover, all levels of DM authority – national, provincial, district, and local – remain under-resourced. The NDC can serve as a coordination and communication hub, but, in practice, the GoPNG normally appoints a State of Emergency (SOE) Controller to serve as the focal point for managing an emergency.

The NDC habitually works directly with international development and humanitarian players within the DMT, and the SOE Controller can request assistance from across the government, including from the NDC and the PNGDF. The roles of local authorities, faith-based groups, the UN, and PNG's bilateral and regional partners cannot be understated, and PNG continues to work with these stakeholders to ensure that not only do PNG's people receive assistance when needed but they also can offer it to neighboring affected states.

National Disaster Management System

The Disaster Management Act of 1984 laid out the composition, roles, and powers of the national and provincial disaster committees (NDCOMM and PDComm, respectively). Moreover, it laid out the roles and responsibilities of the NDC and PDCs, set the rules for appointment of the NDC Director, and detailed the NDC Director's functions. It spelled out how requests for assistance are made and detailed funding arrangements for meeting the cost of disaster relief.[130] As of publication of this handbook, the Act was under review.

The NDCOMM is responsible to the NEC and comprises many secretaries of cabinet departments – i.e., Defence, Finance, Treasury, Provincial and Local Government Affairs, Works and Highways, Health, Foreign Affairs, and National Planning and Monitoring – as well as the Commander of the PNGDF and the RPNGC Commissioner. The NDCOMM may invite non-standing members to meetings, as required by emerging situations. As the top-level DM authority, NDCOMM is tasked with supervising the national state of readiness, maintaining the National Emergency Plan, assigning DM responsibilities, coordinating relief at the level of the national agencies, advising the NEC on assistance needs, laying down guidelines for preparedness plans, approving grants, fostering public awareness, and supervising relief stockpiling.

The NDCOMM chair is the Secretary of Defence, who has responsibility for overall coordination of DM – including DRR, DRM, and response. Coordination of international assistance lies with the Department of Foreign Affairs, and coordination or liaison with provincial authorities is tasked to the DPLGA. Police representatives oversee issues surrounding security and law enforcement, while the PNGDF representatives provide advice and support on evacuation, logistics, relief distribution, and other matters, as required by NDCOMM leadership.

There are three NDCOMM sub-committees – preparedness, response, and recovery. In addition to standing NDCOMM members, other government or non-government stakeholders to each of these committees are shown in Table 1.[131]

The NDC is the secretariat of the NDCOMM. Its mission is to provide national leadership in developing and maintaining measures to reduce community risk and to manage disaster impacts. It handles both disaster response and daily management of national DRR and DRM programs. The NEC appoints the NDC Director. Under the NDC, the Government and Community Liaison handles response coordination during emergencies, and the Risk Management branch deals with long-term matters through awareness, training, and

Preparedness	Response	Recovery
National Weather Service (PNGNWS)	Department of Agriculture and Livestock (DAL)	Department of National Planning
RVO	Department of Education	DAL
Port Moresby Geophysical	PNG Fire Service	Department of Education
Observatory (PMGO)	PNG Red Cross	PNG Fire Service
Conservation and Environment Protection Authority (CEPA)	UNRC / Humanitarian Advisory Team	PNG Red Cross
National Agriculture Research Institute	Department of Community Development	UNDP
University of PNG Geological Department		
Climate Change Development Authority		
PNG Fire Service		
National Maritime Safety Authority		

Table 1: Additional Stakeholders in NDC Sub-Committees

research. NDC staffing is limited – 15 people – and PNGDF details two liaison personnel to the NDC. Figure 11 shows the organizational structure of the NDC.[132]

Core functions of the NDC are:

- Developing, designing, and conducting training
- Developing policies, frameworks, plans, and standard operating procedures (SOP)
- Designing awareness campaigns and collaborating with information stakeholders, such as the mass media
- Conducting community awareness and education on disaster management best practices and safety tips
- Managing the National Emergency Operations Centre (NEOC)
- Recording and reporting incidents
- Coordinating humanitarian relief operations
- Mobilizing and deploying assessment teams
- Managing donor and government relief funds[133]

In practice, when a national emergency is declared, the Prime Minister commonly appoints an SOE Controller, who oversees national-level personnel, resources, and activities during the response,[134] pursuant to the Constitution's SOE clauses. Several times in the past decade, an SOE Controller who was not part of the NDC but represented a key stakeholder was appointed. For

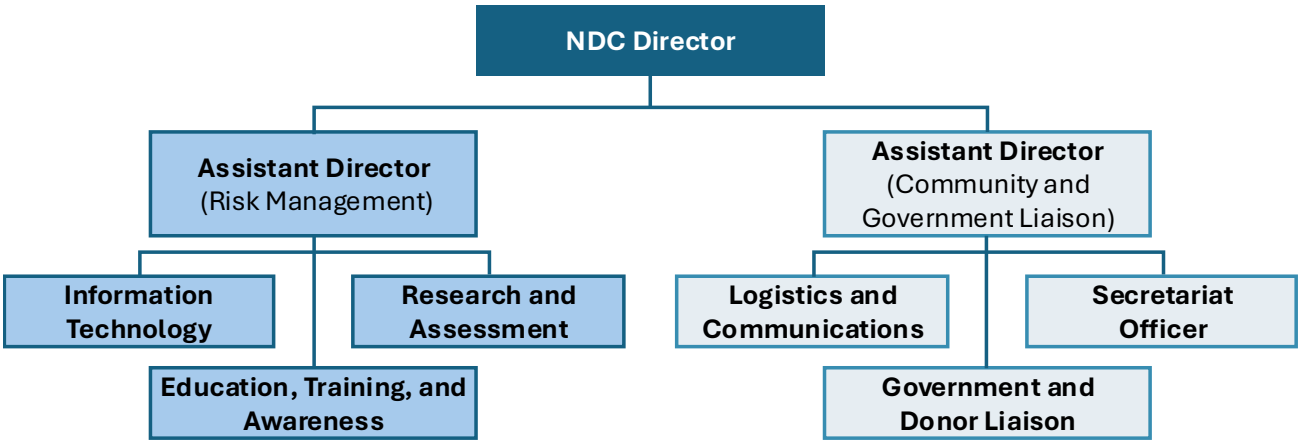

Figure 11: National Disaster Centre Organigram

example, in the 2018 Hela Province earthquake, an Australian consultant, as SOE Controller, headed up the Emergency Disaster Restoration Team. During the COVID-19-related SOE and 2024 election-related violence in the National Capital District, a top member of the RPNGC was the SOE Controller. For the 2023 Mount Bagana eruption response, a Deputy Secretary from within the Autonomous Bougainville Government (ABG) was appointed SOE Controller. The SOE Controller may seek the assistance of other national agencies – e.g., PNGDF – through the NEC, as required by the specific situation.

The SOE Controller may seek support of the NDC, which forms the NEOC to perform the role of communications and control hub. The NDC is also the focal point for international and bilateral support. This role is generally executed via the DMT, which brings the NDC Director together with the leaders of international organizations, NGOs, and donor representatives.[135]

The National Disaster Management Plan that nominally guides all stages of DM – preparedness, mitigation, response, and recovery – dates to 1987. While it covers the basic institutions and roles of disaster response, it, like the Disaster Management Act, is considered ripe for revision to ensure it meets the needs of the country.[136]

In the interim, in 2003, the NEC approved the National Disaster Mitigation Policy that led to the development of the National Disaster Risk Management Plan (NDRMP).[137] As updated, the NDRMP incorporates various aspects of authority, resourcing, and operationalization of plans in an effort to guide national action. It reflects the two-decade long shift from a focus on response to one of reducing and mitigating risk through preparedness. The NDRMP comprises:

- Part 1 – Institutional Arrangements – legal and regulatory authorities, process for mobilizing national disaster response resources, and organization structure for emergency operations
- Part 2 – DM Plan (Operationalization) – arrangements for response, activating plans, sectoral roles and responsibilities, functional preparedness plans (specific event types), and sub-committee terms of reference
- Part 3 – Appendices – reference documents, details of operational roles and responsibilities, audit framework, legislative foundation, and SOPs[138]

Since 2018, there have been SOPs for specific DM actions and for addressing specific hazard types; they include:

- How to establish SOPs
- Flood reporting
- Fire protection options
- Landslide reporting
- Initiating a report of missing small craft and air and small craft search
- Tsunami alert
- Volcano event report
- Dealing with a volcano alert from the RVO

Each SOP is intended for use at all levels of government, from national to local, but the capacity of some PDCs and local offices to implement them is hampered by limited resources.[139]

Meanwhile, to tackle the risk reduction side of DM, with support from UNDP, PNG developed its National Disaster Risk Reduction Framework (NDRRF) 2017-2030, in line with the seven targets and four priorities for action within the Sendai Framework for Disaster Risk Reduction 2015-2030, as well as the Framework for Resilient Development in the Pacific (FRDP). The NDRRF targets a reduction in the loss of lives, livelihoods, and health across the economic, physical, social, cultural, and environmental spheres. It also aims to make DRR a responsibility shared by national and subnational governments and calls for integration of academia, the private sector, and the mass media to proactively address hazard phenomena and boost social, economic, and political resilience.[140]

Subnational and Local Implementation

The province is the key administrative level for DM, and Provincial Administrators are responsible

for coordination for their jurisdictions. PDComms, established by the 1984 Disaster Management Act, are responsible to their respective Provincial Executive Councils (PEC). In general, the Provincial Administrator chairs the PDComm, members of which comprise the Provincial Police Commander, Provincial Works Manager, and representatives of the provincial health, agriculture, education, and other departments, as appropriate. The PDC is the secretariat of the PDComm.

Responsibilities of the PDComm include:

- Assessing the hazards to which the province is exposed
- Liaising with the PEC on development plans within the context of hazards identified
- Preparing the provincial emergency plan
- Coordinating relief stockpiling and relief operations
- Receiving requests for assistance
- Fostering public awareness
- Organizing relief worker training[141]

Most PDCs maintain the ability to stand up an emergency operations center (EOC), sometimes called a Disaster Operations Centre. This EOC will coordinate a response that requires resources above those available at the local level. The EOC allows the PDC to communicate with affected districts and locations as well as with the NDC and other stakeholders, especially from the DMT or the private sector. Depending on the PDC location and whether PNGDF forces have a large-scale presence nearby, PNGDF may embed with the EOC or establish a liaison arrangement in order to receive and report on tasking from civilian leaders.[142]

Based on the Disaster Management Act, the PDComm may seek national assistance for an emergency that has overwhelmed the capacity of provincial authorities to respond. This request goes to the NDCOMM,[143] which can determine the pathway through which the GoPNG will assist the affected province – i.e., through NDC support or by appointing an SOE Controller.

Below the provincial level, district and local authorities are responsible for responding to emergencies within their jurisdictions. District Executive Managers are responsible for DM and may seek the assistance of provincial authorities if an emergency outstrips the district's capacity to respond. Similarly, at the local level, local government presidents are responsible for managing emergencies within their jurisdictions and contacting district authorities for support, as needed.[144]

PDCs are increasingly supporting work to develop community integration strategies to ensure that locals – individually or via standing civil society organizations (CSO) – are involved in preparedness, mitigation, and response. Provincial and district authorities, in cooperation with IOM, have been seeking to shore up gaps in local capacity through community-based DRM planning, which brings together local authorities with their communities, especially representatives of women's groups, men's groups, youth groups, and organizations for people living with disabilities. With community-based plans in place, these local disaster authorities can implement projects that allow activation of the plan – e.g., by accessing funding to make water systems more resilient or to refurbish evacuation centers.[145]

Civil-Military Coordination in Disaster Response

The PNGDF is primarily a land force, but there are maritime and air wings.[146] At the most recent strategic review in 2013, the GoPNG sought to expand the PNGDF to a force of 10,000 by 2030[147] from approximately 3,600 personnel in 2025.[148] This growth would also come with a shift in structure – i.e., separate land, maritime, and air forces.[149]

Among the PNGDF's four core tasks is support to civil authorities during an emergency – e.g., humanitarian crisis, disaster response, terrorism, piracy, or a nuclear, biological, or chemical contingency.[150] The PNGDF commonly mobilizes for this task, often in support of the RPNGC.[151] The PNGDF may not unilaterally mobilize to respond to a disaster. The Prime Minister, as advised by the NEC, may call out the PNGDF to deliver support to civil authorities.[152] Figure 12 illustrates the command authority for a national military call-out and the

relationships of PNGDF with civilians at various levels. Figure 13 shows PNGDF's overall force structure.[153]

The Joint Operations Branch, directly under the Chief of Defence Forces, conducts planning, deployment, liaison, coordination, monitoring, and reporting regarding PNGDF operations across rapid response, humanitarian assistance, infrastructure restoration, and ensuring the safety and security of affected populations in a disaster scenario. Within the context of a disaster, the Branch's responsibilities include:

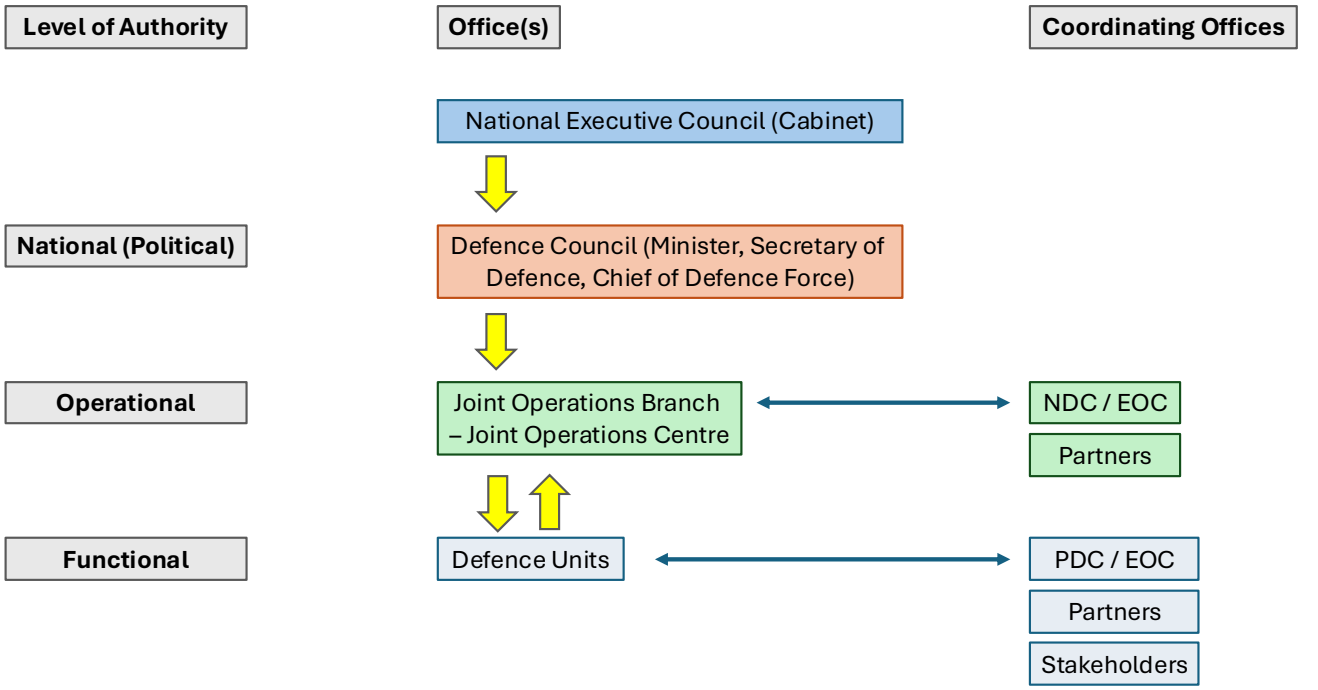

Figure 12: National Military Call-Out Authority for Emergencies

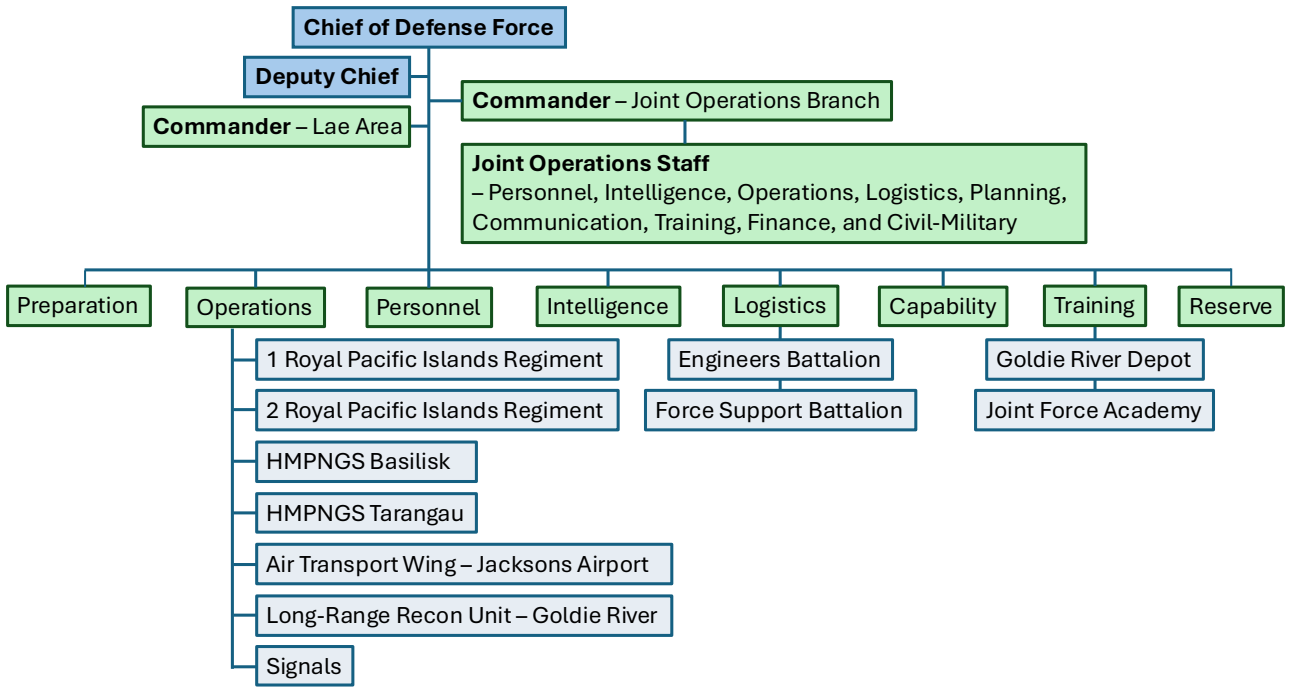

Figure 13: PNGDF Structure

- Planning and assisting in assessments of impacts and needs
- Liaising with PDCs, other government agencies, and other responders
- Identifying PNGDF resources available to respond
- Coordinating use of military assets for transporting personnel, relief items, or equipment to affected areas
- Mobilizing security personnel to secure supplies and distribute supplies, as necessary
- Coordinating communications protocols and flows
- Reporting continuously on the situation
- Compiling after-action report and recommendations[154]

The Engineers Battalion has key capabilities that support a disaster response. These capabilities include:

- Site safety, clearance, and recovery – addressing unstable terrain and supporting search and rescue
- Infrastructure rehabilitation – temporary shelter, road repair, water and sanitation system support
- Logistics – delivery of supplies, inventory, and distribution
- Community support – relocation, site safety assessment assistance[155]

Australia's defense establishment has a 50-year history cooperating with their counterparts in PNG. As part of this engagement, the Australian Department of Defence, Army, Navy, and Air Force maintain a Defence Cooperation Program (DCP) that places 38 permanent advisors within PNG. They are supported by local staff and work alongside PNGDF personnel in Port Moresby, Lae, Wewak, and Manus Island. In times of crisis, the DCP has allowed swift, coordinated support in both directions. The Australian Defence Forces (ADF) at home and within PNGDF are prepared to respond to disasters in PNG alongside PNGDF based on regular training, meetings, and exposure to each other.[156]

An example of the type of operation that the ADF's permanent presence can facilitate was the PNGDF's provision of support to Australia during the bushfire emergency of late 2019 and early 2020. Ninety-nine PNGDF personnel deployed to Australia on 13 January 2020. They comprised engineers, headquarters elements, and members of the 1st Royal Pacific Islands Regiment. They deployed alongside ADF's Joint Task Force 646 to Victoria.[157] Over the course of a month, the PNGDF troops helped clear debris from roads to allow communities that had been isolated by the fires to access services.[158] In this case, a company from the ADF's 3rd Combat Engineer Regiment deployed as Task Group Dingo with the PNGDF engineers attached, and the Regiment's logisticians delivered sustainment support for their PNGDF colleagues.[159]

In addition to direct partnerships with the ADF, PNG is a partner state of the FRANZ Arrangement. This arrangement brings together the governments of Australia, France, and New Zealand in a pact to coordinate disaster reconnaissance and relief at the request of an affected partner state within the Pacific region. Led by the foreign affairs ministries of the three countries, the FRANZ Arrangement allows for the deployment of the signatories' militaries to coordinate their support during disaster response operations. If PNG requests international assistance from the FRANZ signatories, that request may be made and delivered bilaterally, but the FRANZ signatories will also coordinate among themselves. Thus, ADF, France's armed forces units in the Pacific, and the New Zealand Defence Forces would coordinate with PNGDF, with their own respective governments, and with each other.

The PNGDF are also key participants in the Pacific Response Group (PRG), an initiative of the South Pacific Defence Ministers' Meeting (SPDMM). This effort is detailed in the following section: International / Regional Organizations.

International / Regional Organizations

Multilateral regional and global interaction is a critical component to PNG's DM institutions and capacities. The permanent presence of UN agencies

and bilateral partners supports action across the DM spectrum alongside the GoPNG, local authorities, and communities. Person-to-person familiarity and robust institutional relationships facilitate communication and coordination based on trust.

Pacific Regional Organizations

PNG is a member-state of the Pacific regional political, ecological, and scientific organizations, including the keystone Pacific Islands Forum (PIF), Pacific Community (SPC), and Secretariat of the Pacific Regional Environment Programme (SPREP). Moreover, it is a member of or is represented in the other agencies and forums that make up the Council of Regional Organisations of the Pacific (CROP). In addition to overall resilience, the remits of the CROP agencies range across aviation safety, education, electric power, fisheries, and tourism. Since 2022, PIF and SPC have co-organized an annual meeting of Pacific regional countries' ministers with DM portfolios, and the target is to bolster integration and regional solidarity.[160]

In March 2025, the PIF, SPC, and UNDRR signed a 5-year Letter of Cooperation that targets stronger support to PIF and SPC members' DM and resilience-building programming. The signatories' cooperation on this score has four focal areas:

- Strengthen technical assistance and capacity building for Pacific governments
- Prioritize early warning systems and anticipatory action
- Enhance collaboration on loss and damage
- Use scientific data and risk assessments to inform evidence-based policies and actions for DRR

The partnership is intended to strengthen regional progress aligned with the 2050 Strategy for the Blue Pacific Continent, the FRDP, and the Sendai Framework.[161]

Framework for Resilient Development in the Pacific

The FRDP covers the period 2017-2030. It was developed cooperatively by the Pacific Islands states with the support of PIF, SPC, and SPREP, alongside UN agencies and other backers. It provides strategic guidance for various regional stakeholders on enhancing resilience to climate change and disasters in ways that contribute to sustainable development. The three goals of the FRDP are:

1. Stronger integrated adaptation and risk reduction to enhance resilience to climate change and disasters
2. Low-carbon development
3. Stronger disaster preparedness, response, and recovery

The third goal targets greater national and subnational capacity to prepare for and respond to disasters. The FRDP's impact on PNG's overall DM planning and execution is in the form of the promotion of an integrated, all-of-society approach that makes efficient use of limited resources. Moreover, it integrates PNG into the broader Pacific collective effort to develop expertise, best practices, shared technical knowledge, and diplomatic heft within the global DM sphere.[162]

Pacific Islands Forum

As the region's apex political forum, the PIF's role is to coordinate, facilitate, and provide policy advice to its 18 member-states, including PNG, on various issues, among them resilience, including disaster risk financing, access to disaster information, integrating DRR into planning, and strengthening private-sector engagement.[163] The PIF launched the 2050 Strategy for the Blue Pacific Continent in 2022. It forms the basis for Pacific regionalism, with a focus on sustainable development. One of the themes of the 2050 Strategy is "climate change and disasters," in recognition of the importance of disaster preparedness, mitigation, response, and recovery to overall human security.

Pacific Community

SPC is the primary coordinator of the Pacific Islands Emergency Management Alliance (PIEMA) through which member-states' national disaster management organizations (NDMO) – including

PNG's NDC – develop emergency management roadmaps at the national level and collaborate to develop the Regional Strategic Roadmap that allows each country to understand what resources are available regionally to plug gaps in national response capacity.[164] SPC is also one of the main proponents of the Pacific Humanitarian Response Coordination Mechanism (PResCoM). It targets formalization of a method through which Pacific Island states' and territories' NDMOs (including the NDC) can directly connect to regional and international partners to update them on a disaster situation and request assistance. PResCoM is expected to be activated by a request from the NDMO of an affected state to the SPC, which could facilitate information flows and requests for assistance. Expected non-national PResCoM partners include the Pacific Humanitarian Team, FRANZ partners, and the PRG.[165] As of 2025, the PResCoM is still under development through national consultations.

South Pacific Defence Ministers' Meeting

The SPDMM is an annual ministerial meeting that brings together the defense ministers from Australia, Chile, Fiji, France, New Zealand, PNG, and Tonga to discuss defense and security cooperation in the South Pacific. Among the key topics at successive meetings is the increasing demand for rapid response operations. From 2023, there was intensified discussion of improving how the militaries of these countries work together in disaster response, and the meeting endorsed the SPDMM Humanitarian Assistance and Disaster Relief Interoperability Guide.[166] Then, in October 2024, the SPDMM endorsed the formation of the PRG to refine Pacific states' military contributions to crisis response, enable coordinated military support during disaster responses, build interoperability and integration among Pacific militaries, and demonstrate Pacific leadership. Those forces involved in the PRG train together, operate under shared doctrine, and use identical equipment.

The PRG will respond to requests for military assistance from members of the PIF and SPDMM. The specialized role of the PRG is to coordinate military support across the six militaries involved – Australia, Fiji, France, New Zealand, PNG, and Tonga. The initial capability is the Forward Planning Team, which provides planning and liaison support and advises and assists the civilian authorities of a disaster-affected state. All six militaries are represented on the Forward Planning Team, and this representation allows the Team to scope and coordinate tasks for any required follow-on military forces.

As of 2025, in Phase 1 of the PRG headquarters establishment, PNGDF contributes Operations / Plans, Engineering, and Logistics staff. Beyond 2026, in Phase 2 of the PRG stand-up, each military will also maintain a dedicated response capability. From its initial declaration of readiness in November 2024, the PRG has been under Australian command. In December 2024, the Forward Planning Team undertook its first deployment, as part of Operation VANUATU ASSIST.

- 17 December – Port Vila and its environs are rocked by an M7.3 earthquake
- 18 December – PRG notified of potential for a coordinated response
- 19 December – a planning team deployed to Australia's National Emergency Management Agency (Canberra); a second planning team prepared to deploy
- 21 December – Forward Planning Team deployed to support Vanuatu's NDMO
- 26 December – all teams return to regular stations

On the Forward Planning Team in Vanuatu, PNGDF contributed an engineering officer, while a PNGDF planning officer supported one of the planning teams that stood up in Canberra. In Port Vila, the Forward Planning Team embedded within the Vanuatu Mobile Force Operations Cell and liaised with the NDMO. They became heavily involved in information sharing and even worked closely with a reconnaissance team sent by Fiji's armed forces to Port Vila. Through liaisons and links with the Australian High Commission in Vanuatu and the PNGDF headquarters, they also delivered

support to deployed crisis response teams from New Zealand and Queensland (Australia). Through the Forward Planning Team, all SPDMM countries were able to maintain visibility of needs and operations through collated situation reports fed to Australia's Headquarters Joint Operations Command.

The PRG continues to prioritize engagement visits across PIF member-states to ensure that even those countries without military forces are aware of the potential for support from this asset. The on-going effort is to ensure that affected Pacific Island countries "pull" support from the PRG rather than the PRG "pushing" into the response. As of mid-2025, the PRG was involved in various DM training activities throughout the region.[167]

United Nations

There are 14 UN system agencies resident in PNG. Their work covers programs that span education, food security, health, migration, livelihoods, and rights. As each UN agency pursues its work, they cooperate under the leadership of the UNRC to build on their respective strengths and increase program impacts. As one of the main proponents for the global Sustainable Development Goals (SDG), the UN agencies work to support PNG's efforts to achieve these goals, and they monitor national and regional SDG trends.

Under the Country Cooperation Framework (2024-2028), several UN agencies deliver projects that build PNG's DM capacity. In partnership with the NDC and several provincial authorities, UN agencies support development of DRM plans and SOPs, and they help communities develop their own community-based DRM plans to include women, youth, elders, and people living with disabilities. They support workshops to ensure provincial officials build and maintain skills in coordination, information management, and hazard mapping. Along with Australian and U.S. military forces and the PNGDF, UN agencies support local and national officials' capability to utilize technology to monitor disasters. Finally, UN agencies support emergency responses, most often via the DMT,[168] discussed in the next section: Other Disaster Management Partners.

Resident Coordinator's Office (RCO)

As the UNRC is also the Humanitarian Coordinator, the UN RCO has a dedicated Humanitarian Advisory Team (UN HAT) that supports the UNRC's role in leading UN preparedness and response coordination and ensures the secretariat functions of the DMT. The UN HAT participates in response coordination, impact and needs assessments, logistics, early recovery, and planning for long-term recovery. It always works closely with NDC, the PNGDF, and the PDCs of affected provinces, especially on managing humanitarian data and information.[169]

International Organization for Migration

IOM is one of the key players in development and DM within PNG. For 25 years, it has worked with the national and provincial governments to conduct DRM programming across 16 provinces. This work is facilitated by the co-location of IOM field offices with the governments of nine provinces – Eastern and Western New Britain, ARoB, Western Highlands, Enga, Jiwaka, Western, and Morobe.[170] IOM is the co-lead for the Shelter, Non-Food Items, and Camp Coordination and Camp Management Sector alongside the NDC within the DMT.

IOM, in partnership with local authorities, also leads work on displacement data and evidence generation and displacement monitoring through use of the Displacement Tracking Matrix (DTX) tool. The data and insights produced through DTM have proven instrumental in informing planning and programming decisions by the DMT and humanitarian partners.[171]

United Nations Development Programme

UNDP is among the key actors in funding and supporting implementation of programs to build DM capacity and capabilities in PNG. It is especially active in delivering expert support in DRM governance and climate change adaptation. UNDP

also partners with the NDC to develop and expand early warning systems and local preparedness.[172]

Other Disaster Management Partners

During a disaster response, the humanitarian community commonly organizes itself into "clusters," which bring together organizations working on similar sub-sets of relief – e.g., nutrition, water, sanitation, and hygiene (WASH), or logistics. In PNG, clusters are commonly called "sectors." Each sector provides a forum for practitioners to coordinate, solve problems, and make decisions that support effective response. Local NGOs and CSOs are key implementing partners throughout the DM cycle.

Disaster Management Team

The DMT in PNG is the highest strategic coordinating body for international humanitarian assistance in the country. It is co-chaired by the UNRC and the NDC Director and comprises UN agencies, international NGOs, representatives of the International Red Cross and Red Crescent Movement, faith-based organizations, the private sector, and key development partners.[173] Figure 14 shows the structure and make-up of the DMT.[174]

The DMT is also a forum for operational decision-making and oversight for coordinating international humanitarian support to PNG. With representation from key national and international stakeholders, the DMT works toward common strategies. Moreover, in all emergencies, whether the GoPNG has requested, welcomed, or declined international assistance, it is the role of the DMT to support the Government. Although the GoPNG and national actors retain the primary role in initiating, organizing, coordinating, and implementing humanitarian assistance within PNG, the DMT supports national efforts by leading and coordinating humanitarian action of relevant organizations in support of and in coordination with national and local authorities.[175]

Annually, the DMT monitors dozens of hazard incidents and commonly responds to at least one event each year. For example, in 2024, the DMT tracked 129 incidents with potential humanitarian concern, actively monitored 20 events, and coordinated inter-agency response operations for four events – flooding and an earthquake in Sepik

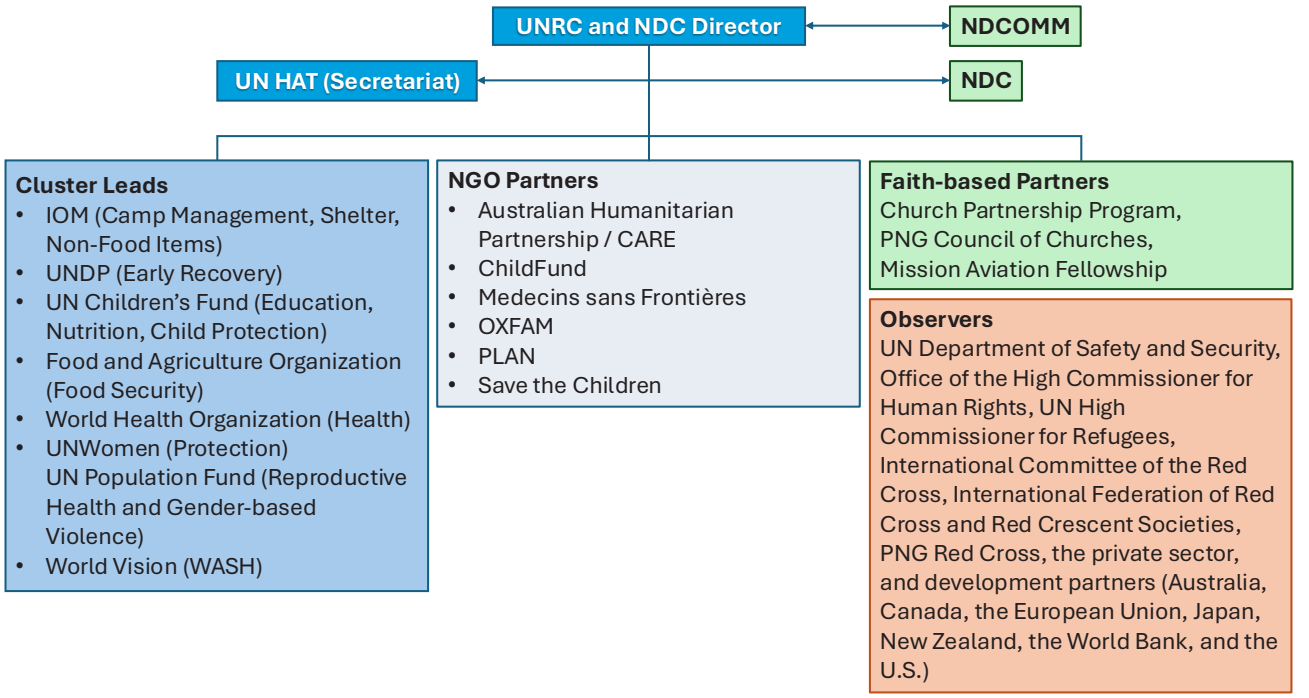

Figure 14: Disaster Management Team Structure

Province (March), the Mulitaka (Enga Province) landslide (May), flooding in Western Province (June-July), and a massacre in Angoram (East Sepik Province) (August).[176]

The DMT has six mandated responsibilities:

- Provide shared strategic plans for collective humanitarian action in response to emergency events in PNG
- Ensure that preparedness and response efforts are inclusive and coordinated
- Ensure that the international humanitarian response is coordinated with national, subnational, and local authorities
- Oversee the Inter-Sector Coordination Group (ISCG)
- Support efforts led by the DMT to obtain free, timely, safe, and unimpeded access by humanitarian organizations to populations in need
- Support and contribute to efforts to address the humanitarian-development nexus

During a disaster response, the ISCG is led by the UN HAT and brings together the sector co-leads (humanitarian and government), the Australian Humanitarian Partnership (AHP), PNG Disability Sector Coalition, Church Partnership Program (CPP), and private-sector partners. The ISCG is intentional about including faith-based and private-sector partners due to their location within communities and their likely role that extends well past the acute response phase. They offer the DMT essential knowledge and resources to all phases of DM in the country. Figure 15 illustrates the sectors and their co-leads, as overseen by the ISCG.[177]

Each sector has the following core functions:

- Support service delivery
- Inform DMT strategic-level decision-making
- Plan and implement sector strategies
- Monitor and evaluate performance
- Build national capacity in preparedness and contingency planning
- Support advocacy[178]

International Committee of the Red Cross

The International Committee of the Red Cross (ICRC) is a private, independent, humanitarian organization, headquartered in Geneva, Switzerland. The ICRC bases its activities on the provisions of International Humanitarian Law, and it is neutral in politics, religion, and ideology. The ICRC assists with the protection of civilian victims of armed conflict and internal strife and their direct results. Within these roles, it may take any humanitarian initiative as a neutral and independent

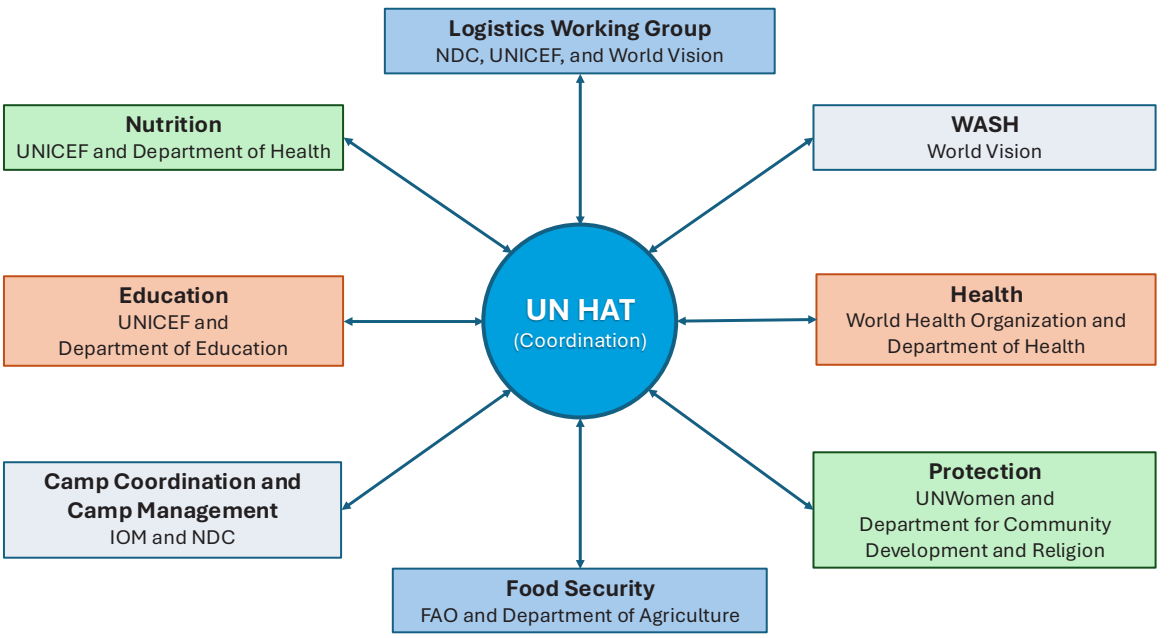

Figure 15: DMT Sector Co-Leads

intermediary.[179] In PNG, the ICRC maintains two offices – Port Moresby and Buka – from which it supports the delivery of humanitarian services to conflict-affected people. For many years, in cooperation with communities, local authorities, and the PNG Red Cross, the ICRC conducted operations in the Highlands where it focused on the psychosocial, health, and shelter needs of people affected by tribal violence. Currently, ICRC operations in PNG support families of people who went missing during the Bougainville conflict of the 1990s. Moreover, ICRC trains PNGDF and police personnel on international human rights law and policing standards.[180] The ICRC, along with other members of the International Red Cross and Red Crescent Movement, is an observer of the DMT.[181]

International Federation of Red Cross and Red Crescent Societies

The International Federation of Red Cross and Red Crescent Societies (IFRC) is the world's largest humanitarian network. It acts before, during, and after disasters and health emergencies to meet the needs and improve the lives of vulnerable people. The IFRC is an international membership organization that unites 191 national Red Cross and Red Crescent Societies and supports them through a global secretariat. Present globally, it brings together more than 16 million volunteers and reaches 160 million people every year through long-term services, development programs, and disaster response. The IFRC also works to improve global humanitarian standards and persuade leaders to act in the interests of vulnerable people. Its strength lies in its volunteer network, community-based expertise, independence, and neutrality.

The IFRC and the PNG Red Cross Society are committed to saving lives and changing minds. They are guided by Strategy 2030, the shared plan of action to tackle the major humanitarian and development challenges of this decade. Through their work, they enable healthy and safe communities, reduce vulnerabilities, improve people's resilience, and promote peace around the world.

The IFRC provides support to the PNG Red Cross via the IFRC country delegation office in Port Moresby and with technical support from the IFRC Asia-Pacific regional office in Malaysia, as well as the country cluster delegation office in Fiji. The IFRC's support focuses on strengthening PNG Red Cross capacity to serve vulnerable communities across the country's diverse and often remote regions. IFRC services rendered to the PNG Red Cross include:

- Capacity Building and Scaling Up Operations – IFRC's presence in PNG helps the National Society expand its humanitarian work and improve its operational effectiveness.
- Health Programs and Public Health Initiatives – The IFRC supports the PNG Red Cross in building public confidence in vaccination and partnering with local community groups to reach people in familiar, comfortable settings.
- Disaster Management and Climate Response – Red Cross volunteers assist communities affected by climate-induced disasters with support from the Red Cross Red Crescent Climate Centre to help reduce the impacts of climate change and extreme weather events.
- Volunteer Development and Community Outreach – The IFRC supports Red Cross volunteers working to rebuild and recover from the destructive impact of natural disasters, conflict, and violence.[182]

Papua New Guinea Red Cross Society

Since 1977, the PNG Red Cross has been the recognized National Society under the IFRC, and it has acted as an auxiliary of the GoPNG for emergency response since 1976. It is legally integrated into national planning and response for disasters and delivers humanitarian assistance where needed.[183] It is a member of the NDCOMM, and regional branches coordinate with their respective PDCs to deliver humanitarian support, as requested by the NDC.[184] PNG Red Cross is also a member of and coordinates closely with the DMT on all aspects of DM. The PNG Red Cross Strategic Plan (2021-2030), currently under mid-term review, lays

out the goals of developing strong humanitarian partnerships, improving readiness and response, leading resilient communities, and promoting the values of the International Red Cross and Red Crescent Movement.[185]

In addition to the headquarters in Port Moresby, the PNG Red Cross has 12 branches, which serve as hubs for action by their more than 700 local volunteers. At the provincial level, representatives from branch offices build relations with the PDC and attend provincial disaster-related meetings. During a disaster, PNG Red Cross staff and volunteers ensure the PDC is aware of Red Cross activities, which most commonly include conducting assessments, distributing non-food relief items, providing first aid, and conducting awareness campaigns.[186]

The PNG Red Cross can reach thousands of people annually with its disaster response (including public health interventions), early recovery programs, and community-based and commercial first aid. Moreover, it implements the IFRC Global Climate Resilience Programme to foster climate-smart DRR and adaptation, with a focus on community education. As part of its broader effort to develop response capacity, the PNG Red Cross continues to build capabilities for management of relief supplies, including stockpiling, warehouse management, and IT systems.[187]

Faith-Based Groups

Mission Aviation Fellowship

The Mission Aviation Fellowship (MAF) is an international Christian organization that utilizes light aircraft and other technology to deliver various types of assistance to PNG's impoverished communities. In PNG for 70 years, MAF is a partner of national church groups, development and humanitarian agencies, hospitals, and NGOs, and it has the ability to use any of its 10 aircraft to serve a network of 200 airstrips from its base in Mount Hagen.[188] With a network of nearly 100 partner organizations in the country, MAF can fly medical evacuation flights, move emergency response personnel around the country, and deliver relief supplies to remote areas.[189]

Papua New Guinea Council of Churches / Church Partnership Program

The Papua New Guinea Council of Churches (PNGCC) brings together seven of the country's largest Christian congregations – Anglican, Baptist, Evangelical Lutheran, Gutnius Lutheran, Roman Catholic, Salvation Army, and the United Church. With the additional representation of 16 associate members, the PNGCC covers some 7.8 million citizens. It works to help churches, the government, and development partners address human development challenges. PNGCC leaders have been active across DM, and members are represented at DMT meetings. Many PNGCC member-congregations are active in provincial and local DM activity.[190]

Launched in 2004, the CPP is backed by the governments of Australia and PNG to promote the role of the faith-based community in sustainable development. It pairs PNG's churches and the PNGCC with sister Australian NGOs and the governments of the two countries, represented by the GoPNG's Department of Community Development and Religion, Office of Religion, and Australia's Department for Foreign Affairs and Trade (DFAT) and High Commission in PNG. The partner NGOs are:

- Anglicans in International Development
- Transform Aid International
- Australian Lutheran World Service
- Caritas Australia
- Salvation Army Australia
- Adventist Development and Relief Agency (ADRA)
- Uniting World

Now in its fourth phase (2022-2029) and nested under the bilateral Building Community Engagement in Papua New Guinea program, the CPP has offered stakeholders mechanisms for sharing lessons learned and for collaborating on challenges, including

sustainable development and gender equality, and it targets additional work to include the citizenry in solving development problems. This final facet, citizen involvement, serves to propel localization of development and DRR forward based on the grass-roots levels of influence the PNG churches have. Moreover, it is targeted at improving delivery of public services to vulnerable and marginalized communities, defined by the CPP as "women, people accused of sorcery, people living with disabilities, and people in rural and remote communities."[191]

Australian Humanitarian Partnership

The AHP is a 10-year (2017-2027) partnership between the Australian Government and Australian NGOs that seeks to support Pacific partner countries, including PNG, to address humanitarian need by preventing, preparing for, and responding to crises. The model is to utilize Australian Government resources to leverage Australian NGO networks and expertise. Thus, in a crisis to which Australia responds, the NGO best placed to deliver to those most in need is selected and resourced. Outside of crisis, the AHP's Disaster READY initiative delivers funding to local, Pacific partners to implement risk reduction and readiness programs in line with the Sendai Framework, FRDP, and SDGs.[192] Several AHP partner organizations – CARE, Oxfam, Plan International, Save the Children, and World Vision – are active across dozens of Disaster READY projects throughout PNG and are, therefore, on the ground and ready to deliver funding and support to their local partners when a disaster strikes.

Case Study – Mount Bagana (2023)

The 2023 eruption of Mount Bagana displaced thousands of residents and contaminated food and water sources across the central regions of Bougainville Island.

Factors influencing the humanitarian response to the eruption:

- Geographic and environmental obstacles
- Limited human, financial, and material resources in ARoB and PNG
- Legacy of the Bougainville conflict
- Strong local and regional commitment to addressing the needs of affected communities
- Clear communication by the ABG and the GoPNG
- Habitual presence of international humanitarian organizations in Bougainville and PNG
- Bilateral partnerships facilitated a tailored set of foreign military support

Introduction

PNG is already among the world's countries most exposed to natural hazards. The country's own lack of abundant financial and institutional resources means that it often seeks international assistance to help resolve emergencies. There is already a strong presence of development partners – e.g., UN agencies, donor countries' development agencies, international and faith-based groups, etc. And the country enjoys strong diplomatic, political, and military ties to a range of players, not least with Australia, European states, Japan, New Zealand, Pacific Islands states and territories, the People's Republic of China (PRC), and the U.S.

Small and moderate-sized emergencies that do not outstrip local, provincial, or national resources are frequent. Although they may not elicit immediate requests for or offers of international assistance, they do cumulatively sap the country's ability to respond to larger-scale hazard events and to build resilience over time. Within the context of regional geo-political competition, rising costs associated with recovery from hazard events, and the potential for those events to become more intense and more frequent, PNG's international partners play a key role in humanitarian and disaster response operations.

This study considers the initial phases of the international response to the 2023 eruption of Mount Bagana to illustrate examples of common operational civil-military coordination challenges and solutions.

Study

Bougainville is the largest island in the Solomon Islands group; it lies 800 km (500 mi) east of Port Moresby. From the mid-20th century, efforts to exploit mineral wealth disrupted the largely sustenance-

based, heterogenous indigenous society of the island. From just before PNG's 1975 independence, an armed Bougainville independence movement existed. During a decade of civil war (1989-1999), an estimated 15,000-20,000 Bougainvilleans were killed and 70,000 were displaced.[193] Peace was concluded in 2001, and in 2019, a promised referendum for island residents to choose between autonomy within PNG or independence went forward, with a more than 97% majority voting in favor of independence.[194] By mid-2023, when Mount Bagana erupted, the ABG and GoPNG continued to work out timelines and other aspects of the future status of Bougainville.

Mount Bagana is a volcano located in the center of Bougainville Island, the larger of the two main islands in the ARoB. The volcano had been in continuous (mostly mild) eruption since 2000, but from April 2023, an effusive period of eruption was punctuated by explosions, ash plumes, ash fall, and lava flows. A 7 July explosive eruption sent a large plume of gas and ash to high altitudes. The ash subsequently fell across central Bougainville from the night after the eruption through 10 July. This ashfall destroyed flora – especially food gardens that sustained a majority of residents – and contaminated rivers and streams. A subsequent explosive eruption on 14-15 July produced additional ash, and intermittent ash emissions continued through the end of July.[195]

On 16 July, PNG's RVO issued an alert that triggered frequent Bougainville Disaster Office (BDO) meetings and activation of the evacuation plan for priority areas.[196] Reports from Bougainville indicated that ash-impacted communities were without sufficient food and water as their crops and water sources had been contaminated.[197] From 20 July, Bougainville officials ordered evacuation of residents of Torokina (South Bougainville District) and Wakunai (Central Bougainville District); orders included direction to depart within 24 hours and to carry only one backpack per person. Residents evacuating areas within Torokina were directed to a care center at Piva (a location in Torokina), and Wakunai residents were to evacuate to a care center in Wakunai village.[198]

As of 30 July, people sheltering at the Torokina and Wakunai care centers told assessment teams that supplies provided to that point were limited and far from meeting the urgent needs of affected people.[199] Both Bougainville authorities and the people of unaffected villages in northern parts of the island had been providing food rations from their own crops and supplies.[200] PNG Red Cross, PLAN International, and IOM were distributing non-food items. Both transportation and communication were limited by a lack of infrastructure in the remote areas accommodating evacuees.[201]

The BDO in Buka, the regional capital, located on the smaller island just north of Bougainville, issued a formal request for support from the GoPNG. Esther Usurup, an ABG official, was appointed by the GoPNG to be the SOE Controller for this emergency. Under her lead, the BDO and UN agencies coordinated relief efforts focused on the two care centers in Torokina and Wakunai. At the end of July, more than 3,900 people had fled to these care centers.[202]

The NDC supported assessments and operations within the BDO. At the local level, the Torokina and Wakunai District Disaster Management Teams were led by their respective District Coordinators. Each team comprised local leaders, including (but not limited to) health, community development, and education officers, and local police commanders.[203]

The PNGDF deployed to Buka to support evacuations and deliver relief supplies, as needed.[204] PNGDF's HMPNGS Cape Gloucester, a landing craft, had transported food and non-food items purchased by the GoPNG from Port Moresby to Buka. The PNGDF Maritime Element also supported GoPNG and ABG to transport food supplies between Rabaul and Buka where they were transferred to the BDO's response boat and other commercial boats, which executed the transport from Buka to Torokina while trucks were able to transport some supplies from Buka to Wakunai. These local transport personnel and vehicles were engaged and paid by the ABG.[205] There was an understanding that PNGDF and RPNGC personnel would not have

direct interaction with Bougainvilleans affected by the eruption due to lingering sensitivities related to the conflict of the 1980s and 1990s.[206]

On 31 July, the PNG NDC formally welcomed international support through the UN RCO.[207] This request formalized an emergency response that integrated stakeholders from the DMT.[208] Through the DMT, UN agencies and the ISCG deployed a multi-agency team to assess humanitarian impacts and advise partners on needs and priorities. The team comprised experts in protection, WASH, information management, logistics, and emergency coordination. They deployed on 7 August and were met by additional experts from IOM, the Food and Agriculture Organization,[209] UNICEF, United Nations Population Fund, World Vision, ADRA, Care International, and others.[210]

Meanwhile, requests for additional assistance were made bilaterally from the GoPNG to Australia, New Zealand, and the U.S.[211]

The Government of New Zealand responded to the GoPNG request for assistance. The New Zealand Ministry of Foreign Affairs and Trade and New Zealand Defence Force (NZDF) reported that the Royal New Zealand Air Force had deployed a C-130 Hercules aircraft to deliver supplies to Buka. It carried 7,000 kilograms (15,500 pounds) of supplies – lighting, generators, hygiene and family kits, water containers, water purification tablets, and temporary shelter materials – from the Air Force Base Aukland on 10 August.[212]

The Australian Government and partners also responded to the GoPNG and ABG requests. On 10 August, the Australian High Commissioner in PNG and the Australian Defence Advisor in the country handed over humanitarian supplies delivered by an ADF C-27 aircraft to Buka. The supplies included shelter materials, hygiene and kitchen kits, water purification tablets, and household items. This delivery marked the first of several planned deliveries.[213] Separately, as part of the AHP DisasterREADY program, CARE International was already on the ground in support of the BDO, and it had recently completed a mapping of local CSOs and NGOs. This exercise identified the organizations best placed to deliver the Bagana eruption response. Of identified NGOs, CARE supported the local authorities' rapid needs assessments, and PLAN International and Save the Children were active in WASH services and market impact assessments, respectively.[214]

The Chief of Mission at the U.S. Embassy in PNG determined that the people of Bougainville were experiencing "significant unmet humanitarian need" and issued a Declaration of Humanitarian Need (DHN) on 2 August. This DHN triggered U.S. federal government support via the U.S. Agency for International Development (USAID), which immediately provided US$200,000 to IOM to support the latter's response actions.[215] Figure 16 is the USAID map showing the area covered by the U.S. Embassy's DHN.[216]

Figure 16: USAID Map of Affected Areas, Mount Bagana Eruption (2023)

On 4 August, USAID determined that the challenges linked to physical access to evacuation sites required assistance from the unique assets available via the U.S. military. USAID requested U.S. Department of Defense (DoD) support to transport supplies to hard-to-reach locations.[217] The DoD tasked the USINDOPACOM Commander with the mission, and the Commander, in turn, assigned personnel aboard the USS America (LHA-6) to deliver the relief supplies.[218] On 7 August, four staff from USAID's Bureau for Humanitarian Assistance (BHA) and two staff from the U.S. Marine Corps deployed to Buka to help coordinate and monitor completion of tasks.[219]

For the U.S. military support to USAID / BHA, U.S. Marines with the 31st Marine Expeditionary Unit, embarked on the USS America, were tasked with using their medium- and heavy-lift rotary wing and tiltrotor air platforms – MV-22 Ospreys, CH-53E Super Stallions, and SH-60 Seahawks. These aircraft handled distribution to remote locations of the relief supplies that had been deposited at Buka by ADF and NZDF aircraft.[220]

The Marines transported nearly 32,000 kilograms (70,000 pounds) of non-food relief items on 118 pallets over the course of 10 days.[221] On 11 August, the first MV-22 Osprey landed in Buka to transport an assessment team and 600 mosquito nets to Torokina. Daily, 11-15 August, local laborers hired on by the ABG BDO loaded relief items onto U.S. Marine Corps aircraft at the Buka airport; those aircraft would then transport those supplies and humanitarian staff to the Torokina and Wakunai care centers. MV-22B Ospreys and CH-53E Super Stallions flew 22 flights from USS America through Buka. On 17 August, the DMT reported sufficient supplies had reached the care centers to meet shelter and hygiene needs of evacuees, and the U.S. military response ended.[222] Photo 1 shows U.S. Marines and responders from various local and international agencies in action during the acute phase of the response.[223]

Humanitarians – national and local – provided the "last mile" delivery of relief items from the landing zones to the care centers at Wakunai and Torokina and then to affected persons not at the care centers. Coordination of the delivery of items from Buka and onward to affected people occurred at the BDO, where the SOE Controller was based. The BDO hosted the EOC, which also housed a four-person team from the DMT / UN HAT. The EOC was the most common space for operational coordination between humanitarians and foreign military responders. A liaison officer from the PNGDF was assigned to the EOC to provide remote (rather than in-person) support. The district administrations at Torokina and Wakunai managed the care centers with the technical support of IOM.

The SOE Controller served a key role in swiftly addressing friction among responders or between responders and the affected community. She frequently convened ad hoc meetings to address bottlenecks, sensitive issues, and personality conflicts. This method reflected what one responder called the "Melanesian" approach to conflict

Photo 1: U.S. Marines and Bougainville Responders Load Relief Supplies

resolution, where "admission, reconciliation, and handshakes" are central to remaining focused on the shared mission.[224]

During the emergency phases, responders utilized various communications platforms to coordinate their actions. For official communications – requests for or approvals of movement, inter-agency dialogue – email provided the appropriate formality and record. At the field level, operational coordination relied on WhatsApp. Humanitarians and military officers at Buka commonly received transport requests or distribution updates via WhatsApp and then relayed them to each other by WhatsApp or voice calls for onward (upward) delivery to planners. This flow was especially true as humanitarians relayed requests to coordinators at the Buka hub, and those coordinators relayed the requests to the U.S. Marines, who then relayed the information to personnel aboard USS America.[225]

Even after the airlifts by foreign military assets, the national, regional, and local governments as well as the humanitarian community continued to work to reach all affected people even after the large-scale deliveries of relief supplies ended. Displacement, contamination of water, and the health impacts of insufficient clean water, food, and health care remained the chronic challenges. The BDO, NDC, DMT member-agencies, and teams from PDCs from other parts of PNG all mobilized support during the humanitarian emergency.

Analysis

This study resonates with global, national, and local understanding that international resources are regularly mobilized to address humanitarian need, and it supports calls to ensure that on-going or emergency interventions support the development of front-line capacity within the NDC and PDCs. The ABG and BDO demonstrated great familiarity with the local, regional, and national DM systems. They were also active in coordinating the many moving parts – civilian and military – in an environment where risks were not minimal. For other responses within PNG to run as effectively, additional resourcing for the NDC and other PDCs is critical and could include regular civil-military workshops or the involvement of PDCs, local authorities, and PNGDF in shared exercises.

The civil-military coordination aspects of the response benefited from the investiture of control for the overall operation to an SOE Controller with local ties. Since the PNGDF remained at arm's length from the affected community, there was little opportunity for the post-conflict atmosphere of Bougainville to become an obstacle to the delivery of relief.

An additional key strength of this response was clear communication; ABG and GoPNG clearly communicated the level of danger and need among affected communities based on assessments conducted by local and international teams. The use of common, commercial communication platforms supported smooth coordination. Moreover, international humanitarians and militaries showed familiarity with their roles; even as the ABG and affected communities may not have been exposed to national or international militaries operating in a disaster response scenario, their trusting relationship with international humanitarians meant that all stakeholders were able to bring issues to a common table for resolution.

The overall strength of the response during the initial emergency phase should not detract from the fact of high and rising levels of need. Especially in PNG's remote and underdeveloped communities, resources to support DRR and DRM programs are limited, and local and national coping capacity is taxed by regular emergencies. Geography and resource constraints are major obstacles to humanitarian access, and these limits indicate a future wherein many disasters result in international humanitarian and foreign military assets being required. Continuing to ensure that people at every level of the response – national/strategic, provincial/operational, and local/tactical – know their roles and the roles of their opposite numbers may make up for other shortfalls.

CRITICAL INFRASTRCTURE FOR DISASTER MANAGEMENT

The critical infrastructure of PNG is limited in scope and highly vulnerable to disruption by natural hazards. Most facilities are concentrated in a few urban hubs. Aviation and maritime links are the primary connectors between provinces. The road network is fragmented, and energy and water networks are small. Telecommunications remain underdeveloped, with low internet penetration and limited redundancy. Health and emergency services are unevenly distributed, and many rural areas are without timely access during crises. Investment in resilience has grown through donor-funded upgrades to ports, airports, and hospitals, along with renewable energy and telecom projects, yet coverage and maintenance gaps persist. Given PNG's exposure to earthquakes, floods, and extreme weather, sustaining and expanding these networks—while hardening them against disruption—remains critical to ensure rapid response and recovery.

Transportation

The transport system relies on a mix of air, sea, and road links to connect its widely dispersed and geographically challenging territory. With rugged mountains, dense rainforest, and scattered islands limiting road reach, over 20 national airports, hundreds of rural airstrips, and a network of coastal ports carry most cargo and personnel. Lae and Port Moresby function as the main international gateways, while secondary airports and regional ports extend access to remote provinces. The road network remains vital for inland movement but is fragmented, exposed to landslides, flooding, and seismic damage, and lacks redundancy. A single failure can sever access for entire regions. This dependence on aviation and maritime transport, coupled with road vulnerability, makes coordinated use of all modes essential for sustaining humanitarian access and restoring connectivity after major emergencies.

Airports

PNG has hundreds of airstrips. Approximately 21 airports have paved runways.[226] Over 500 small-scale aerodromes are managed by local communities, churches, and businesses. Air transport remains the primary mode for high-value and emergency freight. The air services system is relatively well developed as it is required to meet the challenges posed by topography and isolated pockets of population clusters.[227]

Jacksons International Airport, also known as Port Moresby Airport, is located approximately 8 km (5 mi) outside Port Moresby and serves as the country's main international airport. It is the largest and busiest airport in the country and is the main hub for airlines serving the country.[228] While Jacksons International remains the central arrival and departure hub, secondary airports with longer paved runways and higher classifications (e.g. Nadzab Airport in Lae or Kagamuga in Mt. Hagen) may be suitable for regional disaster response staging. These airports may support expanded relief operations, but they would require verification of the condition of runways as well as assessment of fuel availability, warehouse space, customs processing capacity, and apron areas for fixed and rotary wing aircraft.

Many of the hundreds of rural airstrips are closed or unusable, while others are being rehabilitated under the administration of the Rural Airstrip Agency. These bush airstrips are vital lifelines for remote communities but require constant upkeep, including regular grass cutting and clearing debris from drainage systems. Without ongoing maintenance, they can quickly become unsafe or unusable, a condition that would cut off access to essential services like medical evacuations, supply deliveries, and disaster relief.[229]

Tables 2 and 3 provide some details of PNG's airports.[230] Of note, many of PNG's smaller aerodromes lack complete technical documentation

in public databases. Complete runway surface specifications and exact distances to cities are not available for all aerodromes due to limited public documentation for smaller airports. Surface specifications and exact distances to population centers are often unavailable or unreliable. Therefore, many of the distances to town centers in the tables were estimated using the Google Maps measure feature.

Seaports

The country's maritime infrastructure serves as the economic backbone, as coastal shipping connects 17 coastal provinces in the absence of a comprehensive road network.[231]

Papua New Guinea Ports Corporation Limited (PNGPCL), a state-owned enterprise, manages 16 of the country's 22 declared ports.[232] The port system processes 5.8-9.8 million tons of cargo

Airport Name	Nearest City	Elevation	IATA/ ICAO Code	Maximum Runway Length	Runway Surface
Port Moresby / Jacksons International Airport	Port Moresby – 8 km (5 mi)	38 m (125 ft)	POM/ AYPY	2,750 (9,022 ft)	Asphalt/ grooved
Wewak / Boram International Airport	Wewak – 1.4 km (0.87 mi)	5 m (15 ft)	WWK/ AYWK	1,595 m (5,234 ft)	Asphalt
Lae Nadzab / Nadzab Tomodachi International Airport	Lae – 42 km (26 mi)	73 m (239 ft)	LAE/ AYNZ	2,440 m (8,002 ft)	Asphalt/ grooved

Table 2: International Airports

Airport Name	Nearest City	Elevation	IATA/ ICAO Code	Maximum Runway Length	Runway Surface
Alotau-Gurney	Alotau – 16 km (9.94 mi)	23 m (76 ft)	GUR/AYGN	1,690 m (6,431 ft)	Asphalt/ paved
Buka / Bougainville	Buka – 1 km (0.62 mi)	3 m (11 ft)	BUA/ AYBK	1,562 m (5,125 ft)	Asphalt
Daru	Daru – 0 km (0 mi)	6.1 m (20 ft)	DAU/AYDU	1,400 m (4,593 ft)	Asphalt
Goroka Airport	Goroka – 2.9 km (1.80 mi)	1,610 m (5,279 ft)	GKA/AYGA	1,645 m (5,400 ft)	Asphalt
Hoskins Airport	Hoskins - 6.1 km (3.79 mi)	20 m (67 ft)	HKN/AYHK	1,745 (5,723 ft)	Asphalt
Kavieng	Kavieng – 1 km (0.62 mi)	4.6 m (15 ft)	KVG/AYKV	1,782 m (5,846 ft)	Asphalt
Kerema	Kerema – 0 km (0 mi)	3 m (10 ft)	KMA/AYKM	928 m (3,044 ft)	Asphalt
Kieta Aropa	Kieta – 16.9 km (10.5 mi)	3 m (11 ft)	KIE/AYIQ	1,645 m (5,397 ft)	Asphalt
Kiunga	Kiunga – 1 km (0.62 mi)	27 m (88 ft)	UNG/AYKI	1,125 m (3,691 ft)	Asphalt
Kundiawa/ Chimbu	Kundiawa – 0 km (0 mi)	1,516 m (4,974 ft)	CMU/AYCH	1,015 m (3,330 ft)	Asphalt
Madang	Madang – 5 km (3.11 mi)	5 m (18 ft)	MAG/AYMD	1,571 m (5,151 ft)	Asphalt
Mendi	Mendi – 0 km (0 mi)	1,731 m (5,680 ft)	MDU/AYMN	1,344 m (4,411 ft)	Asphalt
Momote / Lorengau	Los Negros Island, Momote – 0 km (0 mi)	4 m (12 ft)	MAS/AYMO	1,925 m (6,316 ft)	Asphalt/ grooved
Mount Hagen / Kagamuga	Mount Hagen – 13 km (8 mi)	1,642 m (5,388 ft)	HGU/AYMH	2,190 m (7,185 ft)	Asphalt
Popondetta /Girua	Popondetta – 15.29 km (9.5 mi)	95 m (311 ft)	PNP/ AYGR	1,672 m (5,485 ft)	Asphalt
Rabaul / Tokua	Kokopo– 13 km (8.1 mi)	10 m (32 ft)	RAB/AYTK	1,720 m (5,643 ft)	Asphalt
Tari	Tari – 0 km (0 mi)	1,700 m (5,577 ft)	TIZ/AYTA	1,539 m (5,050 ft)	Asphalt/ Paved
Vanimo	Vanimo – 0.6 km (0.37 mi)	6.71 m (22 ft)	VAI/AYVN	1,740 m (5,709 ft)	Asphalt or paved
Wapenamanda	Wapanamanda – 0 km (0 mi)	1,975 m (5,889 ft)	WBM/ AYWD	1,540 m (5,052 ft)	Asphalt

Table 3: Domestic Airports

annually.[233] PNGPCL handles approximately 90% of international shipping and 80% of total cargo movement.[234]

Lae Port dominates PNG's maritime logistics as the largest and busiest facility, though it suffers from significant operational constraints including aging infrastructure and onward movement challenges due to deteriorating inland road connectivity. In 2022, ICTSI, which operates the terminal, delivered the country's first ship-to-shore gantry cranes to Lae Port. This equipment replaced mobile harbor cranes and significantly improved container handling capabilities.[235] Port Moresby, the second-largest port, hosts a modern container terminal operated by ICTSI under a 25-year concession established in 2017.[236]

The port network's two-tier emergency response structure designates six Tier 1 facilities (Buka, Kieta, Lae, Madang, Port Moresby, and Rabaul) capable of significant emergency operations. Additional sources such as the PNGPCL and national port listings identify further regional hubs – Aitape, Alotau, Daru, Kavieng, Kimbe, Lorengau, Oro Bay, Samarai, Wewak, and Vanimo – which align with the concept of intermediate (Tier 2) logistics centers in support of national emergency preparedness. These Tier 2 facilities have basic infrastructure requiring careful assessment before major emergency deployment due to limited equipment availability.[237]

Private companies in mining, construction, and shipping operate additional ports, and there may be as many as 400 community-owned and operated piers, jetties, and landings supporting small craft use in remote communities.[238] Private organizations also establish and operate port facilities where government ports do not exist. These facilities are generally not accessible or used for general cargo or public use.

The 2023 U.S.-PNG Defense Cooperation Agreement (DCA) provides unprecedented U.S. military access to PNG seaports during disasters. It grants "unimpeded access" to six critical facilities including Lae Seaport, Port Moresby Seaport, and Lombrum Naval Base.[239] The DCA includes pre-positioning rights for defense equipment, freedom of movement for U.S. vessels, and exemption from port fees during emergency operations.[240] The U.S.–PNG DCA allows the U.S. military to legally assist in disaster situations, including restoring port operations to ensure life-saving supplies can get into affected areas. In fact, U.S. DoD units have already trained to conduct disaster response operations in recent exercises (e.g., a Disaster Response Exercise and Exchange in 2024 and Pacific Partnership missions in Lae and Port Moresby in 2025). Supporting this framework is a US$864 million 10-year investment for infrastructure improvements including runways, wharfs, and fuel storage facilities, with active construction underway as of 2025.[241]

Port infrastructure is undergoing significant modernization through other domestic and foreign investment. In 2022, Australia committed AU$621.4 million (US$405 million) in loans and grants to upgrade key ports including Lae, Kimbe, Kavieng, Daru, and Oro Bay, with project timelines extending over multiple years.[242] Concurrently, Connect PNG is a 20-year infrastructure initiative (2020–2040) with an estimated total budget of PGK 20 billion (US$4.7 billion). Phase One (2021–2027) was intended to receive PGK 7.98 billion (US$1.9 billion), of which approximately PGK 4.5 billion (US$1.1 billion) had been spent by mid-2025. There remains a funding gap of about PGK 2.4 billion (US$569 million) for the period 2020–2023.[243]

Table 4 provides some details about the country's major ports.[244]

Specialized and Private Ports

- Lombrum Naval Base (Manus Island) – PNG's primary naval facility with deep-water access, currently undergoing an AU$150 million (US$97.9 million) upgrade plus a US$11-25 million investment, covered under 2023 U.S.-PNG DCA.[245]
- Puma Energy Facility (Nana Napa) – Petroleum storage and distribution terminal near Port Moresby.[246]
- Ok Tedi Mining Port (Kiunga, Fly River) – Inland river port serving mining operations (Ok Tedi Mine).[247]

Port	Province	Key Roles and Infrastructure
Lae Port	Morobe	Largest port, handles 50% of exports and 90% of coffee shipments; draft 11-12 m (36-39 ft); LOA 200 m (656 ft); aging infrastructure; overland onward movement constrained by inland road gaps; undergoing Australian-funded upgrades
Port Moresby/ Motekea	National Capital District	The country's second-largest port, with modern container terminal; 2 berths, LOA 236 m (774 ft), draft 12.5 m (41 ft), coastal access difficulty; features mobile harbor cranes, handles a significant share of the country's container traffic
Kimbe Port	West New Britian	Primary palm oil export hub; undergoing Australian-funded upgrades
Madang Port	Madang	Northern gateway port with 10.1-m (33-ft) draft, regional distribution hub for northern provinces
Rabaul Port	East New Britian	Supports fishing and tourism; regional distribution center; limited infrastructure

Table 4: Major Seaports

Regional and Community Ports

- Alotau Port (Milne Bay Province) – Serving southeastern PNG trade and regional connectivity, Key local/regional port supporting coastal trade, fisheries, and community transport.[248]
- Buka Port (ARoB) – Island province services and regional trade. Key local/regional port supporting coastal trade, fisheries, and community transport.[249]
- Kieta Port (ARoB) – Regional trade hub and community services. Key local/regional port supporting coastal trade, fisheries, and community transport.[250]
- Lorengau Port (Manus Province) – Island province services and regional connectivity.[251]
- Oro Bay Port (Northern Province) – Regional trade facilitator for northern coastal areas,[252] part of Australian upgrade program.[253]
- Samarai Port (Milne Bay Province) – Island community support and regional distribution.[254]
- Wewak Port (East Sepik Province) – Northern mainland connectivity with container handling capabilities.[255]
- Vanimo Port (West Sepik Province) – Timber industry port near Indonesian border.[256]
- Aitape Port (West Sepik Province) – Coastal community support and regional distribution.[257]
- Daru Port (Western Province) – Remote western access point operating under community service obligations, part of Australian upgrade program.[258]
- Kavieng Port (New Ireland Province) – Island province services and regional trade, part of Australian upgrade program.[259]

Roads

Papua New Guinea relies heavily on its road network as the foundation of its transportation system, especially for connecting inland and coastal communities. The road network spans approximately 30,000 km (18,641 mi),[260] yet only 3.5% of the total network is sealed or asphalted.[261] Within the National Road Network (NRN) - roughly 8,740 km (5,431 mi) - is sealed, though sources vary widely.[262] The NRN, managed by the Department of Works and maintained by the National Roads Authority, carries 89% of nationwide passenger and freight traffic. Industry assessments indicate 67% of national roads are in poor condition.[263] Furthermore, estimates suggest 17% of PNG's people have no road access whatsoever, though the methodology for defining "access" varies across assessments.[264]

This infrastructure deficit is particularly concerning given PNG's high exposure to natural hazards. The country regularly experiences earthquakes, landslides, flooding, and volcanic eruptions that disrupt transportation networks.[265] Geographic features, particularly large rivers, divide the road system into several distinct networks with no roads linking Port Moresby to the Highlands and northern coast regions.[266] As a result, many regions remain reliant on air or sea transport, especially during emergencies.

The Highlands Highway is the backbone of inland connectivity and serves as the primary evacuation route for multiple provinces.[267] However, it is highly exposed to seismic hazards.[268] The 2018 Hela Province earthquake and the 2022 Eastern Highlands earthquake both caused extensive road and bridge damage.[269] In May 2024, a catastrophic

landslide in Enga Province buried 200 m (656 ft) of highway under debris up to 198 m (650 ft) deep and completely blocked the critical transportation corridor.[270]

Other key road segments also face severe hazard exposure. The Kiunga–Tabubil Highway, critical to PNG's mining exports, runs parallel to the Ok Tedi River and is frequently damaged by riverbank erosion and high rainfall. While inland transport corridors such as the Hiritano Highway are primarily affected by heavy rain and riverine flooding, coastal communities in Gulf and Western Provinces have suffered damage from coastal inundation.

PNG's road network also suffers from limited redundancy.[271] Many roads are single-path corridors with no viable detours, and damage to one segment can sever access for entire regions. Bridge failures during seismic events create particularly severe bottlenecks, and infrastructure assessments indicate PNG's bridges include many deteriorated structures, though detailed prioritization criteria do not appear to be publicly available.[272]

Railways

PNG currently has no operational railway network for freight or passenger transport. It has never had a national rail network, although there have been at least 150 mining, industrial, and plantation lines throughout its history.[273]

Navigable Waterways

Inland waterways span approximately 11,000 km (6,835 mi) and serve as lifelines for many remote communities.[274] The country's major navigable rivers, including the Fly, Sepik, and Ramu, are critical to the movement of people, goods, and services, especially in isolated regions of Western, East Sepik, and Madang Provinces. During wet seasons, when roads become impassable due to flooding and landslides, these waterways often represent the only reliable transportation corridors to hundreds of remote villages.

The Fly River system is among the most important, with commercial vessels able to navigate inland to Kiunga, a key logistics hub for the mining sector in Western Province. Tidal influence reaches well into the river's interior and enables year-round navigation in remote areas inaccessible by road.[275] Similarly, the Sepik River, stretching over 1,100 km (683.5 mi), remains navigable for most of its course and is the only reliable transport route for dozens of inland villages in East and West Sepik Provinces.[276] The Sepik's extensive tributary system, including the Karawari River, provides access to isolated communities that have no road connections and rely entirely on waterborne transport for essential supplies, medical services, and market access.[277]

The Purari River system in Gulf Province represents another critical waterway serving remote communities, particularly during seasonal flooding when terrestrial routes become completely unusable. The Ramu River, while only approximately 640 km (397.7 mi) long, has limited navigability due to frequent flooding and channel changes, though some sections remain accessible to small craft during certain seasons and provide vital connections for communities along its banks.

Notably, PNG has some of the highest soil-erosion rates in the world. Consequently, rivers carry high sediment loads and have built up vast swampy deltas. This characteristic is especially notable along the Sepik, Ramu, Fly, and Purari River systems. The high deposition rates can create major problems for transportation.[278]

Communications

Papua New Guinea's communications landscape is a mix of state-owned, private, and foreign-invested networks, with service provision concentrated in urban centers and along key transport corridors. While mobile coverage now reaches most of the population, access remains uneven and can be especially spotty in rural and remote areas where cost, geography, and unreliable power limit connectivity.

Critical disaster communication depends on a handful of terrestrial, satellite, and radio systems, many of which lack redundancy. They are vulnerable to single-point failures during extreme weather or seismic events. Public trust in traditional mass

media outlets such as the National Broadcasting Corporation (NBC) remains relatively high, but legal constraints, press freedom concerns, and occasional government-imposed platform restrictions affect the flow of information. The absence of a national multi-hazard early warning system, combined with infrastructure and institutional gaps, continues to challenge timely, reliable dissemination of alerts and guidance during emergencies.

Early Warning Systems and Information Sharing

An effective early warning system (EWS) integrates four elements:

1. Knowledge – public and technical – of hazards and risks
2. Technical monitoring and warning services
3. Dissemination of meaningful warnings to those people at risk
4. Public awareness of what to do and preparedness to act[279]

To date, PNG has not developed a national multi-hazard EWS because it continues to develop its capacity to monitor and analyze several key hazards, most notably flooding. Moreover, there are shortfalls in the modeling skills necessary to analyze data as well as in the networks over which to transmit data, information, and warnings.

Given the country's exposure to various rapid- and slow-onset hazards, the push to develop an EWS is strong and has attracted the attention of various development partners. The stakeholders in PNG's national EWS include communities, technical and scientific agencies, national, provincial, and local authorities, UN agencies, and other development partners, as well as telecommunications and media organizations.

In 2018, the Morobe PDC, NDC, PNGNWS, CEPA, and New Zealand's National Institute of Water and Atmospheric Research (NIWA) completed a pilot project to develop flood early warning capacity. The pilot was along the Bumbu River, which flows through the city of Lae and often floods, with devastating effect. The project installed three river water-level stations and five automatic rain gauges in the catchment of the Bumbu River, as well as automated weather stations (AWS) in five surrounding provinces. Stakeholders then worked with host communities to develop SOPs and ran a flood simulation exercise, conducted by UNDP. The monitoring equipment began transmitting hydrological data to CEPA, and this transmission marked the first such data collected in the Bumbu catchment in 22 years. There are plans to replicate this system in other river basins, but over the longer term, maintaining the equipment and the community knowledge of its operation will be challenges.[280]

National Multi-Hazard Early Warning Centre

The Department of Mineral Policy and Geohazards Management (DMPGM), the PNGNWS, and the Regional Integrated Multi-Hazard Early Warning System (RIMES) collaborated to establish PNG's National Multi-Hazard Early Warning Centre in 2017. It is tasked and equipped to gather and analyze meteorological and geo-hazard information from the technical agencies and to translate this information into usable bulletins, advisories, and warnings for authorities and the public, commonly through the NBC, but also through other broadcast partners, especially the MAF, which has a UHF radio network.[281] The Centre has a second role as the RIMES sub-regional hub for the Pacific. The hub is intended to support Pacific island states as they develop and resource their meteorological and hydrological programs.[282]

The European Union-funded and SPC-implemented Building Safety and Resilience in the Pacific Phase II (BSRP II) also supports various EWS improvements, including upgraded seismic monitoring capabilities and implementation of targeted digital communication systems for disaster alerts. From May 2025, as part of the BSRP II, additional improvements are being delivered to the National Multi-Hazard Early Warning Centre in the forms of specialized equipment and the presence of a dedicated coordinator.[283]

PNG National Weather Service

Organized under the Department of Transport,[284] the PNGNWS is mandated to deliver meteorological and climate information to the government and the public. Through its network of observation stations, it consolidates data and information at its Jacksons International Airport head office, and it delivers weather and climate products 24-hours-a-day, 7-days-a-week to the government, public, and industrial sectors.[285] As of 2023, PNGNWS operated 14 manual observation stations and 10 AWS, three automated rainfall gauges, and three hydrological stations. A local air navigation services company (private) operated nine AWSs. Based on a 2023 assessment conducted by the PNGNWS, Australia's Bureau of Meteorology, and the World Meteorological Organization, most of the 14 AWSs located throughout the country were not operational and required complete replacement. The PNGNWS faces significant challenges in maintaining, calibrating, and repairing equipment in remote locations.[286]

In cooperation with various development partners, including Australia, Indonesia, and the U.S., and implemented by several UN agencies, the PNGNWS has been developing meteorological and climatological early warning capabilities.[287] However, data links between observation points and the PNGNWS and NDC are non-existent. AWS operators collect data manually and enter it on a paper form that is then emailed, sent via mobile telephone (text), or relayed over a voice call to the PNGNWS, which also shares the data with Australia's Bureau of Meteorology for additional analysis and development of regional weather and climate bulletins. Without local capacity to transmit and analyze data swiftly, the PNGNWS' ability to deliver time-sensitive warnings is hampered.[288]

Department of Mineral Policy and Geohazards Management

DMPGM's Geohazards Management Division is mandated to monitor and assess the country's volcanic, seismic (earthquake and tsunami), and landslide hazards. It advises authorities and communities on mitigation measures and delivers early warning of hazard events. The three main branches are the RVO (volcano impacts), the PMGO (seismic impacts), and the Engineering Geology Branch (landslide impacts). The Division collaborates with the NDC and PDCs, as well as the mass media, various government agencies, and the public to respond to emergencies related to geophysical hazards.[289]

DMPGM is the managing authority for the Community-Based Seismic Network, developed from 2018 with support from Geoscience Australia. In cooperation with both RVO and PMGO, it delivered Raspberry Shake 4D sensor equipment to select locations to allow communities to understand the seismic hazards they confront. These inexpensive systems belong to the communities around them and allow them to have early warning of changes in their volcanic neighbors and to support national seismic monitoring to better inform the public regarding earthquake risks.[290]

Rabaul Volcanological Observatory

The RVO is the government's national volcano monitoring body. Of the country's 15 active and 22 potentially active volcanoes, RVO continuously monitors seven;[291] thus, as of 2019, 90% of the country's volcanoes were not being permanently monitored or systematically surveyed.[292] RVO's monitoring spans the risk management spectrum from hazard mapping and community awareness to assisting in disaster planning.[293] The RVO maintains close links to the PDCs present in areas at risk of volcanic eruption impacts. It has maintained especially close partnerships with the PDCs of ARoB, East and West New Britain, Madang, Manus, Milne Bay, Morobe, Northern / Oro, and Southern Highlands Provinces, all of which are home to volcanoes.[294] Even with a strategy of continuously monitoring only the most high-threat volcanoes, RVO has suffered a shortfall in resources, especially in the ability to place and repair equipment, as theft and scavenging of instruments is common.[295] Despite a lack of staff and other resources, the RVO's model of partnering with at-risk communities is assessed

as one of the key factors that has seen reduced (near zero) volcano-linked deaths in recent decades.[296]

RVO is a partner of volcano scientists internationally. For decades, Geoscience Australia helped RVO build the capacity to install and operate ground-based monitoring equipment at six high-threat volcanoes, and Australian experts supported RVO's community outreach in Bougainville, East and West New Britain, Madang, and Oro Provinces.[297] The U.S. Geological Survey's Volcano Disaster Assistance Program (VDAP) also supported the RVO with technical expertise. In 2022, VDAP donated eight Global Positioning Systems to the RVO and assisted in modernizing their monitoring network for several active volcanoes.[298] Regardless of RVO's ability to monitor volcanoes and assess hazards, they have historically also struggled to build and maintain a public information presence,[299] and, as of 2025, the RVO still does not have a website.

Port Moresby Geophysical Observatory

PMGO's responsibilities are seismic observation and earthquake and tsunami hazard assessment. For the past decade, observation has relied on a nationwide network of stations, comprising seismometers and accelerometers. These devices send data via Telikom PNG to the PMGO main office. The PMGO main office is also the PNG National Data Center that receives and shares data from PNG-situated monitoring equipment operated and shared by the International Monitoring System of the Comprehensive Nuclear-Test-Ban Treaty Organization, International Research Institute for Seismology, U.S. Geological Survey, Pacific Tsunami Warning Center, and Australian Tsunami Warning System. The U.S. Geological Survey shares processed earthquake data with the PMGO, and the Pacific Tsunami Warning Center and Japan Meteorological Agency deliver regional tsunami warnings to PMGO.[300]

The seismic scientists at PMGO, along with technical experts from Geoscience Australia developed and published probabilistic geo-hazard risk maps for the entire country in 2016. This mapping exercise not only delivered up-dated hazard maps to support national and local planners, but it boosted the skills of PMGO seismologists utilizing the most modern earthquake modeling tools. The published maps subsequently informed the GoPNG's Department of Works as it reevaluated and updated building codes in earthquake-prone areas.[301]

Conservation and Environment Protection Authority

CEPA has the task of managing the country's protected lands, waters, and biodiversity. It is also legally mandated to collect and manage hydrological observations and manage hydrological data. As such, the NDRMP identifies it as the technical agency with responsibility for issues related to flooding. However, it has historically not had the resources or the institutional structure to fill this role. Moreover, CEPA does not have a presence – office, staff, etc. – in provincial offices and has struggled to maintain monitoring systems. Until the 2018 Bumbu pilot project was activated, there was no hydrological forecasting system operating in the country.[302]

Information Sharing Focal Points

No single entity can have all of the information needed by stakeholders responding to an emergency. Sharing information among technical agencies, coordinating authorities, and implementing partners both in-country and among potential responders promotes timely, efficient, and effective delivery of disaster relief. The following are some focal points within PNG, in the wider region, and around the world that have and share data and information regarding the hazards that impact PNG's communities.

National Government Offices

National Disaster Centre
PO Box 4970
Boroko, National Capital District
Tel: 675-301-4700
Email: *info@pngndc.gov.pg*

PNG National Weather Service
PO Box 1240
Boroko, National Capital District
Facebook: pngmet

Rabaul Volcanological Observatory
Tel: 675-92-1699

Port Moresby Geophysical Observatory
PO Box 323, Port Moresby
Tel: 675-214-500

Conservation and Environment Protection Authority
Level 7 Dynasty Tower II, PO Box 6601
Boroko, National Capital District 111
Tel: 675-301-4500
Facebook: CEPApng

International Agencies

Disaster Management Team Secretariat (UNRC Office)
Email: *dmt.png@un.org*

UN in PNG
Level 13, Kina Bank Haus
Douglas Street, Down Town
Port Moresby, National Capital District
Tel: 675-321-2877
Email: *rcs-uninpng-office@un.org*
Web: *https://papuanewguinea.un.org/en*
Facebook / Instagram / X: UNinPNG

UNDP
Tel: 675-321-2877 (via UN reception)
Email: *info.png@undp.org*
Web: *https://www.undp.org/papua-new-guinea*
Facebook / Instagram / X: undpinpng

IOM
Level 3, Cuthbertson House, Granville
PO Box 1876 Port Moresby, NCD
Tel: 675-321-3655
Email: *iompng@iom.int*
Web: *https://png.iom.int/*
Facebook / X: iompng
Instagram: unmigration

UN Office for the Coordination of Humanitarian Affairs
ReliefWeb: *https://reliefweb.int/*

International Red Cross and Red Crescent Movement
ICRC – Papua New Guinea Mission
Tel: 675-712-66450
Web: *https://www.icrc.org/en/where-we-work/papua-new-guinea*
X: ICRC_PNG

IFRC Asia Pacific Regional Office (Kuala Lumpur, Malaysia)
Tel: 6019-268-6503
Web: *https://www.ifrc.org/*
X: IFRCAsiaPacific

IFRC Country Delegation
Tel: 675-701-99600
PNG Red Cross
Tel: 675-325-7016 / 675-8220-4385
Email: *info@redcross.org.pg*
Web: *www.redcross.org.pg*
Facebook / Instagram: redcross.org.pg

Telecommunications Infrastructure

The telecommunications sector is undergoing dynamic transformation, spurred by market liberalization, regulatory reform, and major infrastructure investments. However, broadband penetration remains low, and digital inclusion is still a work in progress. The sector continues to evolve, with expanding infrastructure, new entrants, and increased competition.

The mobile market is dominated by three operators: Digicel, Telikom PNG (which includes the Bmobile-Vodafone and Citifon brands), and Vodafone PNG, which launched in 2022. These operators have expanded mobile coverage

significantly, particularly in urban and peri-urban areas, while competing on pricing and service offerings. On the broadband side, PNG DataCo, the state-owned wholesale provider, owns and manages the National Transmission Network, which includes over 12,000 km (7,456 mi) of fiber-optic cables spanning the country.[303] Kacific supplements this coverage by delivering satellite broadband to remote locations, while local service providers continue to serve grassroots users.

The significant digital connectivity and telecommunications services gap between urban and rural areas remains a major concern. The high cost of deployment across rugged, sparsely populated terrain deters investment and limits service expansion outside major cities. Fixed telecom infrastructure remains largely absent outside urban areas, and this absence contributes to PNG's position as the Pacific region's largest underdeveloped telecom market.[304]

As of January 2025, 2.57 million individuals (24.1%) were internet users, a modest 1.8% increase from the year prior.[305] Meanwhile, mobile cellular subscriptions dropped from 49 per 100 people in 2022 to 34 per 100 in 2023, before rebounding to approximately 47 per 100 in early 2025 (5.03 million total connections). This rebound suggests renewed demand following infrastructure expansion — including the Vodafone PNG entry and Telstra's investment in Digicel.[306] Many of these connections, however, may be limited to voice or SMS rather than internet access.[307]

With only 2.0 fixed telephone subscriptions per 100 people as of 2022, fixed-line availability in PNG remains limited. Mobile dominance is driven by the country's challenging terrain, high deployment costs, and alignment with broader global connectivity trends.[308] Fixed broadband penetration remains negligible—just 0.2% in 2022, with subscriptions inching up from 21,000 in 2021 to 21,900 in 2022.[309]

In contrast, mobile broadband coverage (not usage) is more widespread—about 80% of the population is now "covered," though mobile broadband penetration sits at 30–40%, according to the National ICT Authority (NICTA).[310] To expand rural access, PNG DataCo is targeting construction of 500 carrier-neutral mobile towers by 2026. This expansion is funded through a PGK 592 million (US$140 million) digital infrastructure budget, which also includes the second phase of the Kumul Submarine Cable Network (KSCN-2).[311]

Additional submarine infrastructure such as the 2019 Coral Sea Cable (linking PNG to Australia and the Solomon Islands) has helped reduce costs and improve speeds.[312] But connectivity challenges persist, in part due to terrain, lack of reliable power, and unresolved land tenure disputes—40% of new mobile tower sites face land conflicts, which drive up deployment costs.[313]

Mass and Social Media

PNG relies on a combination of traditional mass media, notably radio, television, and print, and growing digital platforms to convey critical information, especially during emergencies. Radio is the most accessible and trusted medium, especially in rural and remote areas where the majority of the population resides. More than 80% of citizens regularly tune in, and radio retains its reach even in areas lacking internet or consistent electricity.[314] The NBC and church-based and community radio services operate provincial networks that cover areas often unreachable by print, TV, or digital channels. These networks play a critical role in providing news, health and agricultural updates, and educational programming.[315]

In contrast, urban residents have more access to television and print outlets such as The National and Post-Courier. While digital adoption is rising, legal constraints and infrastructure gaps still shape information flows.[316]

As of early 2025, 24.1% of the population used the internet, and 12.2% were active social media users.[317] Facebook and Messenger dominate, particularly among younger, urban users, while other platforms such as LinkedIn, Instagram, X/Twitter, Snapchat, Reddit, and Pinterest remain less widely used. Of these platforms, Facebook and X are known sites of political discussion and debate. Facebook is the most popular social media platform by far, with

over 1 million active accounts.

Social media use skews heavily urban and youth-centric, with individuals under 30 years of age making up the majority of users. In contrast, rural communities still rely on radio, church communications, and community loudspeakers for information. Gender disparities persist; only 38% of social media user identities were female, and advertising audiences on Facebook, Messenger, LinkedIn, X, and Instagram all skew male.[318]

Public trust in media is mixed. While traditional media are seen as more credible, they are constrained by limited transparency, legal threats, and structural challenges. PNG ranks very low—78th in the world—when it comes to press freedom, according to the Reporters Without Borders Press Freedom Index 2025.[319] In March 2025, PNG's government temporarily blocked Facebook; it cited national security and misinformation concerns, but this move raised alarm among civil society about freedom of expression.[320] Defamation laws in PNG are among the harshest in the region, with criminal penalties of up to 25 years in prison.[321] Press freedom advocates warn that harsh defamation laws and lack of protections encourage self-censorship, particularly given the high cost of legal defense.[322]

Utilities

Much of the population has no access to either grid electricity or improved water and sanitation services. Those areas with utilities access do not always have service due to various shortfalls – e.g., lack of maintenance and spare parts, conflict, or theft of components. Personnel responding to a disaster event in PNG must consider how to be self-sustaining in terms of electric power and water-sanitation needs. Communities with electric mini-grids are unlikely to have sufficient power to share with in-coming responders. Moving power generation, water, or sanitation equipment to remote areas is expensive and time-consuming; any equipment left after a response may be of limited value because maintenance and repair will depend on local expertise and the availability of spare parts.

Power

The National Electrification Roll-Out Plan (2021) set a target of 70% household electricity access by 2030.[323] As of 2023, the World Bank estimated that 20% of the population had access to the electricity grid,[324] and more than half of all households have access to some type of off-grid power – e.g., solar lanterns, household solar or wind, etc.[325] Full grid access is limited to the areas of Port Moresby, Gazelle (East New Britain), and Ramu (Madang), but there are many isolated mini-grids (medium- or low-voltage) that serve 26 smaller, provincial centers.[326]

As of 2025, customers complained that grid power was increasingly unreliable and expensive. Many entities – mining operations, businesses, public institutions – operate off-grid by using their own diesel generators, which may generate as much power in total as is generated by PNG Power, the state-owned national electricity utility. PNG Power operates under regulation by the National Energy Authority,[327] and it oversees the entire public electric power sector – generation, transmission, distribution, and retail.[328] However, it operates at a loss due to cost and pricing structures and a lack of payments by many customers. Its aging infrastructure spells additional losses during all phases of power delivery.[329]

As of 2024, PNG Power generated approximately 300 megawatts of electricity.[330] The three larger grids use a mix of fossil fuels and hydropower, and the mini-grids are almost entirely diesel-fueled.[331] Some 75% of all electricity generation uses fossil fuels. Hydropower accounted for an estimated 30% of electricity in 2022, a peak period for renewables generation for the country. There is high renewable – hydro, geothermal, and biomass – potential across the country, and much of it is nominally available in remote areas unserved by the existing grid.[332] The ability to finance, build, and operate micro-grids and decentralized renewable generation – most likely solar – is being examined as a solution for many remote communities.[333] Because of these challenges, PNG Power, the World Bank and National Energy Authority launched the National Energy Access

Transformation Project, which would work toward more dense grid connections in urban areas, promote micro-grid and household solar systems in rural areas, and build the institutional structures to achieve the 2030 70% connection target.[334]

Approximately three-quarters of the country's total energy consumption (electricity and transport combined) comes in the form of fossil fuels, which the country produces. Crude and natural gas are key economic drivers in addition to providing the backbones of energy production and use. The country is self-sufficient in crude oil, with some left for export. It is more than self-sufficient in natural gas, which it exports in significant quantities to Australia and Japan.[335]

Water and Sanitation

As of its 2020 review of progress toward the SDGs, PNG reported that some 40% of residents had access to safe drinking water and 13% had access to improved sanitation. Services are concentrated in urban areas,[336] with estimates finding that 90% of urban residents have basic water access versus 45% of rural residents who do. Some 16% of all households lack access to a toilet and practice open defecation.[337]

Water PNG is the state-owned enterprise responsible for water service provision in urban areas. In 2020, it merged with Eda Ranu, a sister enterprise that had provided water services in the National Capital District.[338] Water PNG is tasked with coordination, planning, design, construction, management, and billing for water supply and sewerage services. It owns and operates water supply systems in Port Moresby, Lae, 13 provincial centers, and eight district towns.[339] Water PNG estimates that its water supply services reach some 300,000 customers.[340] Across its networks, it draws water from rivers and boreholes and then treats that water at dedicated water treatment plants, some of which are chlorination-only plants while others deliver cleaning, filtering, and chlorination before delivery to tanks and pipelines for distribution.[341]

Water PNG delivers sanitation services in seven towns - Lae, Mount Hagen, Madang, Popondetta, Kimbe, Alotau, and Kundiawa. These sewerage networks involve septic tanks, biological treatment ponds and lagoons, filters, and various piping to discharge treated wastewater into streams, rivers, and the sea.[342]

Those households, industries, and communities that are not served by piped water or wastewater collection most often utilize their own pumps and cisterns or purchase water from various bottling companies.[343]

The national government's role in extra-urban water infrastructure is limited to supporting policy and implementation and to promoting WASH. The Departments of Health, Provincial and Local Government Affairs, and Implementation and Rural Development all have roles in this realm but are under-resourced. Several NGOs and faith-based groups fill gaps in developing extra-urban water networks. Given the expense of centralized water infrastructure, most work has been pushed to the district level where smaller-scale, practical, locally-informed projects can make immediate impact on lives.[344]

Health Systems

PNG ranks 174th globally and 10th in the Pacific region on the Global Health Security Index, with a score of 25 out of 100—where 100 represents the strongest capacity to prevent, detect, and respond to public health threats.[345] The GoPNG is committed to achieving the SDGs, particularly SDG 3 on "Good Health and Well-being." With an SDG Index score of 53.44 out of 100, the country ranks 152nd among 167 countries assessed. While there has been moderate progress in improving maternal and neonatal health, PNG continues to face significant challenges in controlling infectious diseases such as tuberculosis, malaria, polio, and HIV, as well as addressing the growing burden of non-communicable diseases (NCD) like cardiovascular disease, cancer, diabetes, and chronic respiratory conditions.[346]

The national Department of Health (DoH) serves as the lead agency for PNG's health sector. It is responsible for developing national health plans,

setting quality standards, establishing processes and legislation, and coordinating health service delivery through workforce development and strategic partnerships.[347]

The health system follows a decentralized model known as the Provincial Health Authority (PHA) system. Under this model, provincial and district governments manage the delivery of services through health centers, subcenters, rural hospitals, and aid posts.[348] The PHA system oversees both hospital and rural health services. Built on a primary health care approach, the national health network includes one national referral hospital, which also functions as a provincial hospital, 800 health centers, and approximately 2,500 aid posts. Health services are primarily delivered by the government and church-based service providers, which play a key role in reaching rural and underserved communities.[349]

Health services are primarily funded by the national government and are generally free for residents, although small out-of-pocket payments may apply for outpatient services. PNG's healthcare infrastructure includes a mix of government-run, private, and church-operated facilities, most of which are located in urban areas. While emergency medical services are available in major cities like Port Moresby and Lae, access to specialized care often requires medical evacuation to neighboring countries – e.g., Australia, the Philippines, or Singapore.[350]

The World Health Organization (WHO) Country Cooperation Strategy (2024–2028) for PNG aligns closely with the DoH's priorities. It provides a clear strategic framework to guide WHO's work in the country and ensures alignment with global, regional, and national health strategies through a structured governance model. In support of PNG's Vision 2050, the National Health Plan (2021–2030), and the SDGs, the Strategy outlines four priorities: (1) building resilient health systems, (2) improving population health, (3) integrating health service delivery, and (4) strengthening health security.[351]

PNG's health system continues to face significant challenges, including shortages of medical professionals and supplies. As of 2023, PNG had a doctor density of 0.6 per 10,000 population, a modest improvement from 0.5 in 2000, but still well below the global average of 17.2 per 10,000 reported in 2022.[352] Geographic and infrastructural barriers further limit access to care. Ambulance services exist but are limited in reach and reliability outside major urban centers.[353]

PNG has experienced multiple disasters that had public health elements as well as infectious disease outbreaks. Emergency health responses are managed by disaster coordination teams led by the NDC. These teams are composed mainly of public health personnel from the DoH at the national and provincial levels. When local health services are overwhelmed, PNG may request support from international Emergency Medical Teams (EMT). To build domestic response capacity, PNG established its own EMT in 2021, and it deployed 11 times between 2021 and 2022, primarily in response to COVID-19. However, several challenges remain in fully operationalizing and deploying the PNG EMT. These challenges include limited awareness and understanding of the EMT concept among health stakeholders, difficulty integrating the EMT into existing structures, limited availability of trained personnel for rapid deployment, and insufficient funding to support missions.[354]

PNG is committed to strengthening its public health emergency preparedness through training, collaboration, and system-wide resilience. In 2025, the DoH, in collaboration with the WHO, hosted a Strategic Assessment of Risks for All Hazards workshop in Port Moresby. This whole-of-government and whole-of-society initiative aimed to strengthen PNG's ability to prevent, detect, and respond to public health emergencies. The week-long event focused on risk modeling, emergency preparedness planning, and fostering cross-sector collaboration to establish a resilient and proactive public health security framework.[355]

Aligned with the PNG NDRRF (2017–2030), the government remains committed to enhancing health care at all levels—primary, secondary, and tertiary. Efforts include building the capacity of

health workers in DRR, strengthening disaster medicine training, and supporting community health programs to integrate risk reduction strategies.[356] To develop a skilled health emergency workforce, the Field Epidemiology Training PNG Unit under the DoH runs four major programs: the Intermediate Field Epidemiology Training Program (FETP), Frontline FETP, Advanced FETP, and the Rapid Response Team Training Program. These initiatives collectively build PNG's health security capacity and improve national resilience against public health threats.[357]

Emergency Shelter

Most rural and Highland housing is self-built using bush timber, thatch, or low-grade corrugated iron sheeting. These structures are often located on unstable slopes or floodplains, built without engineering oversight or regulatory standards, and are extremely vulnerable to natural hazards.[358]

In urban areas, such as Port Moresby, some 45-50% of residents live in informal settlements, where dwellings are typically self-built from scrap timber, metal sheeting, or tarpaulin. These homes commonly lack structural reinforcement, secure land tenure, and access to reliable water, sanitation, or electricity.[359] Urban informal housing is also frequently built in hazardous locations – e.g., steep slopes, floodplains, and coastal lowlands – because residents often settle wherever land is available. This pattern is driven by land scarcity, unregulated urban expansion, and limited enforcement of planning and zoning regulations.

In recent years, including the catastrophic 2024 Mulitaka landslide and the March 2024 East Sepik earthquake, thousands of homes have been destroyed, especially in rural highland and floodplain communities where housing is largely informal and structurally weak. For example, IOM and the PNG NDC report that over 1,000 homes were destroyed in East Sepik (March 2024 earthquake).[360]

IOM plays a leading role in shelter provision across PNG. In the aftermath of disasters, IOM distributes emergency shelter kits, comprising tarpaulins, plastic sheeting, rope, and basic tools. They allow families to build temporary shelters. For example, in 2022, IOM delivered shelter kits to displaced populations following floods and conflict in Hela and Southern Highlands Provinces.[361] In early 2025, flood-affected households in Busu, Morobe Province, received such kits to begin reconstructing damaged homes.[362]

IOM complements material aid with "Build Back Safer" training, teaching safer construction methods, such as elevated foundations, stronger roof bracing, and better siting, to reduce risks in future hazard events. These trainings are often delivered alongside shelter distribution and community engagement programs.[363]

Despite these efforts, PNG's housing stock remains fragile. High levels of informality, limited access to durable materials, and widespread settlement in hazard-prone zones make recovery difficult and expose communities to recurring displacement.[364] While IOM's shelter kits and training offer a scalable model for addressing both immediate and longer-term resilience needs, logistical constraints in reaching remote communities, together with limitations in rapid deployment capacity, restrict the ability to achieve comprehensive national coverage.[365]

Food Security

PNG's food system relies heavily on agriculture, with most rural communities practicing subsistence farming for personal consumption. The traditional PNG diet is low in protein and high in carbohydrates, with root crops and cereals—rather than meat or fish—providing most protein intake. Staple foods include root and tuber crops, sago, and bananas, with bananas, yams, taro, and sweet potatoes being the most widely grown.[366] Inland fish farming, particularly tilapia, provides an additional but limited protein source. Rural areas primarily consume locally grown, plant-based foods, while urban areas incorporate more imported and processed products.[367] Furthermore, livestock farming is limited, aside from small-scale chicken and pig farming. As a result, diets are typically low

in protein and key micronutrients such as iron, zinc, iodine, and vitamin A.[368]

Agricultural development is constrained by environmental and land-use challenges. Only 25% of PNG's land is suitable for agriculture, and just 18% of suitable land is cultivable. About half the country is mountainous, 20% is seasonally or permanently flooded, and environmental factors such as high rainfall, extended dry seasons, and persistent cloud cover further limit productivity. In addition, 97% of land is under customary ownership, restricting access to arable land for commercial agriculture.[369] However, PNG is characterized by a diverse range of cash crops, particularly in the Highlands, coastal lowlands, and select island areas.[370]

In the 2024 Global Hunger Index, PNG ranks 110th of 127 countries, with a score of 28.8 on a 100-point scale, where 0 indicates no hunger and 100 represents the worst level. PNG's score reflects a serious level of hunger. About 27.7% of the population is undernourished. Among children under five years of age, 4.1% die before the age of five, 39.8% are stunted, and 6.9% are wasted.[371] PNG is making progress under the SDG 2 on "Zero Hunger," in areas such as cereal yield; however, there are significant challenges that remain, including the need to reduce undernourishment, stunting, and wasting among children under five years old, and improving dietary diversity for children.[372]

The DAL is the lead government agency overseeing PNG's agriculture sector. It is responsible for policy formulation, technical and administrative support, strategic leadership, and coordination of national agricultural development programs. The DAL also monitors program implementation, allocates funding, and fosters partnerships. Established in May 2000, the Food Security Branch serves as the National Food Security Secretariat, responsible for directing, coordinating, and monitoring the National Food Security Policy (2018–2027). The Branch works with provincial and district authorities, national government departments, statutory organizations, the private sector, NGOs, and international partners.[373]

The National Agriculture Sector Plan (2024–2033) outlines a roadmap to strengthen agricultural exports and aligns with Vision 2050, the PNG Development Strategic Plan (2010–2030), and the Medium Term Development Plan IV (2023–2027). The Plan prioritizes agricultural commercialization and livestock development to improve food supply, enhance economic opportunities, and boost sector performance.[374] Furthermore, the National Food Security Policy (2018–2027) includes strategies to strengthen resilience and protect vulnerable populations. These measures include developing risk management systems and safety nets to provide immediate relief during crises, establishing emergency food reserves, preserving crop genetic biodiversity, and promoting resilient agricultural practices to sustain productivity and safeguard nutrition.[375]

CONCLUSION

PNG is among the world's most at-risk countries. It regularly experiences major hazard events that disrupt lives and livelihoods. Both natural and anthropogenic hazards commonly necessitate government and humanitarian responses. Flooding, earthquakes, volcanic eruptions, and landslides are the most common events, but the country's people also contend with conflict and less-frequent biological, climatological, and meteorological hazard events. The vulnerability of the population is also quite high due to geographic remoteness, a lack of infrastructural connections, and high rates of poverty.

To cope with disruptions caused by hazards, PNG continues to build its DM capacity. District and local authorities are responsible for responding to emergencies within their jurisdictions. However, they commonly have insufficient resources to manage the response themselves and seek the assistance of provincial authorities who, in turn, may coordinate a response that impacts districts within their jurisdiction. If an emergency overwhelms the capacity of provincial authorities, the PDComm may seek national assistance through a request to the NDCOMM, which determines the mechanism for assisting the affected province. The SOE Controller has been the more common mechanism in recent years. The appointed SOE Controller oversees national-level personnel, resources, and activities during the response and may seek support from the NDC and other national agencies, including the PNGDF.

As the country continues to build local, district, provincial, and national capacity in the face of increasingly frequent and intense hazard events, it is working to modernize the laws, policies, and plans that allow operationalization of capacity. Both the Disaster Management Act (1984) and the National Disaster Management Plan are considered to be in need of revision. In the interim, in 2003, the National Disaster Mitigation Policy and NDRMP guide action. The NDRRF 2017-2030 also targets whole-of-society cooperation to achieve a reduction in the loss of lives, livelihoods, and health across the economic, physical, social, cultural, and environmental spheres. Since 2018, these frameworks have been joined by SOPs for specific DM actions at all levels of government, but the capacity of some local and provincial disaster centers to implement them is hampered by limited resources.

In the face of limited resources, bilateral, regional, and global partnerships are critical to addressing humanitarian need. The NDC is the focal point for international and bilateral support. This role is generally executed via the DMT, co-chaired by the UNRC and the NDC Director, and comprising UN agencies, international NGOs, the International Red Cross and Red Crescent Movement, faith-based organizations, the private sector, and key development partners. During a major response, as the GoPNG, DMT, and other partners mobilize, the ISCG brings together Sector co-leads (humanitarian and government), the AHP, PNG Disability Sector Coalition, CPP, and private-sector partners. This inter-agency, cross-sector, and whole-of-society approach allows stakeholders to diversify the sources of financial, material, and human resources they can access.

PNG is poised to continue mobilizing its partnerships, not only to meet needs at home but to ensure greater regional stability and security. It is active in the SPDMM-backed PRG and various groupings within the PIF, SPC, and SPREP. It also maintains key bilateral partnerships with Australia, Japan, New Zealand, and the U.S., all of which regularly engage with civilian and military responders in exercises, trainings, symposia, and even emergency responses. This constellation of partnerships allows PNG and its people to contribute to larger global solutions that save lives and alleviate suffering.

APPENDICES

Risk Indices

Risk calculation takes into account exposure to hazards, vulnerability, and coping capacity. Addressing all of these elements is important in reducing and mitigating disaster risk. Various indices emphasize structural or institutional risk while others emphasize hazards or losses (human and economic). Regardless of emphasis, disaster risk calculations use some form of the equation:

Disaster Risk = (Hazard × Vulnerability) / Capacity[376]

Taken from the UNDRR glossary, definitions will help clarify this formula:

- Capacity - The combination of strengths, attributes, and resources available within an organization, community, or society to manage and reduce disaster risks and strengthen resilience.
- Disaster risk - The potential loss of life, injury, or destroyed or damaged assets, which could occur to a system, society, or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability, and capacity.
- Hazard - A process, phenomenon, or human activity that may cause loss of life, injury, or other health impacts, property damage, social and economic disruption, or environmental degradation.
- Vulnerability - The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of an individual, a community, assets, or systems to the impacts of hazards.[377]

In general, the goal of indexing risk is to inform decision makers and DRR and climate adaptation practitioners of the level of risk to and underlying capacity of the target community. The various risk calculation models support proactive crisis management frameworks and are helpful for prioritizing allocation of resources and for coordinating actions focused on anticipating, mitigating, and preparing for humanitarian emergencies.

INFORM Risk Profile

INFORM is a collaboration of the Inter-Agency Standing Committee Reference Group on Risk, Early Warning, and Preparedness with the European Commission. It is a multi-stakeholder forum for developing shared, quantitative analysis relevant to humanitarian crises and disasters. The Joint Research Center of the European Commission is the scientific lead. There are three operational dashboards – i.e., INFORM Risk, INFORM Severity, and INFORM Climate Change.[378]

The **INFORM Risk Index** is an open-source assessment that supports prevention, preparedness, and response decisions. It measures the risk of humanitarian crises and disasters in 191 countries. The INFORM model is based on the standard dimensions of risk: Hazards and Exposure, Vulnerability, and [Lack of] Coping Capacity. The first dimension measures the natural and human hazards that pose the risk. The second and third dimensions cover population factors that can mitigate against or exacerbate the risk. The Vulnerability dimension considers the strength of individuals and households relative to a crisis while the Lack of Coping Capacity dimension considers factors of institutional strength.[379]

The INFORM model is split into different levels to provide a quick overview of the underlying factors leading to humanitarian risk. INFORM gives each country a risk score of 1-10 (1 being the least risk and 10 the greatest) for each of the dimensions, categories, and components of risk, as well as an overall risk score.[380] In the 2025 INFORM Risk Index, PNG had an overall risk score of 6.5/10, which INFORM categorizes as the "High" risk class and lands PNG as the 20th most at-risk country in the

Index. The Hazards and Exposure dimension score takes into account a combination of both natural and anthropogenic hazards, and PNG rated 6.3/10 or 35th of 191 countries. The Vulnerability dimension score was 6.1/10 or 29th of 191, and the Lack of Coping Capacity dimension score was 7.1/10 or 18th of 191. Physical exposure to Earthquake, 9.2/10, was the greatest natural hazard, while Conflict, 8.3/10, was the prevalent anthropogenic hazard. In fact, PNG's overall score for Human Hazards (6.5/10) was higher than the score for Natural Hazards (6.0/10) in an indication of the prevalence of social rifts. Inequality, 8.1/10, was the highest risk in the Vulnerability dimension. A lack of Physical Infrastructure rated 9.6/10 to make it the most significant risk driver in the Lack of Coping Capacity dimension. Figure 17 shows the INFORM Risk dashboard for PNG for 2025.[381]

Notably, the INFORM natural hazard risk assessment excludes volcanoes. According to the RVO, seven of the country's active volcanoes have erupted in the last decade. The country's most active volcanoes include Bagana, Kadovar, Langila, Manam, and Ulawun. More than 1 million people – 17% of the population – live within 30 km (18.5 mi) of an active volcano.[382]

U.S. Government Disaster Management Engagement

The U.S. State Department's Bureau of Population, Refugees, and Migration (PRM) is the lead federal office for short-term foreign humanitarian response. Broadly, PRM coordinates humanitarian policy and diplomacy, provides life-sustaining assistance, and builds global partnerships to promote best practices in disaster relief. At the country level, these activities are executed by the agencies that form part of a U.S. Country Team, under the leadership of the Chief of Mission (COM), who holds responsibility for making a DHN if a major disaster triggers requests for international assistance. In order to build preparedness rather than simply react to large-scale events, the Country Team and other U.S. Government stakeholders undertake regular engagements for training, information sharing, and capacity strengthening. Among the key stakeholders in PNG are USINDOPACOM and its subordinate commands and units as well as the Wisconsin National Guard (WING), who, under the State Partnership Program (SPP) of the U.S. National Guard, have cooperated with PNGDF and other PNG stakeholders since 2020.

U.S. Country Team

The U.S. and PNG have shared diplomatic ties since 1975. In the intervening 50 years, they have built a partnership that addresses major global issues as well as key local obstacles and needs. The military-military relationship is particularly important, as it supports the PNGDF's preparedness across the security spectrum.

The overarching goals of the U.S. Mission in PNG are "inclusive growth through the promotion of market-based economics and strengthened rule of law," according to the 2022 COM's priorities. There is recognition that PNG's own security and stability are critical components of building a free and open Pacific, and U.S. diplomats have publicly acknowledged the importance of bolstering an independent PNG while maintaining strong ties with local and national stakeholders to mitigate the potential for the PRC to gain influence.[383] Therefore,

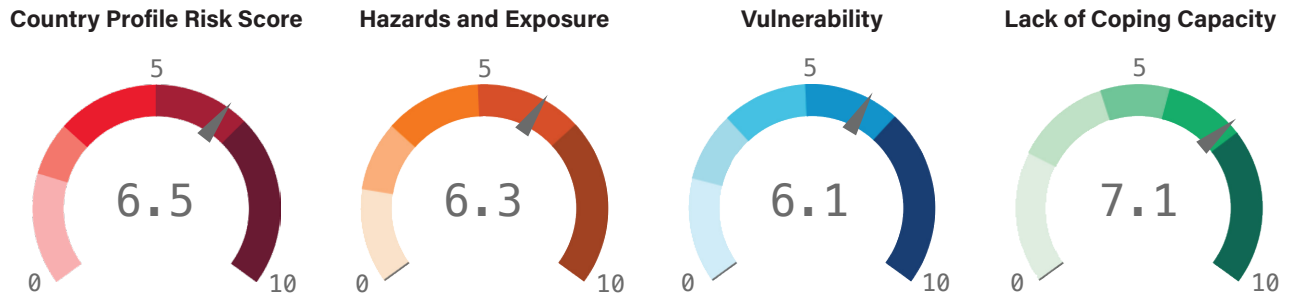

Figure 17: INFORM Dashboard, Papua New Guinea (2025)

U.S. diplomats and agencies support PNG domestic democratic development as well as the building of capacity to tackle infectious diseases, natural hazards, and economic challenges.

Since 2022, PNG has been one of the countries selected for additional U.S. support under the U.S. Strategy to Prevent Conflict and Promote Stability (the "Global Fragility Strategy"). In collaboration with the GoPNG and local civic partners, the U.S. Embassy in the country committed to 10 years of programs crafted to prevent conflict, promote resilience and stability, and advance economic development. Then, in May 2023, the U.S. and PNG concluded both a Defense Cooperation Agreement (DCA) and an Agreement Concerning Counter Illicit Transnational Maritime Activity Operations. The DCA provides a framework for enhanced security cooperation that not only delivers more capacity for the PNGDF but also increases regional security by facilitating bilateral and multilateral exercises and engagements and enabling the U.S. to be more responsive to PNG's needs in emergencies, including disasters. The Agreement regarding illicit maritime activity enables PNG's participation in U.S. Coast Guard programs that help PNG protect its sovereignty through maritime law enforcement and maritime domain awareness.[384]

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Responses in the Past Five Years (2020-2025)

When a disaster overwhelms the response capacity of an affected country and its international humanitarian partners, the U.S. Government may respond to a request for international assistance. The COM can issue a DHN that triggers assistance – in the form of funding, technical support, or relief items – via the PRM's Office of International Disaster Response (PRM / IDR), which replaced USAID / BHA in 2025. PRM / IDR may mobilize Regional Disaster Advisors, deploy a Disaster Assistance Response Team (DART), stand up a Response Management Team, or move to deliver food or non-food relief. Additional support may be in the form of Urban Search and Rescue teams or experts to help manage a chemical, biological, radiological, nuclear, or explosive incident. If civilian capacity is insufficient to meet live-saving need, PRM / IDR may request DoD support via an intra-U.S. Government process. This support will be for unique DoD capabilities for a set period of time.

Enga Landslide – May 2024

On 24 May 2024, Enga Province's Yambali village was struck by a landslide. The PNGDF led search-and-rescue efforts, with additional government agencies undertaking debris clearing to ensure access to the landslide site.[385] Although no final death toll has been agreed upon, in early June, the GoPNG set the estimated number at 760.[386] In the wake of the landslide, the U.S. Government, through USAID, delivered US$500,000 for emergency assistance. Having built partnerships with the NDC and PDCs through its presence in the country, USAID worked with the government, humanitarian partners, and donors to ensure that relief met the needs of affected communities. U.S. relief funding was targeted toward logistics support, protection, and WASH.[387]

East Sepik Earthquake and Floods – April 2024

On 24 March 2024, an M6.9 earthquake struck the Momase Region of East Sepik Province, which, along with the highland provinces of Enga, Eastern and Western Highlands, Madang, Jiwaka, and Chimbu, was already contending with flooding. In all, some 400,000 people across the provinces were affected; 10,000 people were displaced, and 1,000 homes were destroyed.[388] On 27 March, the COM issued a DHN related to the earthquake and flooding.[389] USAID / BHA dispatched experts to

engage with humanitarians, donors, and the GoPNG to help coordinate the response by international partners. In addition, USAID provided US$900,000 in funding for partners responding to affected community needs across the highlands. USAID partner organization IOM distributed shelter kits and non-food items in East Sepik, while additional funding delivered cash to 1,500 households to ensure they had the resources to purchase shelter material, non-food items, and other supplies on the local economy. PNGDF supported delivery of relief items using helicopters.[390]

Mount Ulawun Eruption – December 2023

Eruptions began at Mount Ulawun, on the island of New Britain, on 20 November 2023. The eruptions sent an ash plume high in the air, while lava and ash damaged palm orchards, water sources, household gardens, and other property. At least five people were killed, and 16,000 people fled to care centers. In all, an estimated 24,000 people in East and West New Britain Provinces were affected. At the request of the GoPNG, USAID delivered US$500,000 to partners to meet immediate needs and to assist displaced families to return when possible.[391]

Mount Bagana Eruption – August 2023

From 7 July 2023, the Mount Bagana volcano erupted with ash, gas, lava, and steam all affecting more than 10,000 people; some 3,900 people were displaced in the Torokina and Wakunai districts of the ARoB. The GoPNG, in consultation with the ABG, requested international assistance, with a focus on delivering shelter supplies and WASH support to displaced people sheltering in care centers.[392] After the COM issued a DHN on 2 August,[393] the initial response by USAID was to deliver US$200,000 to IOM for emergency shelter kits and other relief commodities, as well as logistical support for delivering relief items and services. Ahead of the eruption, USAID had supported IOM's pre-positioning of some items, and from these stocks, IOM swiftly delivered water tanks and collapsible water containers to immediately improve drinking water access. However, the locations hosting displaced people were unreachable by most transport methods, and by mid-August, the delivery of relief was still encountering challenges.[394] The Royal Australian Air Force and Royal New Zealand Air Force initially airlifted supplies to Buka, on the small island just north of Bougainville, but onward distribution to care centers in Torokina and Wakunai required additional platforms.[395] At the request of USAID, the U.S. DoD assigned personnel aboard the USS America to transport life-saving emergency assistance to remote areas of the ARoB. U.S. Marines with the 31st Marine Expeditionary Unit, embarked on USS America, supported USAID by providing transport via medium and heavy lift rotary wing and tiltrotor aviation platforms.[396]

Displacement – August 2022

Violence linked to elections and socio-tribal tensions erupted in May 2022. By August, the UN estimated that 156,000 people had been displaced by the violence, and hundreds of homes had been destroyed. In late July, USAID delivered US$100,000 to partner organization CARE International to acquire and deliver food and WASH services to 3,000 of the worst affected people in Porgera-Paiam District. Additional work addressed the needs of some 236,000 people whose access to basic goods and services – e.g., health care, education, etc. – had been disrupted. Among the targeted population were 25,700 students who either were displaced or could not access schooling because of damage to facilities or displacement of teachers and staff.[397]

COVID-19 – 2020-2021

In November 2021, with funding from the American Rescue Plan Act, USAID delivered US$4 million for urgent COVID-19 assistance for PNG. The funding allowed procurement of tools, supplies, and services to support oxygen delivery, clinical care, training, and technical assistance for use of oxygen across PNG's health facilities.[398] In total, the U.S. Government – across USAID, DoD, and

other programming – delivered to US$24 million in emergency support to the PNG Department of Health, National Control Center, and COVID-19 Vaccine Ministerial Task Force. This assistance built upon previous USAID work to build up PNG's infection prevention and control strategies, strengthen laboratory systems, case management, and surveillance tracking, and emergency health communication.[399] PNG also received upwards of 300,000 vaccines donated by the U.S. Government.[400]

DoD DMHA Engagements in the Past Five Years (2020-2025)

As part of the COM's priorities, to increase security capabilities and cooperation with PNG security forces, USINDOPACOM and U.S. law enforcement entities engage with their PNG counterparts on exercises and trainings to enhance PNG domestic capabilities. While one key activity is U.S. Coast Guard assistance patrolling the PNG exclusive economic zone to counter illegal, unregulated, and unreported fishing,[401] the Mission also supports U.S. DoD engagements of various sizes and scopes. Many activities focus specifically on DM, and recent examples of these activities are detailed below.

Disaster Management Workshop – June 2025

In June 2025, USINDOPACOM's CFE-DM conducted a 4-day DM workshop, hosted by Morobe Province disaster managers. The focus of the event was on developing a shared understanding of local, national, and international roles and capabilities during large-scale emergencies, and the culminating exercise was a scenario-driven tabletop exercise that challenged participants to integrate and use information they had learned during presentations and briefings during the workshop. CFE-DM was joined in presenting and participating in the workshop by representatives of PNG's NDC, PNGDF, the Morobe PDC, provincial and local government and community leaders, UN agencies, the International Red Cross and Red Crescent Movement, the WING, and the ADF.

Indo-Pacific Health Security Alliance – May 2025

Port Moresby hosted an Indo-Pacific health security alliance event 6-8 May 2025. With PNG as host, the co-chairs included the ADF and USINDOPACOM, the latter represented by Command Surgeon, Captain Peter Roberts (U.S. Navy). Allied countries and partner organizations participated in the gathering focused on addressing collective readiness for health security threats. The emphasis was on civil-military coordination and collaboration in preventing, detecting, and responding to health threats. By working through an exercise, the participants were able to clarify roles and responsibilities, identify critical coordination processes, and consider resource contributions that are useful not only in health emergencies but also during various disaster scenarios.[402]

Tamiok Strike – April 2025

PNG hosted the fifth iteration of Tamiok Strike from 14 through 25 April 2025 in various locations across the country. This U.S.-PNG exercise, run annually since 2021, increases operational capabilities and interoperability through key activities. The 2025 iteration included humanitarian assistance and disaster response drills, medical and engineering civic action programs, field training, staff exercises, and construction projects. More than 200 troops from the U.S. Army, WING, and PNGDF participated, and members of the ADF observed. The disaster response drills were crafted to support participating forces' preparedness to respond to disasters and other humanitarian crises by ensuring rapid and coordinated assistance to affected communities.[403]

Pacific Angel – August 2024

For four days in late August 2024, PNGDF, the U.S. Air Force, Royal Australian Air Force, and French Air Force conducted Pacific Angel 24-1 to promote interoperability and support capabilities for humanitarian assistance and disaster response. This iteration was the 21st time Pacific Angel has been conducted and the fourth time that PNG has hosted. The August 2024 exercise focused on

search and rescue as well as subject matter expert exchanges,[404] and it culminated in a field training exercise that saw PNGDF personnel treat and load simulated casualties onto U.S. Air Force and Royal Australian Air Force aircraft in order to demonstrate the capacity to work across air platforms and even multinational staffs.[405]

USINDOPACOM Commander Visit – July 2024

Admiral Samuel J. Paparo, commander of USINDOPACOM, paid a 3-day visit to PNG in mid-July 2024. He was joined by a delegation from the U.S. Departments of State and Defense to demonstrate whole-of-government commitment to the partnership with PNG. Among other topics, the Admiral discussed how to enhance cooperation in humanitarian assistance and disaster response, health, and military training with various representatives of the GoPNG. The Admiral's delegation also visited PNG's NDC facility.[406]

Bilateral Disaster Response and Exchange Exercise – June 2024

From 18 June 2024, Port Moresby's Stanley Hotel hosted the second annual DREE, co-hosted by the PNGDF, the NDC, and the U.S. Army. The objective of the 4-day DREE was to build a shared understanding of disaster response, facilitate cooperation between PNG and the U.S., and provide relevant training. The training comprised both lectures and simulations that participants used to for tabletop discussions of disaster scenarios. The 22 participants from the PNGDF, Fire Service, NDC, and various PNG government departments were expected to learn and apply lessons delivered by representatives of the UN, NDC, USAID, CFE-DM, WING, and the Australian Civil-Military Centre (ACMC).[407]

Humanitarian Assistance and Disaster Relief Exercise – May 2024

From 30 April through 9 May, U.S. military personnel and PNGDF conducted joint planning and execution exercises, as well as subject matter expert exchanges with a focus on humanitarian assistance and disaster response missions. U.S. Marines and Sailors with Marine Rotational Force – Darwin, reinforced by Marine Transport Squadron 1, Marine Aircraft Group 41, 4th Marine Aircraft Wing, arrived in Port Moresby for the series of religious key leader engagements, academic briefings, site surveys, and medical interoperability drills that allowed Marine Rotational Force – Darwin to rehearse projecting medical capabilities, equipment, supplies, and Marine Air-Ground Task Force command and control capabilities outside Australia in cooperation with a partner force.[408]

Pacific Partnership – October 2023

The largest annual multinational humanitarian assistance and disaster preparedness mission, Pacific Partnership, arrived in PNG on 9 October 2023 ahead of several days of activities in Port Moresby and Wewak. Pacific Partnership enables participating forces and countries to collaborate in order to enhance disaster response capabilities regionally. In 2023, activities covered engineering, disaster response, public health, and outreach. With 1,500 personnel participating across the Pacific Partnership 2023 portfolio, contributing states comprised Australia, Canada, Chile, Japan, New Zealand, South Korea, the United Kingdom, and the U.S.[409]

Mount Bagana Eruption Response – August 2023

In the wake of the July 2023 Mount Bagana eruption, the GoPNG requested international assistance, and international humanitarians and donors mobilized various supplies and services.[410] The U.S. COM issued a DHN on 2 August.[411] Although funding, supplies, and manpower were available, logistics were complicated by a lack of ways to access the care centers in Torokina and Wakunai where displaced people were sheltering. In August, at the request of USAID, the U.S. DoD assigned personnel aboard the USS America to transport life-saving emergency assistance to remote areas of the ARoB.[412] The Royal Australian and New Zealand Air Forces had successfully moved large amounts of relief goods – e.g., water, shelter materials, etc. – to Buka, which is the capital of

Bougainville and located north of the main island. There were no roads connecting Buka to Torokina and Wakunai across the jungle-covered interior, and sea conditions meant that water transport was impractical.[413] Distributing the relief items onward from Buka became the main task for U.S. Marines with the 31st MEU, embarked on USS America.[414] Over the course of 10 days, they provided support for the USAID and broader humanitarian mission both in Buka and in transit. From 11 through 15 August, they flew 22 flights to transport humanitarian assessment teams as well as the relief goods[415] via medium and heavy lift rotary wing and tiltrotor aviation platforms.[416]

Bilateral Disaster Response and Exchange Exercise – June 2023

PNGDF and the U.S. Army co-hosted a DREE in Port Moresby 26-30 June 2023. The seminar brought together academics, community leaders, and disaster response practitioners for discussions and a tabletop exercise. The DREE focuses on building PNGDF and GoPNG capabilities to prepare for, respond to, and recovery from a disaster, and the 2023 DREE was specifically intended to evaluate and improve the PNG national disaster response framework. At the request of the GoPNG, expertise was delivered by PNGDF, WING and the Wisconsin State Disaster Management Agency, the Institute for Security Governance, CFE-DM, UNDP, and IOM.[417]

PNGDF Gender Focal Point Training – March 2023

The increasing incidence of disasters that require a security force response triggered a request from the PNGDF to USINDOPACOM for specialized training assistance to improve gender equity and equality within the PNGDF. The focus was on ensuring that PNGDF military police, engineers, chaplains, and medical services were prepared to address the needs of all members of affected communities by planning for the unique needs of women, men, boys, and girls after a disaster. The course for 30 PNGDF members provided knowledge of the UN Security Council Resolution 1325 on Women, Peace and Security; the Resolution acknowledges the unique impact of conflict and crisis on women and girls, recognizes women's full and equal participation in peace and security processes, and calls for UN members to incorporate gender perspectives within their institutions. Instructors from USINDOPACOM were joined by instructors from the ADF.[418]

Additional Resources

This appendix provides additional references, with links, to enable readers to find relevant and contextual information.

International and U.S. Government Sources
U.S. Embassy in Papua New Guinea https://pg.usembassy.gov/
CIA World Factbook https://www.cia.gov/the-world-factbook/countries/papua-new-guinea/
Travelers' Health U.S. Centers for Disease Control and Prevention https://wwwnc.cdc.gov/travel/destinations/traveler/none/papua-new-guinea?s_cid=ncezid-dgmq-travel-single-001
Common Country Analysis 2024 United Nations Country Team https://papuanewguinea.un.org/ *In-depth examination of key issues across governance, economic stability, society, sustainability, and humanitarianism*
Sendai Framework for Disaster Risk Reduction 2015-2030 United Nation Office for Disaster Risk Reduction https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030 *Outlines targets and priorities for action not prevent new and reduce existing disaster risk.*
Australian high Commission in Papua New Guinea https://png.embassy.gov.au/
Papua New Guinea Factsheet February 2024 CFE-DM https://www.cfe-dmha.org/LinkClick.aspx?fileticket=zIfiG4v6fM4%3d&portalid=0

National Disaster Risk Reduction/Management
National Disaster Risk Reduction Framework 2017-2030 Government of Papua New Guinea https://www.preventionweb.net/publication/papua-new-guinea-national-disaster-risk-reduction-framework-2017-2030 *Sets out priorities for national action to align with the Sendai Framework, Framework for Resilient Development in the Pacific, and Asia-Pacific Economic Cooperation Disaster Risk Reduction Plan.*
National Disaster Mitigation Policy (2010) National Disaster Centre, Government of Papua New Guinea https://www.preventionweb.net/publication/papua-new-guinea-national-disaster-mitigation-policy-0 *Lays out the basic framework for government agencies to undertake disaster management, especially environmental and disaster mitigation.*
2024 Multi-Hazard Survey: Papua New Guinea Government of Papua New Guinea, UN Country Team, United Nations Development Programme https://reliefweb.int/report/papua-new-guinea/report-2024-multi-hazard-survey-papua-new-guinea-issued-15-march-2025 *Captures citizens' observations and experiences of hazards, their impacts, and available sources of support to inform programming by humanitarian and development partners and support the work of aid and government agencies in disaster management.*

Regional Resources

2050 Strategy for the Blue Pacific Continent
Pacific Islands Forum
https://forumsec.org/2050
Strategic outline for Pacific Island Countries and Territories to collectively address political, social, security, economic, climate, environment, and technology challenges.

Framework for Resilient Development in the Pacific (FRDP)
Geoscience, Energy, and Maritime Division, Pacific Community
https://gem.spc.int/projects/frdp
Strategic guidance for Pacific Island Countries and Territories to reduce their exposure to climate and disaster risk, support low-carbon development, and improve disaster response and reconstruction.

Pacific Meteorological Desk and Partnership
Secretariat of the Pacific Regional Environment Programme
https://www.pacificmet.net/about-us
Coordinates the development of weather than climate services, including early warning, across the Pacific Islands region.

Beyond Barriers; Papua New Guinea Case Study
Humanitarian Advisory Group
https://humanitarianadvisorygroup.org/wp-content/uploads/2022/03/HAG_WV_Case-Study_PNG-1.pdf
Examines country-specific approaches to integrating adaptation and risk reduction.

Asia-Pacific Regional Guidelines for the Use of Foreign Military Assets in Natural Disaster Response Operations ("APC-MADRO Guidelines")
The Asia-Pacific Conferences on Military Assistance to Disaster Relief Operations (APC-MADRO) & UN Office for the Coordination of Humanitarian Affairs (OCHA), 2014
https://www.unocha.org/publications/report/world/asia-pacific-regional-guidelines-use-foreign-military-assets-natural-disaster-response
Reference guide for states planning and executing foreign military support for regional disaster response.

Multinational Force Standing Operating Procedures (MNF SOP) – Annex C: Humanitarian Assistance/ Disaster Relief
Multinational Planning Augmentation Team (MPAT), U.S. Indo-Pacific Command
https://community.apan.org/wg/mnfsop/m/documents/307456 (D1 C1/ PDF pg. 869)
Annex on international humanitarian assistance; part of broad standing procedures for regional multinational force operations other than war.

USINDOPACOM Foreign Disaster Response in the Indo-Asia-Pacific April 1991 – January 2024
CFE-DM, U.S. Pacific Command
https://www.cfe-dmha.org/Publications/New-Releases
Contemporary historical synopsis of foreign disasters the U.S. DoD responded to in the Indo-Pacific.

U.S. DoD Training

Humanitarian Assistance Response Training – Disasters (HART-D) Course
CFE-DM, U.S. Pacific Command
https://www.cfe-dmha.org/hart-d
Target Audience: O3-O6, E6-E9, and DoD civilians who may plan for or execute a Foreign Disaster Relief mission or participate in disaster response activities in exercises or security cooperation engagements.

Acronyms and Abbreviations

°	degree(s) – of temperature (C = Celsius; F = Fahrenheit); or of latitude and longitude (N = North; S = South; E = East; and W = West)
$	dollar(s) – of the U.S. or Australia
ABG	Government of the Autonomous Region of Bougainville
ADF	Australian Defence Forces
ADRA	Adventist Development and Relief Agency
AHP	Australian Humanitarian Partnership
ARoB	Autonomous Region of Bougainville
AWS	automated weather station
BDO	Bougainville Disaster Office
BHA	Bureau for Humanitarian Assistance (of USAID)
BSRP	Building Safety and Resilience in the Pacific
CEPA	Conservation and Environment Protection Authority
COM	Chief of Mission (of the U.S. Embassy)
COVID-19	Coronavirus Disease 2019
CPP	Church Partnership Program
CRED	Centre for Research on Epidemiology of Disasters
CROP	Council of Regional Organisations of the Pacific
CSO	civil society organization
DAL	Department of Agriculture and Livestock
DCA	Defense Cooperation Agreement
DCP	Defence Cooperation Program
DFAT	Department of Foreign Affairs and Trade
DHN	Declaration of Humanitarian Need
DM	Disaster Management
DMPGM	Department of Mineral Policy and Geohazards Management
DMT	Disaster Management Team
DoD	Department of Defense (of the U.S.)
DoH	Department of Health (of PNG)
DPLGA	Department of Provincial and Local-Level Government Affairs
DREE	Disaster Response Exercise and Exchange
DRM	disaster risk management
DRR	disaster risk reduction
EM-DAT	international disaster database (of CRED)
ENSO	El Nino Southern Oscillation
EOC	emergency operations center
EWS	early warning system

FETP	Field Epidemiology Training Program
ft	foot / feet
FRDP	Framework for Resilient Development in the Pacific
GDP	gross domestic product
GoPNG	Government of Papua New Guinea
HAT	Humanitarian Advisory Team (of the UN)
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Person
IFRC	International Federation of Red Cross and Red Crescent Societies
in	inch(es)
INDOPACOM	U.S. Indo-Pacific Command
IOM	International Organization for Migration
ISCG	Inter-Sector Coordination Group
km / km^2	kilometer(s) / square kilometer(s)
LOA	length overall
LLG	local-level government
LNG	liquified natural gas
m	meter(s)
M	Magnitude (seismic)
MAF	Mission Aviation Fellowship
mi / mi^2	mile(s) / square mile(s)
mm	millimeter(s)
NBC	National Broadcasting Corporation
NCD	non-communicable disease
NDC	National Disaster Centre
NDCOMM	National Disaster Committee
NDMO	national disaster management organization
NDRMP	National Disaster Risk Management Plan
NDRRF	National Disaster Risk Reduction Framework
NEC	National Executive Council
NEOC	National Emergency Operations Centre
NGO	non-governmental organization
NICTA	National Information and Communications Technology Authority
NIWA	National Institute of Water and Atmospheric Research (of New Zealand)
NRN	National Road Network
NZDF	New Zealand Defence Force
OCHA	Office for the Coordination of Humanitarian Affairs (of the UN)
OPD	Organizations of People Living with Disabilities

PDC	Provincial Disaster Centre
PDComm	Provincial Disaster Committee
PEC	Provincial Executive Councils
PGK	Papua New Guinean Kina
PHA	Provincial Health Authority
PIEMA	Pacific Islands Emergency Management Alliance
PIF	Pacific Islands Forum
PMGO	Port Moresby Geophysical Observatory
PNG	Papua New Guinea
PNGCC	Papua New Guinea Council of Churches
PNGDF	Papua New Guinea Defence Force
PNGNWS	National Weather Service
PNGPCL	Papua New Guinea Ports Corporation Limited
PRC	People's Republic of China
PResCoM	Pacific Humanitarian Response Coordination Mechanism
PRG	Pacific Response Group
PRM	Bureau of Population, Refugees, and Migration (of the U.S. State Department)
PWD	person with a disability
RCO	Resident Coordinator's Office (of the UN)
RIMES	Regional Integrated Multi-Hazard Early Warning System
RPNGC	Royal Papua New Guinea Constabulary
RVO	Rabaul Volcanological Observatory
SARV	Sorcery Accusation-Related Violence
SDG	Sustainable Development Goal
SOE	State of Emergency
SOP	standard operating procedures
SPC	Pacific Community
SPDMM	South Pacific Defence Ministers' Meeting
SPP	State Partnership Program (of the U.S. National Guard Bureau)
SPREP	Secretariat of the Pacific Regional Environment Programme
TC	Tropical Cyclone
U.S.	United States
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UHC	universal health coverage
UNICEF	United Nations Children's Fund
UNRC	United Nations Resident Coordinator

USAID	United States Agency for International Development
VDAP	Volcano Disaster Assistance Program
WASH	water-sanitation-hygiene
WHO	Ruamkatanyu Foundation
WING	Regional Office (of the DDPM)

Endnotes

1 Tupuola, Jared G. U.S.–Papua New Guinea Relations: Issues for Congress, Library of Congress. 4 December 2024. https://www.congress.gov/crs-product/IF11255

2 Standish, William and Richard Jackson. Papua New Guinea. Encyclopedia Britannica. Updated 1 August 2025. https://www.britannica.com/place/Papua-New-Guinea

3 Country Reports. Papua New Guinea – Geography. accessed 4 August 2025. https://www.countryreports.org/country/PapuaNewGuinea/geography.htm

4 Free relief map of Papua New Guinea, Blue Green Atlas, licensed under CC BY 4.0, accessed 7 August 2025, https://www.bluegreenatlas.com/maps/relief_map_of_papua_new_guinea.html

5 Country Reports. Papua New Guinea – Geography. accessed 4 August 2025. https://www.countryreports.org/country/PapuaNewGuinea/geography.htm

6 UN FAO. Papua New Guinea, SPREP, 2011. https://png-data.sprep.org/system/files/PNG-CP_eng.pdf

7 Climates to Travel. Climate in Papua New Guinea. https://www.climatestotravel.com/climate/papua-new-guinea

8 UN FAO. Papua New Guinea, SPREP, 2011. https://png-data.sprep.org/system/files/PNG-CP_eng.pdf

9 National Statistical Office. National Population Estimate 2021, Papua New Guinea Population Data Project. https://www.nso.gov.pg/download/118/population-estimates-2021/3753/00_png-_population_estimate_results.pdf

10 National Statistical Office. National Population Estimate 2021, Papua New Guinea Population Data Project. https://www.nso.gov.pg/download/118/population-estimates-2021/3753/00_png-_population_estimate_results.pdf

11 UN Department of Economic and Social Affairs, Population Division. Country Profiles – Papua New Guinea, Percentage Urban by Country in 2018. https://population.un.org/wup/countryprofiles?country=Papua%20New%20Guinea

12 PNG Department of Foreign Affairs. People – Ethnic Groups. https://www.dfa.gov.pg/people-ethnic-groups/

13 Kalani, Phoebe. Papua New Guinea Indigenous People: Unveiling A Rich Culture. Polynesian Pride. 25 June 2024. https://blog.polynesianpride.co/papua-new-guinea-indigenous-people/

14 Jackson, Richard, and William Standish. Papua New Guinea - Melanesian, Austronesian, Pidgin. Encyclopedia Britannica. Updated 7 August 2025. https://www.britannica.com/place/Papua-New-Guinea/Languages

15 Internal Displacement Monitoring Centre. Country Profile: Papua New Guinea. 2021, updated 18 May 2022. https://www.internal-displacement.org/countries/papua-new-guinea/

16 IOM and Government of PNG. Profiling Internally Displaced Persons in Papua New Guinea, 2017. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/Profiling%20IDPs%20in%20PNG%2C%202017.pdf

17 UNDP. Assessing the impact of displacement on IDPs and host communities in Papua New Guinea. 2 November 2022. https://data.undp.org/insights/impact-displacement-idps/PNG

18 IOM. Papua New Guinea, Global Data Institute Displacement Tracking Matrix. 29 January 2025. https://dtm.iom.int/dtm-insights/february-2025-edition/data-update-climate-papua-new-guinea

19 UN Papua New Guinea. Common Country Analysis 2024. https://papuanewguinea.un.org/en/284948-common-country-analysis-2024-update

20 Ralph, Nick. Dozens of refugees are still stranded in precarious situations in PNG – and support from Australia is dwindling, The Conversation. 17 November 2024. https://theconversation.com/dozens-of-refugees-are-still-stranded-in-precarious-situations-in-png-and-support-from-australia-is-dwindling-241676

21 Asylum Seeker Resource Center. Cruel neglect of refugees abandoned in PNG continues as more people threatened with eviction. 28 October 2024. https://asrc.org.au/2024/10/28/cruel-neglect-of-refugees-abandoned-in-png-continues-as-more-people-threatened-with-eviction/

22 Abay, Negar Ashtari, Kathleen Kuehnast, Gordon Peake, and Melissa Demian. Addressing Gendered Violence in Papua New Guinea: Opportunities and Options, Special Report No. 528, USIP, March 2024. https://www.usip.org/sites/default/files/2024-03/sr-528_addressing-gendered-violence-papua-new-guinea-opportunities-and-options.pdf

23 Forsyth, Miranda, Ibolya Losoncz, Philip Gibbs, Fiona Hukula, and William Kipongi. Sorcery Accusation-Related Violence in PNG Part 5: Incidents and Victims, In Brief 2021/5, Department of Pacific Affairs, Australian National University. https://openresearch-repository.anu.edu.au/server/api/core/bitstreams/ae5917fc-3185-4bf5-9581-fb1a100010b8/content

24 UN News. The dangers of defending women accused of sorcery in Papua New Guinea. 9 April 2022. https://news.un.org/en/story/2022/04/1115882

25 Australian Aid. Pacific risk profile – Papua New Guinea. July 2021. https://www.dfat.gov.au/sites/default/files/pacific-risk-profile_png.pdf

26 Humanitarian Advisory Group. Giving Rise to Rights: Barriers and Enablers to Participation of Persons with Disabilities in PNG. 2023. https://humanitarianadvisorygroup.org/wp-content/uploads/2023/03/Giving-Rise-to-Rights_FINAL-REPORT_23-March.pdf

27 National Statistical Office. 2009-2010 Papua New Guinea Household and Income Expenditure Survey: Summary Tables. https://www.nso.gov.pg/census-surveys/household-and-income-expenditure-survey/

28 Humanitarian Advisory Group. Giving Rise to Rights: Barriers and Enablers to Participation of Persons with Disabilities in PNG. 2023. https://humanitarianadvisorygroup.org/wp-content/uploads/2023/03/Giving-Rise-to-Rights_FINAL-REPORT_23-March.pdf

29 UN Papua New Guinea. Common Country Analysis 2024. https://papuanewguinea.un.org/en/284948-common-country-analysis-2024-update

30 CIA World Factbook. Papua New Guinea. Updated 1 August 2025. https://www.cia.gov/the-world-factbook/countries/papua-new-guinea/

31 National Parliament of Papua New Guinea. About Our Parliament. Accessed 5 August 2025. https://parliament.gov.pg/about/parliament

32 Department Of Provincial & Local Government Affairs. Home – Frequently Asked. Accessed 5 August 2025. https://www.dplga.gov.pg/

33 Howes, Stephen, Lawrence Sause, and Lhawang Ugyel. "Decentralisation: A political analysis," in Papua New Guinea: Government, Economy and Society, edited by Stephen Howes and Lekshmi N. Pillai, Australian National University, Canberra, 2022, doi.org/10.22459/PNG.2022.03. https://press-files.anu.edu.au/downloads/press/n9594/pdf/ch03.pdf

34 CIA World Factbook. Papua New Guinea. Updated 1 August 2025. https://www.cia.gov/the-world-factbook/countries/papua-new-guinea/

35 World Bank. World Bank Country and Lending Groups for fiscal year 2026. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

36 World Bank. Papua New Guinea Economic Update: Macroeconomic Stability and Growth: Unlocking the Potential of Agriculture. 2025. https://documents1.worldbank.org/curated/en/099062625004022566/pdf/P506957-007e2dee-b90b-43d0-a9c7-380f5f59a7f3.pdf

37 IMF Datamapper. Papua New Guinea – Real GDP Growth. Accessed 5 August 2025. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/PNG?zoom=PNG&highlight=PNG

38 Asian Development Bank. Asian Development Outlook 2025 – Papua New Guinea. https://www.adb.org/sites/default/files/publication/1044336/png-ado-april-2025.pdf

39 World Bank. Papua New Guinea Economic Update: Macroeconomic Stability and Growth: Unlocking the Potential of Agriculture. 2025. https://documents1.worldbank.org/curated/en/099062625004022566/pdf/P506957-007e2dee-b90b-43d0-a9c7-380f5f59a7f3.pdf

40 Asian Development Bank. Asian Development Outlook 2025 – Papua New Guinea. https://www.adb.org/sites/default/files/publication/1044336/png-ado-april-2025.pdf

41 Global Finance. Papua New Guinea GDP Country Report. Accessed 5 August 2025. https://gfmag.com/country/papua-new-guinea-gdp-country-report/

42 World Bank Group. Papua New Guinea Economic Update – June 2025. https://www.worldbank.org/en/country/png/brief/papua-new-guinea-economic-update-june-2025

43 Asian Development Bank. Poverty Data: Papua New Guinea. 2024. https://www.adb.org/where-we-work/papua-new-guinea/poverty

44 World Bank. Papua New Guinea Economic Update: Macroeconomic Stability and Growth: Unlocking the Potential of Agriculture. 2025. https://documents1.worldbank.org/curated/en/099062625004022566/pdf/P506957-007e2dee-b90b-43d0-a9c7-380f5f59a7f3.pdf

45 Australian Aid. Pacific Risk Profile: Papua New Guinea. https://www.dfat.gov.au/sites/default/files/pacific-risk-profile_png.pdf

46 Geoscience Australia. Reducing disaster risk in Papua New Guinea. https://www.ga.gov.au/scientific-topics/community-safety/projects/reducing-disaster-risk-in-papua-new-guinea#:~:text=The%20island%20nation%20of%20Papua,%2C%20tropical%20cyclones%20and%20heatwaves)\

47 Geoscience Australia. Reducing disaster risk in Papua New Guinea. https://www.ga.gov.au/scientific-topics/community-safety/projects/reducing-disaster-risk-in-papua-new-guinea#:~:text=The%20island%20nation%20of%20Papua,%2C%20tropical%20cyclones%20and%20heatwaves)\

48 UNEP Grid-Geneva. Interactive Country Fiches: PNG. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

49 Geoscience Australia. Reducing disaster risk in Papua New Guinea. https://www.ga.gov.au/scientific-topics/community-safety/projects/reducing-disaster-risk-in-papua-new-guinea#:~:text=The%20island%20nation%20of%20Papua,%2C%20tropical%20cyclones%20and%20heatwaves)\; Davies, Hugh L., et al. Learning from the Aitape Tsunami. Geology Department, University of Papua New Guinea. https://nctr.pmel.noaa.gov/PNG/Upng/Learned/#:~:text=Earthquakes%20generated%20by%20rapid%20oblique,Map%20of%20the%20Aitape%20coast.

50 UC Berkeley. Papua New Guinea. https://belonging.berkeley.edu/climatedisplacement/case-studies/papua-new-guinea

51 Bool, Holland. Papua New Guinea's Rural Communities, Devastated by Disasters, Receive Medical Support. Direct Relief. 17 September 2024. https://www.directrelief.org/2024/09/papua-new-guineas-rural-communities-devastated-by-disasters-receive-medical-support/

52 UC Berkeley. Papua New Guinea. https://belonging.berkeley.edu/climatedisplacement/case-studies/papua-new-guinea

53 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

54 UN OCHA. Papua New Guinea: Earthquake, Tsunami and Volcano Risks, 19 March 2019. https://www.unocha.org/publications/map/papua-new-guinea/papua-new-guinea-earthquake-tsunami-and-volcano-risks-19-mar-2019

55 Davies, H.L., Simeon, O.B., Hope, G. et al., "Past major tsunamis and the level of tsunami risk on the Aitape coast of Papua New Guinea", Nat Hazards 96, 1019–1040 (2019), https://link.springer.com/article/10.1007/s11069-019-03585-5#article-info

56 Asian Disaster Reduction Center. Information on Disaster Risk Reduction of the Member Countries: Papua New Guinea. https://www.adrc.asia/nationinformation.php?NationCode=598&Lang=en&NationNum=12

57 NOAA. On this day: Papua New Guinea Tsunami of 1998. https://www.ncei.noaa.gov/news/day-papua-new-guinea-tsunami-1998

58 NASA. Manam Volcano, Papua New Guinea. https://earthobservatory.nasa.gov/images/149883/manam-volcano-papua-new-guinea

59 Data Friendly Space. Tsunami risk analysis for Papua New Guinea (July 2025). 30 July 2025. https://reliefweb.int/report/papua-new-guinea/tsunami-risk-analysis-papua-new-guinea-july-2025

60 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

61 UNCT PNG. Common Country Analysis 2024 Update. 3 December 2024. https://reliefweb.int/report/papua-new-guinea/common-country-analysis-2024-update

62 Davies, Hugh L. The geology of New Guinea - the cordilleran margin of the Australian continent. Episodes Journal of International Geoscience 2012; 35 (1): 87 – 102. Published online 1 March 2012. https://www.episodes.org/journal/view.html?doi=10.18814/epiiugs/2012/v35i1/008

63 UNCT PNG. Common Country Analysis 2024 Update. 3 December 2024. https://reliefweb.int/report/papua-new-guinea/common-country-analysis-2024-update

64 Geoscience Australia. Papua New Guinea's complex hazard profile, https://www.ga.gov.au/scientific-topics/community-safety/projects/reducing-disaster-risk-in-papua-new-guinea#:~:text=The%20island%20nation%20of%20Papua,%2C%20tropical%20cyclones%20and%20heatwaves); Smithsonian Institution. Rabaul. https://volcano.si.edu/volcano.cfm?vn=252140; Davies, Hugh L. The Geology of New Guinea – the cordilleran margin of the Australian continent. Episodes Journal of International Geoscience. 1 March 2012. https://www.episodes.org/journal/view.html?-doi=10.18814/epiiugs/2012/v35i1/008

65 UNEP, European Commission, and GRID Geneva. Interactive Country Fiches. Papua New Guinea. Problems. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

66 World Bank Group. Climate Risk Country Profile: Papua New Guinea. 2021. https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15871-WB_Papua%20New%20Guinea%20Country%20Profile-WEB.pdf

67 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. Status Report 2019. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

68 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

69 UNEP GRID-Geneva and European Commission. Interactive country fiches. Papua New Guinea. Climate Change. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

70 UNEP Grid-Geneva. Interactive Country Fiches: PNG. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

71 World Bank Group. Climate Risk Country Profile: Papua New Guinea. 2021. https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15871-WB_Papua%20New%20Guinea%20Country%20Profile-WEB.pdf

72 UNEP GRID-Geneva and European Commission. Interactive country fiches. Papua New Guinea. Climate Change. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

73 UNEP Grid-Geneva. Interactive Country Fiches: PNG. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

74 Government of PNG, UNCT PNG, UNDP. Report - 2024 Multi-Hazard Survey: Papua New Guinea. 15 March 2025. https://reliefweb.int/report/papua-new-guinea/report-2024-multi-hazard-survey-papua-new-guinea-issued-15-march-2025

75 FAO. In Papua New Guinea one third of the population is affected by drought and frost. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-one-third-population-affected-drought-and-frost

76 World Bank Group. Climate Risk Country Profile: Papua New Guinea. 2021. https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15871-WB_Papua%20New%20Guinea%20Country%20Profile-WEB.pdf

77 IOM. Papua New Guinea Crisis Response Plan 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-crisis-response-plan-2024

78 UC Berkeley. Papua New Guinea. https://belonging.berkeley.edu/climatedisplacement/case-studies/papua-new-guinea

79 World Bank. Papua New Guinea receives Bank assistance for El Niño drought. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-receives-bank-assistance-el-ni%C3%B1o-drought

80 WFP. Papua New Guinea: El Nino 2015-16. https://reliefweb.int/map/papua-new-guinea/papua-new-guinea-el-nino-2015-16-7-sep-2015

81 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

82 Australian Department of Foreign Affairs and Trade. PNG – Australia's commitment to strengthening climate and disaster resilience in the Pacific. https://www.dfat.gov.au/about-us/publications/png-australias-commitment-to-strengthening-climate-and-disaster-resilience-in-the-pacific

83 WFP. Papua New Guinea: El Nino 2015-16. https://reliefweb.int/map/papua-new-guinea/papua-new-guinea-el-nino-2015-16-7-sep-2015

84 WFP. Papua New Guinea: El Nino 2015-16. https://reliefweb.int/map/papua-new-guinea/papua-new-guinea-el-nino-2015-16-7-sep-2015

85 Care. El Niño in 1997-1998: Impacts and CARE's Response. https://reliefweb.int/report/world/el-ni%C3%B1o-1997-1998-impacts-and-cares-response

86 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. Status Report 2019. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

87 WorldData.info. Cyclone in Papua New Guinea. https://www.worlddata.info/oceania/papua-new-guinea/cyclones.php

88 World Bank Group. Climate Risk Country Profile: Papua New Guinea. 2021. https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15871-WB_Papua%20New%20Guinea%20Country%20Profile-WEB.pdf

89 Direct Relief. Papua New Guinea's Rural Communities, Devastated by Disasters, Receive Medical Support. September 2024. https://www.directrelief.org/2024/09/papua-new-guineas-rural-communities-devastated-by-disasters-receive-medical-support/

90 Department of Health, Polio Global Eradication Initiative, UNICEF, WHO. PNG Polio Outbreak Response: First 100 Days. 30 September 2018. https://www.who.int/docs/default-source/wpro---documents/emergency/polio/20181004-polio-100-days.pdf?sfvrsn=2f371529_2

91 OCHA. Papua New Guinea: Polio Outbreak – May 2025. https://reliefweb.int/disaster/ep-2025-000107-png; Department of Health, Polio Global Eradication Initiative, UNICEF, WHO. PNG Polio Outbreak Response: First 100 Days. 30 September 2018. https://www.who.int/docs/default-source/wpro---documents/emergency/polio/20181004-polio-100-days.pdf?sfvrsn=2f371529_2

92 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf

93 World Bank. Climate Risk Country Profile PNG (2021). https://climateknowledgeportal.worldbank.org/sites/default/files/country-profiles/15871-WB_Papua%20New%20Guinea%20Country%20Profile-WEB.pdf

94 UNCT PNG. Common Country Analysis 2024 Update. 3 December 2024. https://reliefweb.int/report/papua-new-guinea/common-country-analysis-2024-update

95 World Resource Institute. Ok Tedi Mine: Unearthing Controversy. Not dated. http://pdf.wri.org/ wr2002_case_oktedi_papua.pdf

96 Business and Human Rights Resource Centre. Papua New Guinea: Chinese-owned Ramu Nickel spills 200,000 litres of toxic slurry into the sea; co.commits to address compensation. Accessed 6 June 2022. https://www.business-humanrights.org/en/latest-news/papuanew-guinea-chinese-owned-ramu-nickel-spills-200000-litres-of-toxic-slurry-into-the-sea-co-commits-to-addresscompensation/

97 Government of Papua New Guinea, National Disaster Centre, Disaster Management Team, and UNDP. 2024 Multi-Hazard Survey: Papua New Guinea. 15 March 2025. https://reliefweb.int/report/papua-new-guinea/report-2024-multi-hazard-survey-papua-new-guinea-issued-15-march-2025

98 Centre for Research on the Epidemiology of Disasters (CRED). Entry Criteria: Minimal Requirements for a Disaster to Be Entered in EM-DAT. Accessed 2 June 2025. https://doc.emdat.be/docs/protocols/entry-criteria/.

99 UNCT PNG. Papua New Guinea: Humanitarian Highlights - Latest Incidents (31 January 2025), https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-humanitarian-highlights-latest-incidents-31-january-2025; IOM. Papua New Guinea: Poroma Local Level Government, Southern Highlands Province, Flash Alert – Floods Rapid Assessment Report, 12 December 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-poroma-local-level-government-southern-highlands-province-flash-alert-floods-rapid-assessment-report-12-december-2024

100 UNCT PNG. Papua New Guinea: Disaster Management Team Humanitarian Update - Humanitarian Situations Monitored in June 2025 (30 June 2025). 30 June 2025. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-disaster-management-team-humanitarian-update-humanitarian-situations-monitored-june-2025-30-june-2025

101 OCHA. Relief Web. Papua New Guinea Drought – Nov 2024. https://reliefweb.int/disaster/dr-2024-000234-png

102 IOM. DTM Aiya Local Level Government, Southern Highlands Province, Papua New Guinea - Round 01 - Flooding and Landslip Rapid Assessment Report | 01-Nov-2024. https://reliefweb.int/report/papua-new-guinea/dtm-aiya-local-level-government-southern-highlands-province-papua-new-guinea-round-01-flooding-and-landslip-rapid-assessment-report-01-nov-2024

103 IOM. Papua New Guinea — Floods Flash Update (13 September 2024). https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-floods-flash-update-13-september-2024

104 Radio New Zealand. Morobe Province: Crucial bridge in Lae collapses due to flooding. 28 August 2024. https://www.rnz.co.nz/international/pacific-news/526378/morobe-province-crucial-bridge-in-lae-collapses-due-to-flooding

105 IFRC. Papua New Guinea Landslide 2024 - DREF Final Report (MDRPG012). https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-landslide-2024-dref-final-report-mdrpg012; Direct Relief. Papua New Guinea's Rural Communities, Devastated by Disasters, Receive Medical Support. 17 September 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guineas-rural-communities-devastated-disasters-receive-medical-support; UNCT PNG. Papua New Guinea: Disaster Management Team Humanitarian Update - Humanitarian Situations Monitored in February 2025 (28 February 2025). https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-disaster-management-team-humanitarian-update-humanitarian-situations-monitored-february-2025-28-february-2025

106 European Commission (ECHO). Papua New Guinea - Landslides and floods (media, PNGMET) (ECHO Daily Flash of 21 March 2024). https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-landslides-and-floods-media-pngmet-echo-daily-flash-21-march-2024

107 Government of Japan. Emergency Assistance to the Independent State of Papua New Guinea in Response to the Damage caused by the Flood and Landslide. 12 April 2024. https://reliefweb.int/report/papua-new-guinea/emergency-assistance-independent-state-papua-new-guinea-response-damage-caused-flood-and-landslide

108 IOM. Papua New Guinea - Situation Report 1: Flash Floods and Landslides in the Highlands Region (Western Highlands, Jiwaka, Chimbu and Eastern Highlands) (25 March 2024). https://dtm.iom.int/reports/papua-new-guinea-situation-report-1-flash-floods-and-landslides-highlands-region-western?close=true

109 IOM. Papua New Guinea: East Sepik Province Displacement Profile, 31 July 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-east-sepik-province-displacement-profile-31-july-2024; OCHA. Asia and the Pacific: Weekly Regional Humanitarian Snapshot (19 - 25 March 2024). 26 March 2024. https://reliefweb.int/report/papua-new-guinea/asia-and-pacific-weekly-regional-humanitarian-snapshot-19-25-march-2024

110 USAID. The US provides immediate emergency assistance to support communities affected by Mount Ulawun volcanic eruptions. https://reliefweb.int/report/papua-new-guinea/united-states-provides-immediate-emergency-assistance-support-communities-affected-mount-ulawun-volcanic-eruptions

111 OCHA. Asia and the Pacific: Weekly Regional Humanitarian Snapshot (3 - 9 October 2023). https://reliefweb.int/report/afghanistan/asia-and-pacific-weekly-regional-humanitarian-snapshot-3-9-october-2023

112 USINDOPACOM Foreign Disaster Response in the Indo-Pacific April 1991 – January 2024, https://www.cfe-dmha.org/LinkClick.aspx?fileticket=MNZLDbxZaic%3d&portalid=0; IOM. Papua New Guinea Crisis Response Plan 2024. 27 March 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-crisis-response-plan-2024

113 UNCT PNG. Papua New Guinea: 7.0M Earthquake – Chambri Lake, East Sepik Province Disaster Management Team Flash Update No. 01, 4 April 2023. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-70m-earthquake-chambri-lake-east-sepik-province-disaster-management-team-flash-update-no-01-4-april-2023

114 UNCT PNG. PNG: 7.6M Markham Valley Earthquake - DMT Flash Update No. 05. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-76m-markham-valley-earthquake-morobe-madang-eastern-highlands-disaster-management-team-flash-update-no-05-16-october-2022

115 OCHA. Asia and the Pacific: Weekly Regional Humanitarian Snapshot (12 - 18 April 2022). https://reliefweb.int/report/philippines/asia-and-pacific-weekly-regional-humanitarian-snapshot-12-18-april-2022; ECHO. Papua New Guinea - Manam volcano eruption (GDACS, UN OCHA, media) (ECHO daily Flash of 20 April 2022). 20 April 2022. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-manam-volcano-eruption-gdacs-un-ocha-media-echo-daily-flash; Email from Richard Higgins, Disaster Management Team Secretariat in PNG, on 29 May 2022

116 Stephanie McLennan and Rachel LaFortune, "Papua New Guinea's Rapid Tides Expose Climate Risks", Human Rights Watch, 20 December 2021, https://www.hrw.org/news/2021/12/20/papua-new-guineas-rapid-tidesexpose-climate-risks

117 Humanitarian Advisory Group. Beyond Barriers: Papua New Guinea Case Study. March 2022. https://humanitarianadvisorygroup.org/wp-content/uploads/2022/03/HAG_WV_Case-Study_PNG-1.pdf

118 Floodlist. Papua New Guinea – Floods hit Morobe province. https://floodlist.com/asia/papua-new-guinea-morobe-province-april-2020; Andrew, Larry. Flooding affects more than 1,000 settlers in Lae. The National. 2 April 2020. https://reliefweb.int/report/papua-new-guinea/flooding-affects-more-1000-settlers-lae

119 "Papua New Guinea: Landslide: 2020/03/21", ADRC, accessed 10 May 2022, https://www.adrc.asia/view_disaster_en.php?NationCode=&Lang=en&Key=2375; ECHO. PNG – Landslide. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-landslide-dg-echo-pngmet-media-echo-daily-flash-23-march

120 Johns Hopkins University of Medicine Coronavirus Resource Center. 3 March 2023. https://coronavirus.jhu.edu/region/papua-new-guinea

121 Papua New Guinea: Mt. Ulawun Volcano – Jun 2019", ReliefWeb, GlideVO-2019-000118-PNG, https://reliefweb.int/disaster/vo-2019-000118-png

122 UNCT PNG. Papua New Guinea: Volcanic Activity - Office of the Resident Coordinator Flash Update No. 4 (As of 05 July 2019). https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-volcanic-activity-office-resident-coordinator-flash-2; IFRC. Papua New Guinea: Volcanoes Eruptions Information bulletin. 29 June 2019. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-volcanoes-eruptions-information-bulletin

123 Papua New Guinea – Manam Volcano Eruption (DG ECHO, UN DMT) (ECHO Daily Flash of 10 December 2018)", ReliefWeb, 10 December 2018, https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-manamvolcano-

eruption-dg-echo-un-dmt-echo-daily-flash-10

124 DFAT. Papua New Guinea - Australia's commitment to strengthening climate and disaster resilience in the Pacific.; UNICEF. One year on after the earthquake in Papua New Guinea. https://www.unicef.org/png/stories/one-year-after-earthquake-papua-new-guinea; OCHA Regional Office Asia Pacific. 2018 Year in Review. January 10, 2019. https://ocharoap.exposure.co/2018-year-in-review; Thomson Reuters Foundation. Violence and landslides block aid access to Papua New Guinea quake victims. 14 April 2018. https://reliefweb.int/report/papua-new-guinea/violence-and-landslides-block-aid-access-papua-new-guinea-quake-victims

125 ReliefWeb. Papua New Guinea: Kadovar Volcano. January 2018. https://reliefweb.int/disaster/vo-2018-000002-png

126 National Disaster Centre. Massive PNG landslide wipes out sleeping village. November 19, 2016. http://pngndc.gov.pg/?p=441

127 OCHA. Asia and the Pacific: Weekly Regional Humanitarian Snapshot (9-15 February 2016). 15 Feb. 2016. https://reliefweb.int/report/philippines/asia-and-pacific-weekly-regional-humanitarian-snapshot-9-15-february-2016; IOM. Papua New Guinea Drought, Floods and Conflict Response Situation Report - 29 February 2016. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-drought-floods-and-conflict-response-situation-report-29

128 ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf; ADPC & UNDRR. Disaster Risk Reduction in Papua New Guinea. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf; UNEP GRID-Geneva and European Commission. Interactive Country Fiches. Papua New Guinea. Climate Change. https://dicf.unepgrid.ch/papua-new-guinea/climate-change

129 IFRC. Pacific: Tropical Cyclone Pam (MDR55001) Emergency Plan of Action Final Report. 4 June 2018. https://reliefweb.int/report/vanuatu/pacific-tropical-cyclone-pam-mdr55001-emergency-plan-action-final-report; CFE-DM. Case Study No. 2. https://www.cfe-dmha.org/LinkClick.aspx?fileticket=LBVaZBnQV00%3d&portalid=0; IFRC. One year on from Tropical Cyclone Pam, Red Cross reaches 44,000 people with humanitarian assistance. 11 March 2016. https://reliefweb.int/report/vanuatu/one-year-tropical-cyclone-pam-red-cross-reaches-44000-people-humanitarian-assistance; Australian Government – DFAT. Papua New Guinea - Australia's commitment to strengthening climate and disaster resilience in the Pacific. https://www.dfat.gov.au/about-us/publications/png-australias-commitment-to-strengthening-climate-and-disaster-resilience-in-the-pacific

130 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

131 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

132 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

133 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

134 IFRC Resilience Library. Papua New Guinea – Legal Preparedness for International Assistance Assessment. Accessed 14 July 2025. https://www.rcrc-resilience-southeastasia.org/disaster-law/international-disaster-response-law-in-the-pacific/country-profiles/papua-new-guinea/

135 IFRC Resilience Library. Papua New Guinea – Legal Preparedness for International Assistance Assessment. Accessed 14 July 2025. https://www.rcrc-resilience-southeastasia.org/disaster-law/international-disaster-response-law-in-the-pacific/country-profiles/papua-new-guinea/

136 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

137 UNDP in PNG. Project Document – Strengthening Disaster Risk Management in Papua New Guinea. 2015. https://info.undp.org/docs/pdc/Documents/PNG/DRM%20Signed%20Revised%20%20PRODOC-%20June%202020.pdf

138 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

139 Chamberlain, Peter. Independent Review of the "Strengthening Disaster Risk Management in Papua New Guinea" Project. January 2019. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiOyIGjmr2OAxXeKEQIHaoSO0IQFnoECBkQAQ&url=https%3A%2F%2Fwww.dfat.gov.au%2Fsites%2Fdefault%2Ffiles%2Fsdrmp-review-report.pdf&usg=AOvVaw3zXopFeOxrSLoGAZg3LiwH&opi=89978449

140 National Disaster Centre. Papua New Guinea national disaster risk reduction framework 2017-2030. 2017. https://www.preventionweb.net/publication/papua-new-guinea-national-disaster-risk-reduction-framework-2017-2030

141 National Disaster Centre. Disaster Risk Management in Papua New Guinea. PPT. Presented 24 June 2025.

142 PNGDF Engineers Disaster Response – Mulitaka Landslide Case Study (May – November 2024). PPT. 25 July 2025.

143 IFRC Resilience Library. Papua New Guinea – Legal Preparedness for International Assistance Assessment. Accessed 14 July 2025. https://www.rcrc-resilience-southeastasia.org/disaster-law/international-disaster-response-law-in-the-pacific/country-profiles/papua-new-guinea/

144 UNDP in PNG. Project Document – Strengthening Disaster Risk Management in Papua New Guinea. 2015. https://info.undp.org/docs/pdc/Documents/PNG/DRM%20Signed%20Revised%20%20PRODOC-%20June%202020.pdf

145 United Nations in Papua New Guinea. IOM, Provincial Disaster Centres Partner to Build Community Resilience to Disasters. 9 March 2022. https://papuanewguinea.un.org/en/175200-iom-provincial-disaster-centres-partner-build-community-resilience-disasters

146 Aisuk, Lt Col Don. PNGDF Brief: HADR Workshop. PPT. 25 June 2025.

147 Australian Army Research Centre. Session 3: Trust and Respect in Regional Partnerships. Speech by Brig-Gen Gilbert Toropo, Commander of the Papua New Guinea Defence Force. 2018. https://researchcentre.army.gov.au/library/australian-army-journal-aaj/volume-14-number-3-army-motion-edition/session-3-trust-and-respect-regional-partnerships

148 Young, Astrid; and Blake Johnson. Friends to all: Papua New Guinea seeks equal status in partnerships. The Strategist; Australian Strategic Policy Institute. 30 July 2025. https://www.aspistrategist.org.au/friends-to-all-papua-new-guinea-seeks-equal-status-in-partnerships/?utm_medium=email&utm_campaign=Daily%20The%20Strategist&utm_content=Daily%20The%20Strategist+CID_f1fe52bebcd66520c91b2ec3d9acd530&utm_source=CampaignMonitor&utm_term=Friends%20to%20all%20Papua%20New%20Guinea%20seeks%20equal%20status%20in%20partnerships

149 Australian Army Research Centre. Session 3: Trust and Respect in Regional Partnerships. Speech by Brig-Gen Gilbert Toropo, Commander of the Papua New Guinea Defence Force. 2018. https://researchcentre.army.gov.au/library/australian-army-journal-aaj/volume-14-number-3-army-motion-edition/session-3-trust-and-respect-regional-partnerships

150 Aisuk, Lt Col Don. PNGDF Brief: HADR Workshop. PPT. 25 June 2025.

151 Young, Astrid; and Blake Johnson. Friends to all: Papua New Guinea seeks equal status in partnerships. The Strategist; Australian Strategic Policy Institute. 30 July 2025. https://www.aspistrategist.org.au/friends-to-all-papua-new-guinea-seeks-equal-status-in-partnerships/?utm_medium=email&utm_campaign=Daily%20The%20Strategist&utm_content=Daily%20The%20Strategist+CID_f1fe52bebcd66520c91b2ec3d9acd530&utm_source=CampaignMonitor&utm_term=Friends%20to%20all%20Papua%20New%20Guinea%20seeks%20equal%20status%20in%20partnerships

152 IFRC Resilience Library. Papua New Guinea – Legal Preparedness for International Assistance Assessment. Accessed 14 July 2025. https://www.rcrc-resilience-southeastasia.org/disaster-law/international-disaster-response-law-in-the-pacific/country-profiles/papua-new-guinea/

153 Aisuk, Lt Col Don. PNGDF Brief: HADR Workshop. PPT. 25 June 2025; and Vogae, Lt Col James. PNGDF JOC HADR Workshop. PPT. 25 June 2025.

154 Vogae, Lt Col James. PNGDF JOC HADR Workshop. PPT. 25 June 2025.

155 PNGDF Engineers Disaster Response – Mulitaka Landslide Case Study (May – November 2024). PPT. 25 July 2025.

156 Defence Cooperation Program: Papua New Guinea. PPT. June 2025.

157 Minister of Foreign Affairs. Papua New Guinea Defence Force lends a hand in our time of need. 13 January 2020. https://www.foreignminister.gov.au/minister/marise-payne/media-release/papua-new-guinea-defence-force-lends-hand-our-time-need

158 Wayne, Hilda; and Rachael Lucas. PNG and Pacific troops thanked for deployment during Australia's bushfire crisis. Australian Broadcasting Corporation. 18 February 2020. https://www.abc.net.au/news/2020-02-19/png-troops-leave-omeo-victoria-after-helping-bushfire-crisis/11970986

159 Mandl, Matthew. The Principles of Logistics During Operation Bushfire Assist 2020. The Cove. 11 April 2020. https://cove.army.gov.au/article/principles-logistics-during-operation-bushfire-assist-2020

160 Pacific Community. Inaugural Pacific Disaster Ministers Meeting begins in Nadi. 14 September 2022. https://www.spc.int/updates/news/media-release/2022/09/inaugural-pacific-disaster-ministers-meeting-begins-in-nadi

161 Pacific Islands Forum. RELEASE: PIF, SPC and UNDRR Establish Strategic Partnership to Strengthen Pacific Disaster Resilience. 5 March 2025. https://forumsec.org/publications/release-pif-spc-and-undrr-establish-strategic-partnership-strengthen-pacific-disaster

162 Pacific Community (SPC), Secretariat of the Pacific Regional Environment Programme (SPREP), Pacific Islands Forum Secretariat (PIFS), United Nations Development Programme (UNDP), United Nations Office for Disaster Risk Reduction (UNISDR) and University of the South Pacific (USP). Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management [FRDP] 2017 – 2030. https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/e7/e72a4f6c285eaa2449cc253aba0cf98a.pdf?sv=2015-12-11&sr=b&sig=Egv92ZgC2xLnABBxFPDc619d6BtID6yAfE3NaQ7mOwY%3D&se=2026-01-17T20%3A23%3A58Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22FRDP_2016_Resilient_Dev_pacific.pdf%22

163 Pacific Islands Forum. Climate Change and Disasters. Accessed 22 July 2025. https://forumsec.org/climate-change-and-disasters

164 Pacific Community. Pacific countries consulted to help strengthen regional approaches to disaster management. 17 April 2020. https://www.spc.int/updates/blog/2020/04/pacific-countries-consulted-to-help-strengthen-regional-approaches-to-disaster

165 PResCoM Technical Advisory Group. Pacific Humanitarian Response Coordination Mechanism. PPT (undated). https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/ab/abccb56475daeac22a2ff925b41e6899.pdf?sv=2015-12-11&sr=b&sig=s9FoNE0xrGVgN62cvYKcKmy0TacQe8vONUgA%2BDR9W%2FM%3D&se=2026-01-18T21%3A43%3A38Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22D1_Agenda_Item_2_PResCoM.pdf%22

166 Defence Australia. South Pacific Defence Ministers' Meeting. 7 December 2023. https://www.minister.defence.gov.au/statements/2023-12-07/south-pacific-defence-ministers-meeting

167 Hiob, Major Ivan. Pacific Response Group. PPT. 25 June 2025.

168 UN in PNG. Annual Results Report 2024. https://papuanewguinea.un.org/en/292214-annual-results-report-2024

169 Email communication from United Nations entities in PNG on 17 August 2025.

170 International Organization for Migration in PNG. Humanitarian Action and Resilience Building. PPT. June 2025.

171 Email communication from Pepter Murorera, IOM, on 20 August 2025.

172 UN in PNG. Common Country Analysis 2024 Update. 3 December 2024. https://papuanewguinea.un.org/en/284948-common-country-analysis-2024-update

173 IOM. Papua New Guinea Crisis Response Plan 2024. 8 May 2024. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-crisis-response-plan-2024

174 System-wide Humanitarian Coordination. PPT at CFE-DM DM Workshop, 24 June 2025.

175 System-wide Humanitarian Coordination. PPT at CFE-DM DM Workshop, 24 June 2025.

176 Government of Papua New Guinea, National Disaster Centre, Disaster Management Team, and UNDP. 2024 Multi-Hazard Survey: Papua New Guinea. 15 March 2025. https://reliefweb.int/report/papua-new-guinea/report-2024-multi-hazard-survey-papua-new-guinea-issued-15-march-2025

177 System-wide Humanitarian Coordination. PPT at CFE-DM DM Workshop, 24 June 2025; Wynn, Darren (Australia Assists); and the NDC, 2025.

178 System-wide Humanitarian Coordination. PPT at CFE-DM DM Workshop, 24 June 2025.

179 International Committee of the Red Cross (ICRC). The Movement. Accessed 23 March 2020. https://www.icrc.org/en/movement#:~:text=The%20International%20Red%20Cross%20and,armed%20conflicts%20and%20other%20emergencies.

180 International Committee of the Red Cross. Papua New Guinea Operational Facts and Figures (January – December 2024). https://www.icrc.org/sites/default/files/2025-03/ICRC_Papua_New_Guinea_Operational_Facts_and_Figures_2024.pdf

181 IFRC. Papua New Guinea: 2025-2027 IFRC network country plan. 22 April 2025. https://www.ifrc.org/ifrc-network-country-plans?location%5B%5D=6448&search_terms=&search_terms=

182 Email communication from IFRC Asia-Pacific Regional Office on 17 August 2025.

183 IFRC. Papua New Guinea: 2025-2027 IFRC network country plan. 22 April 2025. https://www.ifrc.org/ifrc-network-country-plans?location%5B%5D=6448&search_terms=&search_terms=

184 Humanitarian Advisory Group, GLOW Consultants, InSights, San May Thu, and Shedrick Singip. Localisation in Protracted Crises and Fragile Settings. February 2024. https://humanitarianadvisorygroup.org/insight/localisation-in-protracted-crises-and-fragile-settings/

185 IFRC. Papua New Guinea: 2025-2027 IFRC network country plan. 22 April 2025. https://www.ifrc.org/ifrc-network-country-plans?location%5B%5D=6448&search_terms=&search_terms=

186 Philemon, Janet; Gellie Akui and Maki Igarashi. PNG Red Cross Society & IFRC: Principled Humanitarian Action in Disaster Response. PPT. June 2025.

187 IFRC. Papua New Guinea: 2025-2027 IFRC network country plan. 22 April 2025. https://www.ifrc.org/ifrc-network-country-plans?location%5B%5D=6448&search_terms=&search_terms=

188 MAF. Papua New Guinea. Accessed 22 July 2025. https://papuanewguinea.mafint.org/

189 MAF. MAF in PNG Statistics. Accessed 22 July 2025. https://papuanewguinea.mafint.org/maf-papua-new-guinea/png-facts

190 Papua New Guinea Council of Churches. Church Partnership Program. Accessed 22 July 2025. https://pngcc.org.pg/migration-and-multicultural-ministry/

191 Australian Department of Foreign Affairs and Trade. Church Partnership Program – Phase 4. 17 May 2022. https://www.dfat.gov.au/sites/default/files/church-partnership-program-phase-4.pdf

192 Australian Humanitarian Partnership. About. Accessed 28 July 2025. https://australianhumanitarianpartnership.org/about

193 UNDP Pacific Centre. Bougainville Peace Agreement: the Burnham I and II Dialogues. 29 October 2015. https://www.undp.org/sites/g/files/zskgke326/files/migration/asia_pacific_rbap/PC_Bougainville_PA.pdf

194 Bougainville Referendum Commission. Referendum Result. Accessed 15 July 2025. https://bougainville-referendum.org/index.html

195 Global Volcanism Program. Bagana. Smithsonian Institution; National Museum of Natural History. Accessed 11 July 2025. https://volcano.si.edu/volcano.cfm?vn=255020

196 Rabaul Volcanic Observatory. Volcano Alert Stages. February 2022. https://webdev.datec.net.pg/geohazards/wp-content/uploads/2022/02/Volcano-Alert-Stages.pdf

197 Australian Humanitarian Partnership. Disaster READY Annual Report 2022-23 Papua New Guinea. https://australianhumanitarianpartnership.org/ahp-and-disaster-ready-annual-reports/ahp-2022-23-annual-report-cayn6-lnxhr-x6fs6

198 Autonomous Bougainville Government. Mt Bagana Update (as at July 17, 2023). News and Public Notices. https://abg.gov.pg/index.php?/news/read/mt-bagana-update-as-at-july-17-2023

199 Displacement Tracking Matrix of the International Organization for Migration. Papua New Guinea — Mount Bagana Site Profile — Wakunai and Torokina #1 (July 2023). 30 July 2023. https://dtm.iom.int/fr/node/27096

200 Email communication from Darren Wynn on 17 August 2025.

201 Displacement Tracking Matrix of the International Organization for Migration. Papua New Guinea — Mount Bagana Site Profile — Wakunai and Torokina #1 (July 2023). 30 July 2023. https://dtm.iom.int/fr/node/27096

202 United Nations Development Programme. UNDP helps Bougainville recover from Mt. Bagana eruption. 19 September 2023. https://www.undp.org/papua-new-guinea/stories/undp-helps-bougainville-recover-mt-bagana-eruption

203 United Nations, Papua New Guinea. 2023 UN Annual Results Report: Papua New Guinea. 30 March 2024. https://papuanewguinea.un.org/en/264757-annual-results-report-2023

204 United Nations, Papua New Guinea. Papua New Guinea: Mt. Bagana Volcano Eruption, Autonomous Region of Bougainville - Disaster Management Team Flash Update No. 1, 14 August 2023. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-mt-bagana-volcano-eruption-autonomous-region-bougainville-disaster-management-team-flash-update-no-1-14-august-2023

205 Email communication from Darren Wynn on 17 August 2025.

206 Personal communication from Darren Wynn, Australia Assists Logistics Officer on 14 July 2025.

207 United Nations, Papua New Guinea. Papua New Guinea: Mt. Bagana Volcano Eruption, Autonomous Region of Bougainville - Disaster Management Team Flash Update No. 1, 14 August 2023. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-mt-bagana-volcano-eruption-autonomous-region-bougainville-disaster-management-team-flash-update-no-1-14-august-2023

208 Autonomous Bougainville Government. Mt Bagana Update (as at July 17, 2023). News and Public Notices. https://abg.gov.pg/index.php?/news/read/mt-bagana-update-as-at-july-17-2023

209 United Nations, Papua New Guinea. Mt. Bagana (AROB) on World Humanitarian Day - UN Resident Coordinator, Mr. Richard Howard. 18 August 2023. https://papuanewguinea.un.org/en/242713-mt-bagana-arob-world-humanitarian-day-un-resident-coordinator-mr-richard-howard

210 Personal communication from Darren Wynn, Australia Assists Logistics Officer on 14 July 2025.

211 Personal communication from Darren Wynn, Australia Assists Logistics Officer on 14 July 2025.

212 New Zealand Defence Force. New Zealand sends aid to autonomous region of Bougainville after eruption. 11 August 2023. https://www.nzdf.mil.nz/media-centre/news/new-zealand/

213 Kenneth, Gorethy. Aussies donate to Bougainville. Post-Courrier. 14 August 2023. https://www.postcourier.com.pg/aussies-donate-to-bougainville/

214 Australian Humanitarian Partnership. Disaster READY Annual Report 2022-23 Papua New Guinea. https://australianhumanitarianpartnership.org/ahp-and-disaster-ready-annual-reports/ahp-2022-23-annual-report-cayn6-lnxhr-x6fs6

215 CFE-DM. "Response to the Eruption of the Mt. Bagana Volcano Papua New Guinea – August 2023," Module for the Humanitarian Assistance Response Training – Disasters (HART-D). January 2025.

216 USAID. Papua New Guinea: Declaration of Humanitarian Need (DHN) – Volcanic Activity. From the CFE-DM. "Response to the Eruption of the Mt. Bagana Volcano Papua New Guinea – August 2023," Module for the Humanitarian Assistance Response Training – Disasters (HART-D). January 2025.

217 CFE-DM. "Response to the Eruption of the Mt. Bagana Volcano Papua New Guinea – August 2023," Module for the Humanitarian Assistance Response Training – Disasters (HART-D). January 2025.

218 Lawrence. Drew F. Marines Tapped to Aid Papua New Guinea in Wake of Volcanic Activity. Military.com. 9 August 2023. https://www.military.com/daily-news/2023/08/09/marines-tapped-aid-papua-new-guinea-wake-of-volcanic-activity.html

219 CFE-DM. "Response to the Eruption of the Mt. Bagana Volcano Papua New Guinea – August 2023," Module for the Humanitarian Assistance Response Training – Disasters (HART-D). January 2025.

220 Mahadzir, Dzirhan. USS America, Embarked 31st MEU Elements in Papua New Guinea for Humanitarian Efforts. USNI News. 14 August 2023. https://news.usni.org/2023/08/14/uss-america-embarked-31st-meu-elements-in-papua-new-guinea-for-humanitarian-efforts

221 SOFX. Marine 31st Expeditionary Unit Navigated Ash-Filled Skies and Dodged Typhoons During Humanitarian Mission. 7 January 2024. https://www.sofx.com/challenges-of-the-31st-marine-expeditionary-unit-in-bougainville-relief-mission/

222 CFE-DM. “Response to the Eruption of the Mt. Bagana Volcano Papua New Guinea – August 2023,” Module for the Humanitarian Assistance Response Training – Disasters (HART-D). January 2025.

223 Heins, Gunnery Sgt. J.R. 31st MEU: Supports Humanitarian Efforts in Pap New guinea [Image 14 of 16]. 31st Marine Expeditionary Unit; DVIDS. 12 August 2023. https://www.dvidshub.net/image/7969139/31st-meu-supports-humanitarian-efforts-papa-new-guinea

224 Personal communication from Darren Wynn, Australia Assists Logistics Officer on 14 July 2025.

225 Personal communication from Darren Wynn, Australia Assists Logistics Officer on 14 July 2025.

226 CIA. The World Factbook (2023 Archive). Airports – with paved runways. https://www.cia.gov/the-world-factbook/about/archives/2023/field/airports-with-paved-runways/

227 The National. Rural Airstrip Agency partners with Govt to maintain airstrips. 24 Jan 2023. https://www.thenational.com.pg/rural-airstrip-agency-partners-with-govt-to-maintain-airstrips/; The National. 500 rural airstrips prioritized. 1 Dec 2023. https://www.thenational.com.pg/500-rural-airstrips-prioritised/

228 Airport Technology. Port Moresby Jacksons International Airport. 8 May 2013. https://www.airport-technology.com/projects/port-moresby-jacksons-international-airport/

229 The National. Rural Airstrip Agency partners with Govt to maintain airstrips. 24 Jan 2023. https://www.thenational.com.pg/rural-airstrip-agency-partners-with-govt-to-maintain-airstrips/; The National. 500 rural airstrips prioritized. 1 Dec 2023. https://www.thenational.com.pg/500-rural-airstrips-prioritised/

230 Universal Weather & Aviation, Inc. AYVN VAI. Accessed 16 July 2025. https://www.universalweather.com/airports/AYVN-VAI-VANIMO-AIRPORT-VANIMO-SANDAUN-PAPUA-NEW-GUINEA/; AC-U-KWIK. AYVN – Vanimo. Accessed 16 July 2025. https://acukwik.com/Airport-Info/AYVN; OurAirports. Airports in Papua New Guinea. https://ourairports.com/countries/PG/airports.html; Metar-TAF. Papua New Guinea. Accessed 5 August 2025. https://metar-taf.com/airport/AUP-agaun-airport; AC-U-KWIK. AYVN – Vanimo. Accessed 16 July 2025. https://acukwik.com/Airport-Info/AYVN

231 Independent Consumer and Competition Commission. Coastal Shipping Industry Review. June 2024. https://iccc.gov.pg/wp-content/uploads/2024/06/Coastal-Shipping-Final-Report-June-2024-.pdf

232 PNG Ports. Who we Are. Accessed 21 July 2025. https://www.pngports.com.pg/index.php/about/who-we-are#:~:text=PNG%20Ports%20serves%20the%20nation’s%20needs%20for,as%20the%20primary%20national%20port%20facilities%20provider.

233 PNG Ports Corporation Limited. (2025). Who We Are. https://www.pngports.com.pg/index.php/about/who-we-are; International Association of Ports and Harbors. PNG Ports Corporation Ltd. Accessed 18 July 2025. https://www.iaphworldports.org/memberports/png-ports-corporation-ltd/

234 LCA. Papua New Guinea Port Assessment. Accessed 18 July 2025. https://www.lca.logcluster.org/21-papua-new-guinea-port-assessment#:~:text=6%20out%20of%2016%20ports%20are%20able,Lorengau%2C%20Oro%20Bay%2C%20Samarai%2C%20Wewak%2C%20and%20Vanimo. ; Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/; National Statistical Office Papua New Guinea. (2023). International Merchandise and Trade. https://www.nso.gov.pg/statistics/economy/international-merchandise-and-trade/

235 International Container Terminal Services, Inc. ICTSI delivers PNG’s first STS cranes. 5 Dec 2022. https://www.ictsi.com/press-releases/ictsi-delivers-pngs-first-sts-cranes

236 International Container Terminal Services, Inc. ICTSI tranforms PNG ports into high-performing trade gateways. 29 June 2020. https://www.ictsi.com/press-releases/ictsi-transforms-png-ports-high-performing-trade-gateways; International Container Terminal Services, Inc. Motukea International Terminal Ltd. Accessed 8 Aug 2025. https://www.ictsi.com/our-offering/our-terminals/motukea-international-terminal-ltd

237 Logistics Cluster LCA.2.1 Papua New Guinea Port Assessment. Accessed 8 Aug 2025. https://lca.logcluster.org/print-preview/5426; PNG Ports Corporation. PNG’s ports ranked among the best in the world. 30 Sept 2024. https://pngports.com.pg/index.php/component/content/article/pngs-ports-ranked-among-the-best-in-the-world?Itemid=101&catid=9

238 LCA. Papua New Guinea Port Assessment. Accessed 18 July 2025. https://www.lca.logcluster.org/21-papua-new-guinea-port-assessment#:~:text=6%20out%20of%2016%20ports%20are%20able,Lorengau%2C%20Oro%20Bay%2C%20Samarai%2C%20Wewak%2C%20and%20Vanimo.

239 LCA. Papua New Guinea Port Assessment. Accessed 18 July 2025. https://www.lca.logcluster.org/21-papua-new-guinea-port-assessment#:~:text=6%20out%20of%2016%20ports%20are%20able,Lorengau%2C%20Oro%20Bay%2C%20Samarai%2C%20Wewak%2C%20and%20Vanimo.

240 U.S. Department of Defense. 22 May 2023. Secretary of Defense Lloyd J. Austin III Statement on U.S.-Papua New Guinea Defense Cooperation Agreement. https://www.defense.gov/News/Releases/Release/Article/3403683/secretary-of-defense-lloyd-j-austin-iii-statement-on-us-papua-new-guinea-defens/

241 Pearl, Harry. RNZ. BenarNews. 11 Dec 2024. PNG reveals defense deal with US worth US$864m. https://www.rnz.co.nz/international/pacific-news/536364/png-reveals-defense-deal-with-us-worth-us-864m

242 Australian Infrastructure Financing Facility for the Pacific. Upgrading ports across Papua New Guinea. Accessed on 18 July 2025. https://www.aiffp.gov.au/investments/investment-list/upgrading-ports-across-papua-new-guinea

243 APAC Tenders. 25 Feb 2025. Government Focuses on Improving PNG’s Infrastructure Development in 2025. https://apactenders.com/government-focuses-on-improving-pngs-infrastructure-development-in-2025/ ; The National. The case of Connect PNG: What will roads lead to? 11 June 2025. https://www.thenational.com.pg/the-case-of-connect-png-what-will-roads-lead-to/; The National. Programme to transform PNG. 19 Feb. 2024. https://www.thenational.com.pg/programme-to-transform-png/

244 Digital Logistics Capacity Assessments. 2.1.1 Papua New Guinea Port of Lae. Accessed on 18 July 2025. https://lca.logcluster.org/211-papua-new-guinea-port-lae; Digital Logistics Capacity Assessments. 2.1.2 Papua New Guinea

Port of Port Moresby. Accessed on 18 July 2025. https://lca.logcluster.org/212-papua-new-guinea-port-port-moresby; Australian Department of Foreign Affairs and Trade. 15 Feb 2024. Supporting Papua New Guinea's maritime infrastructure growth. https://www.foreignminister.gov.au/minister/penny-wong/media-release/supporting-papua-new-guineas-maritime-infrastructure-growth; Australian Infrastructure Financing Facility for the Pacific. Upgrading ports across Papua New Guinea. Accessed on 18 July 2025. https://www.aiffp.gov.au/investments/investment-list/upgrading-ports-across-papua-new-guinea; PNG Ports Corporation Limited. Madang Port. Accessed on 18 July 2025. https://pngports.com.pg/index.php?option=com_sppagebuilder&view=page&id=52; Digital Logistics Capacity Assessments. 2.1 Papua New Guinea Port Assessment. Accessed on 18 July 2025. https://lca.logcluster.org/21-papua-new-guinea-port-assessment

245 Indo-Pacific Defense Forum. 24 April 2025. Naval base modernization highlights growing Australia-PNG-U.S. defense cooperation. https://ipdefenseforum.com/2025/04/naval-base-modernization-highlights-growing-australia-png-u-s-defense-cooperation/

246 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

247 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

248 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

249 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

250 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

251 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

252 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

253 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/; Australian Infrastructure Financing Facility for the Pacific. Upgrading ports across Papua New Guinea. Accessed on 18 July 2025. https://www.aiffp.gov.au/investments/investment-list/upgrading-ports-across-papua-new-guinea

254 Digital Logistics Capacity Assessments. 2.1 Papua New Guinea Port Assessment. Accessed on 18 July 2025. https://lca.logcluster.org/21-papua-new-guinea-port-assessment

255 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

256 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

257 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/

258 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/; Australian Infrastructure Financing Facility for the Pacific. Upgrading ports across Papua New Guinea. Accessed on 18 July 2025. https://www.aiffp.gov.au/investments/investment-list/upgrading-ports-across-papua-new-guinea

259 Business Advantage PNG. 10 Oct 2019. Ports and shipping in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/ports-and-shipping-in-papua-new-guinea-a-sector-profile/; Australian Infrastructure Financing Facility for the Pacific. Upgrading ports across Papua New Guinea. Accessed on 18 July 2025. https://www.aiffp.gov.au/investments/investment-list/upgrading-ports-across-papua-new-guinea

260 Department of Works and Highways – Corporate Plan 2025-2029. Uploaded 17 Dec 2024. https://works.gov.pg/pages/138

261 The World Bank. Road Transport Electricity and Water and Sanitation Services in East Asia South Asia and The Pacific Islands. https://documents1.worldbank.org/curated/en/742271595404096928/pdf/Road-Transport-Electricity-and-Water-and-Sanitation-Services-in-East-Asia-South-Asia-and-the-Pacific-Islands.pdf

262 Lawrence, Craig. Infrastructure Challenges for Papua New Guinea. Lowry Institute. 6 Dec 2017. https://interactives.lowyinstitute.org/archive/png-in-2017/png-in-2017-infrastructure-challenges-for-papua-new-guineas-future.html

263 Business Advantage PNG. 28 Nov 2019. Road infrastructure in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/road-infrastructure-in-papua-new-guinea-a-sector-profile/

264 Business Advantage PNG. 28 Nov 2019. Road infrastructure in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/road-infrastructure-in-papua-new-guinea-a-sector-profile/

265 World Bank Climate Change Knowledge Portal. Accessed 21 July 2025. Papua New Guinea - Vulnerability. https://climateknowledgeportal.worldbank.org/country/papua-new-guinea/vulnerability

266 Digital Logistics Capacity Assessments. Accessed 21 July 2024. Papua New Guinea Road Assessment. https://lca.logcluster.org/23-papua-new-guinea-road-assessment

267 Business Advantage PNG. 28 Nov. 2019. Road infrastructure in Papua New Guinea: a sector profile. https://www.businessadvantagepng.com/road-infrastructure-in-papua-new-guinea-a-sector-profile/

268 PNG Department of Works. 13 Dec 2024. Rehabilitation and Maintenance of Roads. https://works.gov.pg/pages/23

269 Kwon, Jake. CNN. 11 Sept. 2022. Papua New Guinea rocked by massive 7.6 earthquake. https://www.cnn.com/2022/09/10/asia/earthquake-papua-new-guinea/index.html ; WHO. Papua New Guinea earthquake. Accessed 21 July 2025. https://www.who.int/westernpacific/emergencies/papua-new-guinea-earthquake

270 ReliefWeb. (2024). Papua New Guinea: Landslide - May 2024. https://reliefweb.int/disaster/ls-2024-000080-png ; NPR. 28 May 2024. Fears rise of another landslide and spread of disease in Papua New Guinea. https://www.npr.org/2024/05/28/nx-s1-4983566/papua-new-guinea-landslide-latest

271 Digital Logistics Capacity Assessments. Accessed 21 July 2025. Papua New Guinea Road Assessment. https://lca.logcluster.org/23-papua-new-guinea-road-assessment

272 Global Infrastructure Hub. Accessed 21 July 2025. Papua New Guinea. Supported by the World Bank. https://infracompass.gihub.org/ind_country_profile/png/

273 Railway Gazette International. (2023). Accessed 21 July 2025. Papua New Guinea railway proposal. https://www.railwaygazette.com/infrastructure/papua-new-guinea-railway-proposal/63352.article

274 WorldData.info Country Comparison Papua New Guinea vs. USA. https://www.worlddata.info/country-comparison.php?country1=PNG&country2=USA; CIA. The World Factbook. (2011). https://www.cia.gov/the-world-factbook/about/archives/2021/field/waterways/

275 International Hydrographic Review. (n.d.). The Fly River: Navigation and Development. Retrieved from https://journals.lib.unb.ca/index.php/ihr/article/viewFile/23449/27224

276 Lawrence, C. (2017). Infrastructure Challenges For Papua New Guina's Future. Lowy Institute. https://interactives.lowyinstitute.org/archive/png-in-2017/downloads/Lawrence_Infrastructure.pdf; CIA World Factbook. (2021). Papua New Guinea - Waterways. Retrieved from https://www.cia.gov/the-world-factbook/countries/papua-new-guinea/#transportation

277 Samaritan Aviation. Where Hope Takes Flight. Accessed 21 July 2025. https://samaritanaviation.org/; Yanei, M. The National (Papua New Guinea). 11 June 2025. Canal opens up access for ESP villagers. https://www.thenational.com.pg/canal-opens-up-access-for-esp-villagers/

278 Britannica. Sepik River. Accessed 23 July 2025. https://www.britannica.com/place/Sepik-River

279 UNDP and the Climate Change and Development Authority. AN ASSESSMENT OF EARLY WARNING SYSTEMS FOR INLAND AND COASTAL FLOODING IN PAPUA NEW GUINEA (PNG/AF/EWS/2014) FINAL REPORT – ROADMAP FOR IMPLEMENTATION OF FLOOD EARLY WARNING SYSTEMS. https://info.undp.org/docs/pdc/Documents/PNG/Roadmap%20for%20Early%20Warning%20System%20%20Implementation.pdf

280 NIWA. Solutions: Early warning of PNG floods. 16 October 2018. https://niwa.co.nz/news/solutions-early-warning-png-floods

281 Chamberlain, Peter. Independent Review of the "Strengthening Disaster Risk Management in Papua New Guinea" Project. January 2019. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiOyIGjmr2OAxXeKEQIHaoSO0IQFnoECBkQAQ&url=https%3A%2F%2Fwww.dfat.gov.au%2Fsites%2Fdefault%2Ffiles%2Fsdrmp-review-report.pdf&usg=AOvVaw3zXopFeOxrSLoGAZg3LiwH&opi=89978449

282 RIMES. RIMES Sub-Regional hubs. Accessed 30 July 2025. https://rimes.int/node/1029

283 Pacific Community. SPC's Disaster Resilience Program launches in Papua New Guinea. 5 May 2025. https://www.spc.int/updates/news/media-release/2025/05/spcs-disaster-resilience-program-launches-in-papua-new-guinea

284 UN Systematic Observation Financing Facility. GBON National Contribution Plan of Papua New Guinea. World Meteorological Organization. 07 May 2024. https://www.un-soff.org/wp-content/uploads/2024/12/PNG_GBON-National-Contribution-Plan.pdf

285 DEVEX. PNG National Weather Service. Accessed 24 July 2025. https://www.devex.com/organizations/png-national-weather-service-135103

286 UN Systematic Observation Financing Facility. GBON National Contribution Plan of Papua New Guinea. World Meteorological Organization. 07 May 2024. https://www.un-soff.org/wp-content/uploads/2024/12/PNG_GBON-National-Contribution-Plan.pdf

287 Maiha, Samuel. Papua New Guinea Meteorological Service Country Report: Reporting on National Priority Actions of the Pacific Islands Meteorological Strategy (PIMS) 2017-2025). PPT. PMC-5 Meeting in Apia, Samoa, 7-9 August 2019. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.pacificmet.net%2Fsites%2Fdefault%2Ffiles%2Finline-files%2Fdocuments%2F10.12%2520Papua%2520New%2520Guinea%2520%2520PMC-5%2520Country%2520Reports.docx&wdOrigin=BROWSELINK

288 UN Systematic Observation Financing Facility. GBON National Contribution Plan of Papua New Guinea. World Meteorological Organization. 07 May 2024. https://www.un-soff.org/wp-content/uploads/2024/12/PNG_GBON-National-Contribution-Plan.pdf

289 PNG National Research Institute. Managing Geological Hazards in PNG. 2023. https://pngnri.org/images/2023/DMPGM.pdf

290 Anda, Dr. Ingvar. Technical Disaster Risk Reduction Program in PNG – Evaluation Report. November 2022. https://www.dfat.gov.au/publications/development/technical-disaster-risk-reduction-program-png-evaluation-report

291 World Conference on Disaster Risk Reduction. Rabaul Volcanological Observatory – Sasakawa Prize Candidate Information. 2015. https://www.wcdrr.org/sasakawa/nominees/3907.html

292 Geoscience Australia. An investigation of international of volcano monitoring techniques: to provide an evidence base for future support of the Rabaul Volcano Observatory by the Australian Government. 2018. https://frontiersi.com.au/wp-content/uploads/2019/02/FrontierSI-Investigation-of-International-Volcano-Monitoring-Report.pdf

293 World Conference on Disaster Risk Reduction. Rabaul Volcanological Observatory – Sasakawa Prize Candidate Information. 2015. https://www.wcdrr.org/sasakawa/nominees/3907.html

294 World Conference on Disaster Risk Reduction. UN Sasakawa Award Nominees – Rabaul Volcanological Observatory, Papua New Guinea. 2015. https://www.preventionweb.net/files/workspace/37131_candidateinformation%5B8%5D.pdf

295 Geoscience Australia. An investigation of international of volcano monitoring techniques: to provide an evidence base for future support of the Rabaul Volcano Observatory by the Australian Government. 2018. https://frontiersi.com.au/wp-content/uploads/2019/02/FrontierSI-Investigation-of-International-Volcano-Monitoring-Report.pdf

296 World Conference on Disaster Risk Reduction. UN Sasakawa Award Nominees – Rabaul Volcanological Observatory, Papua New Guinea. 2015. https://www.preventionweb.net/files/workspace/37131_candidateinformation%5B8%5D.pdf

297 Geoscience Australia. An investigation of international of volcano monitoring techniques: to provide an evidence base for future support of the Rabaul Volcano Observatory by the Australian Government. 2018. https://frontiersi.com.au/wp-content/uploads/2019/02/FrontierSI-Investigation-of-International-Volcano-Monitoring-Report.pdf

298 U.S. INDOPACOM. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana Volcanic Eruptions. 11 August 2023. https://www.pacom.mil/Media/News/News-Article-View/Article/3491472/the-united-states-provides-immediate-emergency-assistance-to-support-communitie/

299 Geoscience Australia. An investigation of international of volcano monitoring techniques: to provide an evidence base for future support of the Rabaul Volcano Observatory by the Australian Government. 2018. https://frontiersi.com.au/wp-content/uploads/2019/02/FrontierSI-Investigation-of-International-Volcano-Monitoring-Report.pdf

300 Kentuo, Norris Kisa. Seismic Observation Network and Seismicity of Papua New Guinea. (n.d.). https://iisee.kenken.go.jp/net/shiva/update/PNG_Norris_14_15G.pdf

301 Anda, Dr. Ingvar. Technical Disaster Risk Reduction Program in PNG – Evaluation Report. November 2022. https://www.dfat.gov.au/publications/development/technical-disaster-risk-reduction-program-png-evaluation-report

302 UNDP and the Climate Change and Development Authority. AN ASSESSMENT OF EARLY WARNING SYSTEMS FOR INLAND AND COASTAL FLOODING IN PAPUA NEW GUINEA (PNG/AF/EWS/2014) FINAL REPORT – ROADMAP FOR IMPLEMENTATION OF FLOOD EARLY WARNING SYSTEMS. https://info.undp.org/docs/pdc/Documents/PNG/Roadmap%20for%20Early%20Warning%20System%20%20Implementation.pdf

303 Shlezinger, Nadav Shemer. Business Advantage. Telecommunications rollout speeds up. 7 May 2025. https://www.businessadvantagepng.com/telecommunications-rollout-speeds-up/#:~:text=PNG's%20mobile%20operators%20have%20made,sources%20tell%20Business%20Advantage%20PNG.

304 Kemp, Simon. DataReportal. Digital 2025: Papua New Guinea. 3 March 2025. https://datareportal.com/reports/digital-2025-papua-new-guinea#:~:text=A%20total%20of%205.03%20million,percent%20of%20the%20total%20population; GlobeNewswire by Notified. Papua New Guinea - Telecoms, Mobile and Broadband - Statistics and Analyses

TPG Telecom begins work to upgrade the PPC-1 cable to 12Tb/s. 7 Oct. 2021. https://www.globenewswire.com/news-release/2021/10/07/2310534/0/en/Papua-New-Guinea-Telecoms-Mobile-and-Broadband-Statistics-and-Analyses.html

305 Kemp, Simon. DataReportal. Digital 2025: Papua New Guinea. 3 March 2025. https://datareportal.com/reports/digital-2025-papua-new-guinea#:~:text=A%20total%20of%205.03%20million,percent%20of%20the%20total%20population.; Kepios. Making Sense of Digital Trends. https://kepios.com/?utm_source=DataReportal&utm_medium=Country_Article_Hyperlink&utm_campaign=Digital_2025&utm_term=Papua_New_Guinea&utm_content=Kepios_Link

306 World Bank Group. (2025). Mobile cellular subscriptions (per 100 people) – Papua New Guinea. https://data.worldbank.org/indicator/IT.CEL.SETS.P2?locations=PG; Kemp, Simon. DataReportal. Digital 2025: Papua New Guinea. 3 March 2025. https://datareportal.com/reports/digital-2025-papua-new-guinea#:~:text=A%20total%20of%205.03%20million,percent%20of%20the%20total%20population.; GSMA Intelligence. Accessed 23 July 2025. https://www.gsmaintelligence.com/?utm_source=kepios&utm_medium=partner

307 Kemp, Simon. DataReportal. Digital 2025: Papua New Guinea. 3 March 2025. https://datareportal.com/reports/digital-2025-papua-new-guinea#:~:text=A%20total%20of%205.03%20million,percent%20of%20the%20total%20population.

308 World Bank Group (2025). Fixed telephone subscriptions (per 100 people). Accessed 1 Aug 2025. https://data.worldbank.org/indicator/IT.MLT.MAIN.P2

309 World Bank Group. (2025). Mobile cellular subscriptions (per 100 people) – Papua New Guinea. https://data.worldbank.org/indicator/IT.CEL.SETS.P2?locations=PG

310 Shlezinger, Nadav Shemer. Business Advantage. Telecommunications rollout speeds up. 7 May 2025. https://www.businessadvantagepng.com/telecommunications-rollout-speeds-up/#:~:text=PNG's%20mobile%20operators%20have%20made,sources%20tell%20Business%20Advantage%20PNG.

311 Shlezinger, Nadav Shemer. Business Advantage. Telecommunications rollout speeds up. 7 May 2025. https://www.businessadvantagepng.com/telecommunications-rollout-speeds-up/#:~:text=PNG's%20mobile%20operators%20have%20made,sources%20tell%20Business%20Advantage%20PNG.

312 Lancaster, Henry. BuddeComm. Papua New Guinea Telecoms Market Report. July 2025. https://www.budde.com.au/Research/Papua-New-Guinea-Telecoms-Mobile-and-Broadband-Statistics-and-Analyses#:~:text=Infrastructure%20deployment%20costs%20are%20high,of%20services%20for%20end%2Dusers.

313 OnePNG. PNG Telecom Sector Grows, But Land Disputes Threaten Sustainability. 29 June 2025. https://www.onepng.com/2025/06/png-telecom-sector-grows-but-land.html

314 ICT PNG. (2024). National Media Development Policy 2024. https://www.ict.gov.pg/wp-content/uploads/2024/12/NMDP-2024-NEC-Approved-Clean-011124-2-1.pdf; ABC. PNG Citizen Media Engagement Study. 30 Nov 2023. https://www.abc.net.au/abc-international-development/citizen-media-engagement-study-2023/103176554

315 PNG Post-Courier. Media in PNG. 1 July 2025. https://www.postcourier.com.pg/media-in-png/

316 Reporters Without Borders (RSF). Accessed 1 August 2025. Papua New Guinea Press Freedom Profile. https://rsf.org/en/country/papua-new-guinea

317 DataReportal. (2025). Digital 2025: Papua New Guinea. https://datareportal.com/reports/digital-2025-papua-new-guinea

318 DataReportal. (2025). Digital 2025: Papua New Guinea. https://datareportal.com/reports/digital-2025-papua-new-guinea

319 Reporters Without Borders (RSF). Accessed 1 August 2025. Papua New Guinea Press Freedom Profile. https://rsf.org/en/country/papua-new-guinea; Lyons, Kate. The Guardian. 16 June 2025. Pacific faces 'critical moment' in fight for press freedom. https://www.theguardian.com/world/2025/jun/17/pacific-faces-critical-moment-in-fight-for-press-freedom-media-watchdog-warns-ntwnfb

320 The Australian. 27 March 2025. Australia should hold its nerve against Facebook, Rod Sims says. https://www.theaustralian.com.au/business/technology/australia-should-hold-its-nerve-against-facebook-rod-sims-says/news-story/1d59c53963c8220612c79b0966ff3053

321 Lyons, Kate. The Guardian. 16 June 2025. Pacific faces 'critical moment' in fight for press freedom. https://www.theguardian.com/world/2025/jun/17/pacific-faces-critical-moment-in-fight-for-press-freedom-media-watchdog-warns-ntwnfb

322 Lyons, Kate. The Guardian. 16 June 2025. Pacific faces 'critical moment' in fight for press freedom. https://www.theguardian.com/world/2025/jun/17/pacific-faces-critical-moment-in-fight-for-press-freedom-media-watchdog-warns-ntwnfb

323 Davies, Martin; and Christian Lohberger. Electrifying PNG: challenges and opportunities for decentralized solar. DevPolicy Blog. 16 May 2025. https://devpolicy.org/electrifying-png-challenges-and-opportunities-for-decentralised-solar-20250516/

324 World Bank Group. Data – Access to electricity (% of population) – Papua New Guinea. Accessed 4 August 2025. https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=PG

325 PNG Power, National Energy Authority, and World Bank. Papua New Guinea National Energy Access Transformation Project (P173194): ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK. February 2024. https://documents1.worldbank.org/curated/en/099053124020030339/pdf/P173194151f879041b8a71e4118ec75279.pdf

326 Asian Development Bank. Power Sector Development Project (RRP PNG 47356) – Sector Assessment (Summary): Energy. Accessed 4 August 2025. https://www.adb.org/sites/default/files/linked-documents/47356-002-ssa.pdf

327 Davies, Martin; and Christian Lohberger. Electrifying PNG: challenges and opportunities for decentralized solar. DevPolicy Blog. 16 May 2025. https://devpolicy.org/electrifying-png-challenges-and-opportunities-for-decentralised-solar-20250516/

328 Ilieva, Lili Encheva. Papua New Guinea's energy production. EBSCO. 2024. https://www.ebsco.com/research-starters/power-and-energy/papua-new-guineas-energy-production

329 Davies, Martin; and Christian Lohberger. Electrifying PNG: challenges and opportunities for decentralized solar. DevPolicy Blog. 16 May 2025. https://devpolicy.org/electrifying-png-challenges-and-opportunities-for-decentralised-solar-20250516/

330 Davies, Martin; and Christian Lohberger. Electrifying PNG: challenges and opportunities for decentralized solar. DevPolicy Blog. 16 May 2025. https://devpolicy.org/electrifying-png-challenges-and-opportunities-for-decentralised-solar-20250516/

331 Asian Development Bank. Power Sector Development Project (RRP PNG 47356) – Sector Assessment (Summary): Energy. Accessed 4 August 2025. https://www.adb.org/sites/default/files/linked-documents/47356-002-ssa.pdf

332 Ilieva, Lili Encheva. Papua New Guinea's energy production. EBSCO. 2024. https://www.ebsco.com/research-starters/power-and-energy/papua-new-guineas-energy-production

333 Davies, Martin; and Christian Lohberger. Electrifying PNG: challenges and opportunities for decentralized solar. DevPolicy Blog. 16 May 2025. https://devpolicy.org/electrifying-png-challenges-and-opportunities-for-decentralised-solar-20250516/

334 PNG Power. Projects – National Energy Transformation Project. Accessed 4 August 2024. https://www.pngpower.com.pg/index.php/projects/view/national-energy-transformation-project

335 Ilieva, Lili Encheva. Papua New Guinea's energy production. EBSCO. 2024. https://www.ebsco.com/research-starters/power-and-energy/papua-new-guineas-energy-production

336 Department of National Planning and Monitoring. Papua New Guinea Voluntary National Review 2020: Progress of Implementing the Sustainable Development Goals. 2020. https://sustainabledevelopment.un.org/content/documents/26452VNR_2020_Papua_New_Guinea_Report.pdf

337 UNICEF PNG. Water, Sanitation and Hygiene. Accessed 4 August 2025. https://www.unicef.org/png/what-we-do/water-sanitation-and-hygiene

338 PNG Business News. Water PNG and Eda Ranu Merge. 7 December 2020. https://www.pngbusinessnews.com/articles/2020/12/water-png-and-eda-ranu-merge

339 Kumul Consolidated Holdings. Water PNG. Accessed 4 August 2025. https://www.kch.com.pg/our-portfolio/water-png-limited/

340 Water PNG. Water Districts. Accessed 4 August 2025. https://www.waterpng.com.pg/index.php/tour/water-network/water-districts

341 Water PNG. Water Sources. Accessed 4 August 2025. https://www.waterpng.com.pg/index.php/tour/water-network/water-sources

342 Water PNG. Sewerage System. Accessed 4 August 2025. https://www.waterpng.com.pg/index.php/tour/sewerage-system

343 Privett, Connell; and Ed Budds. Water PNG: Innovation in Hydration. APAC Outlook. 12 August 2022. https://www.apacoutlookmag.com/company-profiles/550-water-png

344 Wilson, Marc; Gordon Nanau, Milika Sobey, and Semi Lotawa. Political Economy of Water Management and Community Perceptions in the Pacific Island Countries. Asia Foundation. 2024. https://asiafoundation.org/wp-content/uploads/2024/08/Political-Economy-of-Water-Resources-Management-and-Community-Perceptions-in-the-Pacific-Island-Countries.pdf

345 Global Health security Index. 2021 GHS Index Country Profile for Papua New Guinea. https://ghsindex.org/country/papua-new-guinea/

346 Sustainable Development Report. Papua New Guinea. Accessed 1 August 2025. https://dashboards.sdgindex.org/profiles/papua-new-guinea

347 Papua New Guinea. Ministry of Health. Vision, Mission, Goals & Values. Accessed 5 August 2025. https://www.health.gov.pg/subindex.php?about=1

348 Umo, Ian. PNG Medical Blog. The Provincial Health Authority System in Papua New Guinea. 18 April 2024. https://pngmedicalblog.com/2024/04/18/the-provincial-health-authority-system-in-papua-new-guinea/

349 Grundy, John; Dakulala, Paison; Wai, Ken; Maalsen, Anna; Whittaker, Maxine; and Smith, Neville. World Health Organization. JSTOR. 2019. https://www.jstor.org/stable/pdf/resrep28454.9.pdf

350 Expat Financial. Papua New Guinea Healthcare System & Medical Insurance Options. Accessed 5 August 2025. https://expatfinancial.com/healthcare-information-by-region/oceania-healthcare-system/papua-new-guinea-healthcare-system/

351 World Health Organization. Papua New Guinea-WHO country cooperation strategy 2024-2028. 30 May 2024. https://www.who.int/papuanewguinea/publications-detail/9789290620525

352 World Health Organization. Density of physicians (per 10 000 population). 30 April 2025. https://data.who.int/indicators/i/CCCEBB2/217795A

353 MetLife. Papua New Guinea. Accessed 6 August 2025. https://www.metlife.com/MWBwelcome/before-you-leave/papua-new-guinea/

354 Oli, U., Hosea, R., Balasubramaniam, B. P. L., Timbi, F., & Nou, G. (2023). Challenges of establishing an emergency medical team in Papua New Guinea. Western Pacific surveillance and response journal : WPSAR, 14(6 Spec edition), 1–6. https://doi.org/10.5365/wpsar.2023.14.6.1036

355 Lovai, Willie. PNG and WHO advancing Public Health Security through multi-sectoral collaboration. 17 February 2025. https://www.who.int/papuanewguinea/news/detail/17-02-2025-png-and-who-advancing-public-health-security-through-multi-sectoral-collaboration-on-strategic-assessment-of-all-hazards-risks

356 UNDP. Papua New Guinea. PNG National Disaster Risk Reduction Framework 2017- 2030. 11 January 2019. https://www.undp.org/papua-new-guinea/publications/png-national-disaster-risk-reduction-framework-2017-2030

357 Field Epidemiology in Action. Intermediate Field Epidemiology Training Program of PNG (iFETPNG). Accessed 6 August 2025. https://www.fieldepiinaction.com/our-programs-blog/ifetpng

358 Schmidt, E., Fang, P., Jemal, M., Mahrt, K., Mukherjee, R., Rosenbach, G., & Yadav, S. (2024). Papua New Guinea Rural Household Survey Report 2023. International Food Policy Research Institute. https://inapng.com/wp-content/uploads/2025/02/Report_2024_PNG_Survey_web_091724.pdf; UNDRR. Disaster Risk Reduction in Papua New Guinea. Status Report 2019. https://www.preventionweb.net/files/68266_682309pngdrmstatusreport.pdf; World Bank. (2014). The Pacific: Hardship and vulnerability in the Pacific Island countries. Washington, DC: World Bank Group. https://documents1.worldbank.org/curated/en/649891468098658407/pdf/85557-REVISED-WP-P144446-PUBLIC-Box391432B-1502066-Pacific-Hardship-Web-PUBLIC.pdf

359 Australian Institute of International Affairs. 18 March 2025. Mapping the Unseen: How Satellite Images Reveal Port Moresby's Hidden Urban Growth. https://www.internationalaffairs.org.au/australianoutlook/mapping-the-unseen-how-satellite-images-reveal-port-moresbys-hidden-urban-growth/; UN Habitat. Papua New Guinea: Port Moresby Urban Profile. 2010. https://unhabitat.org/sites/default/files/download-manager-files/Papua%20New%20Guinea%20Port%20Moresby%20Urban%20Profile.pdf

360 RNZ. 21 March 2024. East Sepik needs help says governor – '1000 homes lost' in PNG earthquake.' https://www.rnz.co.nz/international/pacific-news/512632/east-sepik-needs-help-says-governor-1000-homes-lost-in-png-earthquake

361 IOM. 13 Oct. 2022. IOM Delivers Emergency Shelter Kits to Families Displaced by Conflict. https://roasiapacific.iom.int/news/iom-delivers-emergency-shelter-kits-families-displaced-conflict

362 IOM. 16 Jan 2025. Emergency Shelters Provide Relief to Communities Affected by Flooding in Busu, Morobe. https://png.iom.int/stories/emergency-shelters-provide-relief-communities-affected-flooding-busu-morobe

363 IOM. 12 Dec 2022. IOM, USAID Train Local Communities in Safe Shelter Construction. https://png.iom.int/news/iom-usaid-train-local-communities-papua-new-guinea-safe-shelter-construction; IOM. 27 Feb. 2025. IOM Delivers Safe Shelter and Build-Back-Safer Training to Strengthen Mulitaka Landslide Response. https://png.iom.int/news/iom-delivers-safe-shelter-and-build-back-safer-training-strengthen-mulitaka-landslide-response

364 IOM. 15 Feb. 2022. IOM Partners with UN OCHA, USAID, and the Australian Government to Deliver Assistance to Communities Affected by Flooding in Papua New Guinea. https://png.iom.int/news/iom-partners-un-ocha-usaid-and-australian-government-deliver-assistance-communities-affected-flooding-papua-new-guinea

365 IOM. 15 Feb. 2022. IOM Partners with UN OCHA, USAID, and the Australian Government to Deliver Assistance to Communities Affected by Flooding in Papua New Guinea. https://png.iom.int/news/iom-partners-un-ocha-usaid-and-australian-government-deliver-assistance-communities-affected-flooding-papua-new-guinea; IOM. Rapid Response Teams (RRTs): Enhanced response capacity to sudden or deteriorating protracted crises. Accessed 4 Aug 2025. https://www.iom.int/rapid-response-teams-rrts-enhanced-response-capacity-sudden-or-deteriorating-protracted-crises; International Organization for Migration.

(2022, August 9). Highlands crisis: Humanitarian needs and priorities plan – Papua New Guinea. International Organization for Migration. https://crisisresponse.iom.int/sites/g/files/tmzbdl1481/files/appeal/documents/220809%20Highlands%20Crisis%20Humanitarian%20Needs%20and%20Priorities%20Plan%20FINAL.pdf

366 Schmidt, Emily and Mukerjee, Rishabh. IFPRI. Survey: Rural Papua New Guinea faces an array of food security challenges. 18 October 2024. https://www.ifpri.org/blog/survey-rural-papua-new-guinea-faces-an-array-of-food-security-challenges/#:~:text=The%20household%20survey%20analysis%20suggests,therefore%20promote%20a%20healthy%20lifestyle.

367 Sammut, J. et al. (2024). Towards Food, Nutrition and Income Security in Papua New Guinea Through Inland Fish Farming. In: Dansie, A., Alleway, H.K., Böer, B. (eds) The Water, Energy, and Food Security Nexus in Asia and the Pacific. Water Security in a New World. Springer, Cham. https://doi.org/10.1007/978-3-031-25463-5_20

368 Sammut, J. et al. (2024). Towards Food, Nutrition and Income Security in Papua New Guinea Through Inland Fish Farming. In: Dansie, A., Alleway, H.K., Böer, B. (eds) The Water, Energy, and Food Security Nexus in Asia and the Pacific. Water Security in a New World. Springer, Cham. https://doi.org/10.1007/978-3-031-25463-5_20

369 Food and Agriculture Organization of the United Nations. Food Systems Profile – Papua New Guinea. 2023. Food Systems Profile - Papua New Guinea

370 International Trade Administration. Papua new guinea Country Commercial Guide. 11 January 2024. https://www.trade.gov/country-commercial-guides/papua-new-guinea-agriculture-equipment

371 Global Hunger Index. Papua New Guinea. Accessed 6 August 2025. https://www.globalhungerindex.org/papua-new-guinea.html

372 Sustainable Development Report. Papua New Guinea. Sustainable Development Goal 2. 2025. https://dashboards.sdgindex.org/profiles/papua-new-guinea

373 Independent State of Papua New Guinea. Department of Agriculture and Livestock. Food Security. Accessed 7 August 2025. https://www.agriculture.gov.pg/divisions/technical/food-security/

374 Independent State of Papua New Guinea. PM Marape Launches New National Agriculture Plan that Encapsulates a K30 Billion Economic Contribution by 2033. 21 June 2024. https://www.pmnec.gov.pg/pm-marape-launches-new-national-agriculture-plan-that-encapsulates-a-k30-billion-economic-contribution-by-2033/

375 Independent State of Papua New Guinea. Papua New Guinea National Food Security Policy 2018-2027. https://faolex.fao.org/docs/pdf/png202059.pdf

376 Fitzgibbon, C. and Crosskey, A. Disaster risk reduction management in the drylands in the Horn of Africa. Brief prepared by a Technical Consortium hosted by CGIAR in partnership with the FAO Investment Centre. Technical Consortium Brief 4. Nairobi: International Livestock Research Institute. 2013. https://repo.mel.cgiar.org/handle/20.500.11766/5197

377 UNDRR. Terminology. Accessed 8 September 2022. https://www.undrr.org/terminology

378 European Commission. Disaster Risk Management Knowledge Centre (DRMKC). INFORM. Accessed 30 January 2023. https://drmkc.jrc.ec.europa.eu/inform-index

379 European Commission. Disaster Risk Management Knowledge Centre (DRMKC). INFORM Global Risk Index. Methodology. https://drmkc.jrc.ec.europa.eu/inform-index/InDepth/Methodology

380 European Commission. Disaster Risk Management Knowledge Centre (DRMKC). INFORM Risk Methodology. https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Methodology

381 European Commission. Disaster Risk Management Knowledge Centre (DRMKC). INFORM Country Risk Profile 2025 – Papua New Guinea. https://drmkc.jrc.ec.europa.eu/inform-index/INFORM-Risk/Country-Risk-Profile

382 UN in PNG. Common Country Analysis 2024 Update. 3 December 2024. https://papuanewguinea.un.org/en/284948-common-country-analysis-2024-update

383 U.S. Mission Papua New Guinea. Integrated Country Strategy Papua New Guinea, Solomon Islands, and Vanuatu. 2 February 2022. https://pg.usembassy.gov/integrated-country-strategy-papua-new-guinea-solomon-islands-and-vanuatu/

384 U.S. Mission Papua New Guinea. The United States and Papua New Guinea Sign New Defense Cooperation Agreement and Shiprider. 22 May 2023. https://pg.usembassy.gov/the-united-states-and-papua-new-guinea-sign-new-defense-cooperation-agreement-and-shiprider/

385 UN OCHA. Asia and the Pacific: Weekly Regional Humanitarian Snapshot (21 - 27 May 2024). 29 May 2024. https://reliefweb.int/report/bangladesh/asia-and-pacific-weekly-regional-humanitarian-snapshot-21-27-may-2024

386 Radio New Zealand. Papua New Guinea landslide: People in Enga's high risk areas advised to relocate. 6 June 2024. https://www.rnz.co.nz/international/pacific-news/518829/papua-new-guinea-landslide-people-in-enga-s-high-risk-areas-advised-to-relocate

387 U.S. Mission Papua New Guinea. "This Assistance will Help Meet the Immediate Needs of the People of Enga Province as They Begin Rebuilding." 29 May 2024. https://pg.usembassy.gov/support-to-landslide-affected-communities-in-enga/

388 U.S. Mission Papua New Guinea. USAID Donates $3.45 million Kina in Emergency Relief. 2 April 2024. https://pg.usembassy.gov/usaid-donates-3-45-million-kina-in-emergency-relief/

389 USAID. Papua New Guinea: Declaration of Humanitarian Need - Earthquake and Floods (3/27/2024). https://reliefweb.int/map/papua-new-guinea/papua-new-guinea-declaration-humanitarian-need-earthquake-and-floods-3272024

390 U.S. Mission Papua New Guinea. USAID Donates $3.45 million Kina in Emergency Relief. 2 April 2024. https://pg.usembassy.gov/usaid-donates-3-45-million-kina-in-emergency-relief/

391 USAID. The United States provides immediate emergency assistance to support communities affected by Mount Ulawun volcanic eruptions. 9 December 2023. https://reliefweb.int/report/papua-new-guinea/united-states-provides-immediate-emergency-assistance-support-communities-affected-mount-ulawun-volcanic-eruptions

392 USAID. Pacific Islands Assistance Overview, February 2024. 23 February 2024. https://reliefweb.int/report/vanuatu/pacific-islands-assistance-overview-february-2024

393 Duaine, Adrian. Case Study: Response to the Eruption of the Mt. Bagana Volcano, PNG – Aug 2023. CFE-DM. 15 January 2025.

394 U.S. Mission Papua New Guinea. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana. 12 August 2023. https://pg.usembassy.gov/the-united-states-provides-immediate-emergency-assistance-to-support-communities-affected-by-mount-bagana-volcanic-eruptions/

395 UN Country Team in PNG. Papua New Guinea: Mt. Bagana Volcano Eruption, Autonomous Region of Bougainville - Disaster Management Team Flash Update No. 1, 14 August 2023. https://reliefweb.int/report/papua-new-guinea/papua-new-guinea-mt-bagana-volcano-eruption-autonomous-region-bougainville-disaster-management-team-flash-update-no-1-14-august-2023

396 U.S. Mission Papua New Guinea. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana. 12 August 2023. https://pg.usembassy.gov/the-united-states-provides-immediate-emergency-assistance-to-support-communities-affected-by-mount-bagana-volcanic-eruptions/

397 USAID. The United States Provides Immediate Assistance to Respond to Displacement in Papua New Guinea. 29 July 2022. https://reliefweb.int/report/papua-new-guinea/united-states-provides-immediate-assistance-respond-displacement-papua-new-guinea

398 U.S. Mission Papua New Guinea. United States Provides $4 million U.S. dollars to Support Papua New Guinea's COVID-19 Surge Response. 15 November 2021. https://pg.usembassy.gov/united-states-provides-4-million-u-s-dollars-to-support-papua-new-guineas-covid-19-surge-response/

399 U.S. Mission Papua New Guinea. USAID to Provide USD $5 Million (17.8 Million Kina) to Support COVID-19 Response. Accessed 8 July 2025. https://pg.usembassy.gov/usaid-to-provide-usd-5-million-17-8-million-kina-to-support-covid-19-response/

400 U.S. Mission Papua New Guinea. United States Provides $4 million U.S. dollars to Support Papua New Guinea's COVID-19 Surge Response. 15 November 2021. https://pg.usembassy.gov/united-states-provides-4-million-u-s-dollars-to-support-papua-new-guineas-covid-19-surge-response/

401 U.S. Mission Papua New Guinea. Integrated Country Strategy Papua New Guinea, Solomon Islands, and Vanuatu. 2 February 2022. https://pg.usembassy.gov/integrated-country-strategy-papua-new-guinea-solomon-islands-and-vanuatu/

402 U.S. Indo-Pacific Command Public Affairs. Papua New Guinea hosts the USINDOPACOM and Australian Defence Force Indo-Pacific health security alliance event. 8 May 2025. https://www.pacom.mil/Media/NEWS/News-Article-View/Article/4178285/papua-new-guinea-hosts-the-usindopacom-and-australian-defence-force-indo-pacifi/

403 U.S. Mission Papua New Guinea. Successful Conclusion of Tamiok Strike 2025: Strengthening U.S.-Papua New Guinea Military Cooperation. 25 April 2025. https://pg.usembassy.gov/successful-conclusion-of-tamiok-strike-2025-strengthening-u-s-papua-new-guinea-military-cooperation/

404 Curtiss, Senior Master Sgt. DeAndre. Pacific Angel 24-1 kicks off in Papua New Guinea. U.S. INDOPACOM. 25 August 2024. https://www.pacom.mil/Media/NEWS/Article/3885518/pacific-angel-24-1-kicks-off-in-papua-new-guinea/

405 Curtiss, Senior Master Sgt. DeAndre. USAF, RAAF and PNGDF training efforts culminate with aeromedical evacuation FTX during Pac Anger 24-1. 374th Airlift Wing. 31 August 2024. https://www.pacaf.af.mil/News/Article-Display/Article/3893494/usaf-raaf-and-pngdf-training-efforts-culminate-with-aeromedical-evacuation-ftx/

406 U.S. Indo-Pacific Command Public Affairs. U.S. Indo-Pacific Commander leads U.S. Interagency Delegation to Papua New Guinea. 16 July 2024. https://www.pacom.mil/Media/NEWS/Article/3839620/us-indo-pacific-commander-leads-us-interagency-delegation-to-papua-new-guinea/

407 U.S. Mission Papua New Guinea. Papua New Guinea Defence Force, U.S. Army Conduct Bilateral Disaster Response and Exchange Exercise. 2 July 2024. https://pg.usembassy.gov/bilateral-disaster-response-and-exchange-exercise/

408 McDole, Gunnery Sgt. Kassie. MRF-D 24.3 U.S. Marines, Sailors arrive in C-40A to Papua New Guinea for HADR exercise. Marine Rotational Force – Darwin. 2 May 2024. https://www.marforpac.marines.mil/Media-Room/Pacific-Marines-Stories/Article/Article/3763459/mrf-d-243-us-marines-sailors-arrive-in-c-40a-to-papua-new-guinea-for-hadr-exerc/

409 U.S. Mission Papua New Guinea. Pacific Partnership 2023 Returns to Papua New Guinea. 10 October 2023. https://pg.usembassy.gov/pacific-partnership-2023-returns-to-papua-new-guinea/

410 USAID. Pacific Islands Assistance Overview, February 2024. 23 February 2024. https://reliefweb.int/report/vanuatu/pacific-islands-assistance-overview-february-2024

411 Duaine, Adrian. Case Study: Response to the Eruption of the Mt. Bagana Volcano, PNG – Aug 2023. CFE-DM. 15 January 2025.

412 U.S. Mission Papua New Guinea. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana. 12 August 2023. https://pg.usembassy.gov/the-united-states-provides-immediate-emergency-assistance-to-support-communities-affected-by-mount-bagana-volcanic-eruptions/

413 Duaine, Adrian. Case Study: Response to the Eruption of the Mt. Bagana Volcano, PNG – Aug 2023. CFE-DM. 15 January 2025.

414 U.S. Mission Papua New Guinea. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana. 12 August 2023. https://pg.usembassy.gov/the-united-states-provides-immediate-emergency-assistance-to-support-communities-affected-by-mount-bagana-volcanic-eruptions/

415 Duaine, Adrian. Case Study: Response to the Eruption of the Mt. Bagana Volcano, PNG – Aug 2023. CFE-DM. 15 January 2025.

416 U.S. Mission Papua New Guinea. The United States Provides Immediate Emergency Assistance to Support Communities Affected by Mount Bagana. 12 August 2023. https://pg.usembassy.gov/the-united-states-provides-immediate-emergency-assistance-to-support-communities-affected-by-mount-bagana-volcanic-eruptions/

417 U.S. Mission Papua New Guinea. USA and PNG Partner on Disaster Preparedness. 28 June 2023. https://pg.usembassy.gov/usa-and-png-partner-on-disaster-preparedness/

418 U.S. Mission Papua New Guinea. PNGDF Receives First Gender Focal Point Training to Increase Gender Equity and Equality. Accessed 7 July 2025. https://pg.usembassy.gov/pngdf-receives-first-gender-focal-point-training-to-increase-gender-equity-and-equality/

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