Disaster Risk Reduction in the Republic of Vanuatu

Status Report

adpc Asian Disaster Preparedness Center

UNDRR
UN Office for Disaster Risk Reduction

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Status Report 2022

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About this report

The disaster risk reduction status report provides a snapshot of the state of disaster risk reduction in the Republic of Vanuatu under four priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030. It also highlights progress and challenges associated with ensuring coherence with key global frameworks. It also provides recommendations for strengthening disaster risk management governance by government institutions and stakeholders at national and local levels.

This report was prepared by the United Nations Office for Disaster Risk Reduction (UNDRR) with support from the Asian Disaster Preparedness Center (ADPC) and Tonkin + Taylor through country consultations and a desk review of key documents, including legal instruments and disaster risk reduction frameworks, policies, strategies, and plans.

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This report serves as a reference document for implementing and monitoring the Sendai Framework. The findings, interpretations, and conclusions expressed in this document do not necessarily reflect the views of UNDRR or the United Nations Secretariat, partners, and governments. They are based on the inputs received during consultative meetings, individual interviews, and the literature reviews conducted by the research team. The presentation of the material in this report concerning the legal status of any country or territory or its authorities or concerning the delimitations of its frontiers or boundaries, as well as the text and the tables, is intended solely for statistical or analytical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. While every effort has been made to ensure the accuracy of the information, the document remains open for any corrections in facts, figures, and visuals.

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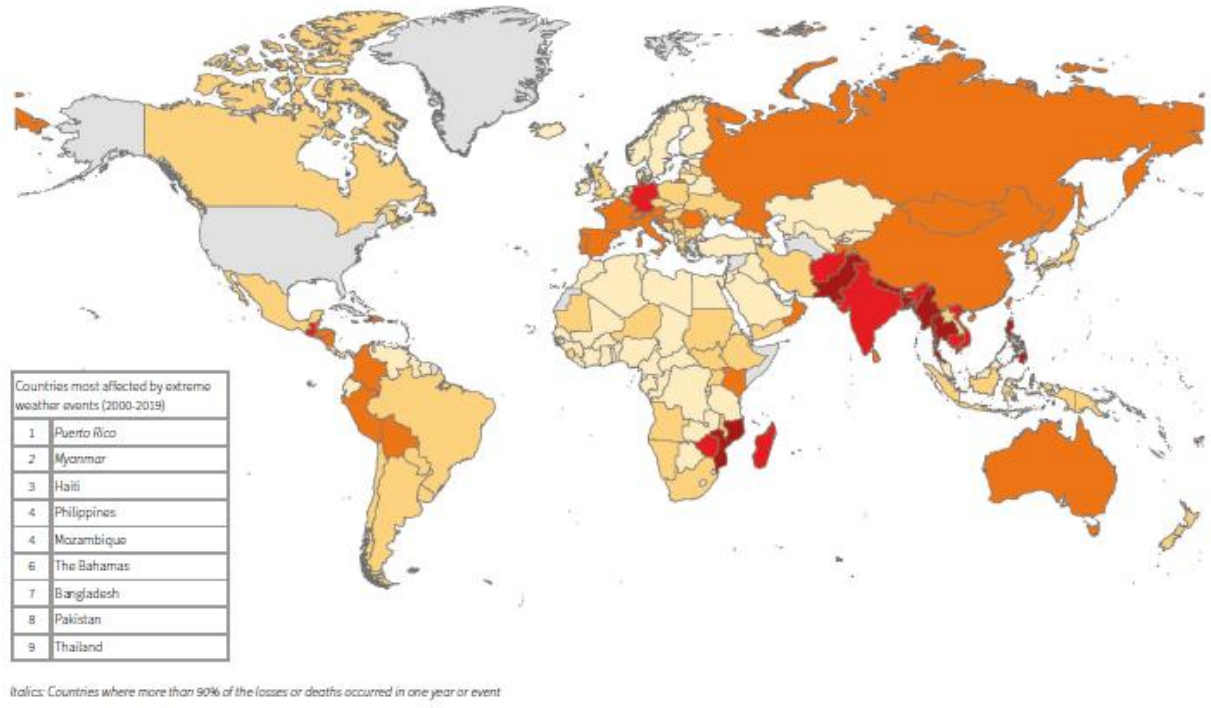

(GermanWatch, 2021)

POPULATION 2020	
Total Population	307,150
Urban Population	78,400 (25.2%)
Population Density per Km²	25
ECONOMIC INDICATORS	
Gross Domestic Product in Current $US	896 million
GDP Per Capita ($US)	2,919
GDP Growth (Annual %)	-5.4%
HUMAN DEVELOPMENT	
Human Development Index	0.607
HDI Rank	140
Income Level Category	Lower Middle Income

(World Bank, 2022)

(UNDP, 2022)

Climate Risk Index

–

Rank 37 / Score of 53.83*

INFORM Risk Index

–

Rank 68 / Medium Risk**

World Risk Index

–

Rank 49 / High***

* Climate Risk Index 2000-2019 analyses how countries have been affected by weather-related losses between 2000-2019. (GermanWatch, 2021)

** INFORM risk index is a global tool that measures the risk of humanitarian crises and disasters based on three dimensions: hazard & exposure, vulnerability, and lack of coping capacity. (INFORM, 2021)

***World Risk Index 2022 assesses the disaster risk for 193 countries based on Exposure, Vulnerability, Susceptibility, Lack of coping capacities, and Lack of adaptive capacities. (Bündnis Entwicklung Hilft, 2022)

1. Introduction

Vanuatu is highly exposed to tropical cyclones, storm surges, landslides, flooding, droughts, volcanic eruptions, earthquakes, and tsunamis. The Government of Vanuatu has formulated various plans and policies to tackle the impacts of climate change and natural hazards and build a resilient nation.

In the western part of the South Pacific, an archipelago of over 83 islands makes up the Republic of Vanuatu. These islands make up over 12,199 km^2 of land mass in an economic zone of 860,000 km^2. Two islands, Espiritu Santo and Malakula, make up almost 50% of the land mass. The terrain is mostly mountainous with a narrow coastline and the two main islands have many volcanic peaks and rainforests. Many of the islands also are located in a seismically and volcanically active area which increases the prevalence of volcanic eruptions, earthquakes and tsunamis. [Government of Vanuatu, 2007] [Pacific Climate Change Portal].

Vanuatu's economy is mostly made up of the service sector which accounts for 64% (as of 2019) of the Gross Domestic Product (GDP) per capita, followed by the agriculture, forestry, fisheries, and the industry sector. In 2020, the annual GDP was USD 881.5 million which is a 5.6% decrease from the previous year. The agriculture sector is mostly made up of small-scale farmers and the main products are copra, kava, cocoa, coffee and taro. Nearly 80% of the population resides in rural areas and relies on agriculture for livelihood. The fishery sector makes up nearly 1% of the GDP of Vanuatu and it has huge potential for growth. The tourism sector reported 23% of GDP and generated 35% of the total employment in the country prior to COVID-19 (as of 2019). The main appeal for tourists is the culture, nature, adventure, and relaxation. As of 2021, it is reported that this sector is still recovering following the suspension of international travel due to COVID-19. Remittance is also one of the important sources of income in Vanuatu, which contributes 3.8% to GDP (as of 2019). [The World Bank, 2022] [PSDI, 2020] [UNCDF, 2021]

Rainfall in Vanuatu is affected by the South Pacific Convergence Zone. The mountainous regions also play a large role in the rainfall variation that is felt across some islands. For example, during the wet season (November to April), rainfall is high on the windward side of mountain ranges of the larger islands while it is lower on the leeward sides. The climate is also affected by the El Niño Southern Oscillation (ENSO) where during the El Niño events, drier conditions are seen in Port Vila, the capital of Vanuatu, and Aneityum, the southernmost island of Vanuatu. During La Niña events, there is even more rainfall during the wet season [Australian Bureau of Meteorology and CSIRO, 2011].

Vanuatu aims to be a regional leader in climate change mitigation and Disaster Risk Reduction (DRR), through policies and strategies that guide mitigation efforts in addressing greenhouse gas emission. The Ministry of Climate Change Adaptation, Meteorology, Geohazards, Environment, Energy and Disaster Management supports the National Advisory Board on climate change mitigation and DRR led by the Director of Meteorology and Geohazards Department and the Director of the National Disaster Management Office.

In Vanuatu, the National Advisory Board on Climate Change and Disaster Risk Reduction was mandated by the Council of Ministers on 15 October 2012 to "act as Vanuatu's supreme policy making and advisory body for all DRR and climate change programmes, projects initiatives and activities". [Pacific Climate Change Portal, 2020] [Whyte & Silas-Nimoho, 1999] [Government of Vanuatu, 2021]

1.1 Demographic Characteristics

Total population of Vanuatu is 307,105 (51% male and 49% female), with a 2.4% population growth per year (as per 2020). Around 80% of the population lives on seven islands (out of 83 islands), i.e., Efate, Santo, Tanna, Malekula, Pentecost, Ambae and Ambrym. Nearly 75% of the population lives in rural areas, and 25% live in urban areas. The median age of the population in Vanuatu is 20 years,

and 65% of the population is between the age of 0 and 29 years. Median age has decreased since 2015 but is expected to increase again in the coming years. The average household size is nearly five people per house with males being the head of the household in 82% of the homes. 65% of households do not have access to improved sanitation and another 16% do not have access to safe drinking water. [The World Bank, 2022] [Vanuatu National Statistics Office, 2017] [MOH,2021].

As of 2018, around 88% of the people aged 15 and above are considered literates. For both men and women between the age of 15 - 49, 56% of the population have at least completed primary level of education with another 33% completing secondary education. There are 7% of men who completed more than secondary education, while 6% of women have secondary. While women have around the same education as men, fewer are employed. Only 55% of women between the ages of 15 - 49 are employed while 82% of men of the same age group are employed. It is reported that out of 38,223 employed women, 68.7% are working in informal sectors. Employment does increase with education level but there is still a gap between men and women. For example, 60% of women and 76% of men with a secondary education have employment and 66% of women and 77% of men with more than a secondary education have employment. [VNSO and SPC, 2014] [ILO, 2021]

Vanuatu's government is made up of 52 members of Parliament and elections are held every four years. Since independence there have been only five women who have been elected. At the end of nomination process for the general election in 2020, there were a total of 17 women out of 295 candidates; however, no women were elected to the parliament. [Pacific Women in Politics, 2020]

Around 60% of women have experienced some form of physical or sexual violence in their lives and 68% reporting that received some form of psychological violence by their partners. These rates increase in rural areas in comparison to urban areas but violence against women is prevalent across all provinces, islands, age groups, education levels and religions. These numbers are likely underreported as there is still stigma and shame around family violence, which is considered a private issue. [Vanuatu Women's Centre, 2011] [Wesley, 2013] [World Vision, 2020]

1.2 Economic Impact of Disasters

Vanuatu is highly susceptible to disasters with a 56.8% likelihood of a disaster occurring every year. These disasters affects around 12% of the population and contribute to an average of 42.8% GDP loss. Tropical Cyclone have one of the largest economic impacts to countries in the South Pacific. In 2015, Tropical Cyclone (TC) Pam caused USD 449.4 million economic loss, where USD 270.9 million was due to infrastructure damage and the remaining USD 178.5 million was towards future economic loss. TC Pam created an economic loss of 60% of the GDP, and GDP growth decreased by 2%. [Lee, Zhang, & Nguyen, 2018] [World Trade Organisation, 2018] [Government of Vanuatu, 2022]

However, because of data collection limitations, these numbers might be on the conservative side. Figure 1 shows the damage and losses to the agriculture sector by sector and affected province.

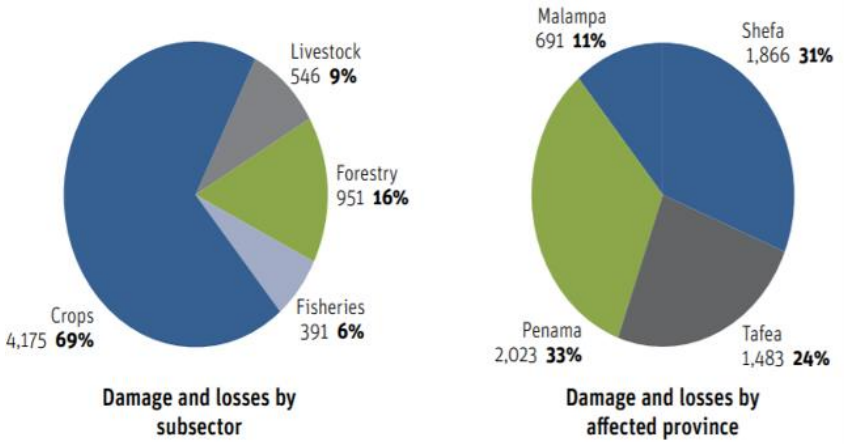

Figure 1. Agriculture damage and losses by subsector (left) and affected province (right) (VT Million)

[Government of Vanuatu, 2015]

The housing sector took a large brunt of the damage as it accounted for 32% of the total damage costs. The tourism sector accounted for 20% of damage, education sector accounted for 13% and the transport sector accounted for 10% of the total damage. However, when it came to future economic loss, it was the agriculture sector that took 33% of the total losses followed by the tourism sector which took 26% of the total losses. [Government of Vanuatu, 2015]

Vanuatu is also ranked highly for seismic hazards with around 240 earthquakes that ranged from 3.3 to 7.1 in magnitude striking the country and its surrounding area in just the first 10 months of 2018. With earthquakes comes volcano eruptions and in 2018 Manaro Voui volcano erupted resulting in the evacuation of Ambae Island leading to economic disturbance. [Lee, Zhang, & Nguyen, 2018] [World Trade Organisation, 2018]

The 2018 Manaro Voui volcano eruption also caused extensive damages to the economy. The Vanuatu Government has allocated around USD 3.4 million towards the disaster. Nearly 3,000 people, around 875 households, were displaced from the volcano. These people left behind their homes, assets and livelihoods and were mostly relocated to the island of Maewo to start their lives over again. Total costs after damage and rebuilding could be up to USD 40 million. Almost half of these costs come from needing shelter and education for displaced individuals. Relocation costs are hard to determine especially because the relocated population is dependent on subsistence farming for their livelihood and, due to ash fall, this has been severely impacted. Furthermore, the relocated population is also affected by their heavy reliance on livestock, fisheries and forestry income that have all also been impacted. Agriculture, businesses, retail and transport sectors have not been set up in Maewo yet for this group of people and will take time to be put into place.Therefore, support from the government will be heavily needed for these individuals. [Vanuatu National Disaster Management Office, 2018]

In 2020, the country's economy contracted by 8.5%, due to the COVID-19 pandemic. The situation was exacerbated by TC Harold, which struck in April 2020 affecting more than 158,000 people, representing 43%of the population, and damaging homes, schools, medical facilities and crops. In 2020, the total loss and damage associated with TC Harold and COVID-19 was estimated around VUV (Vanuatu Vatu) 60 billion (around USD 523.4 million), which reflects around 54% of the country's GDP. The total cost of recovery and reconstruction activities was estimated around VUV 36.4 billion (around USD 317.28 million), which is nearly 33% of the country's GDP. It is forecasted that the damages of TC Harold and the ongoing global pandemic will have a long-term impact on ni-Vanuatu households and communities. Figure 2 presents the impacts of TC Harold and COVID-19 on different sectors in Vanuatu. [Government of Vanuatu, 2022] [Government of Vanuatu, 2020]

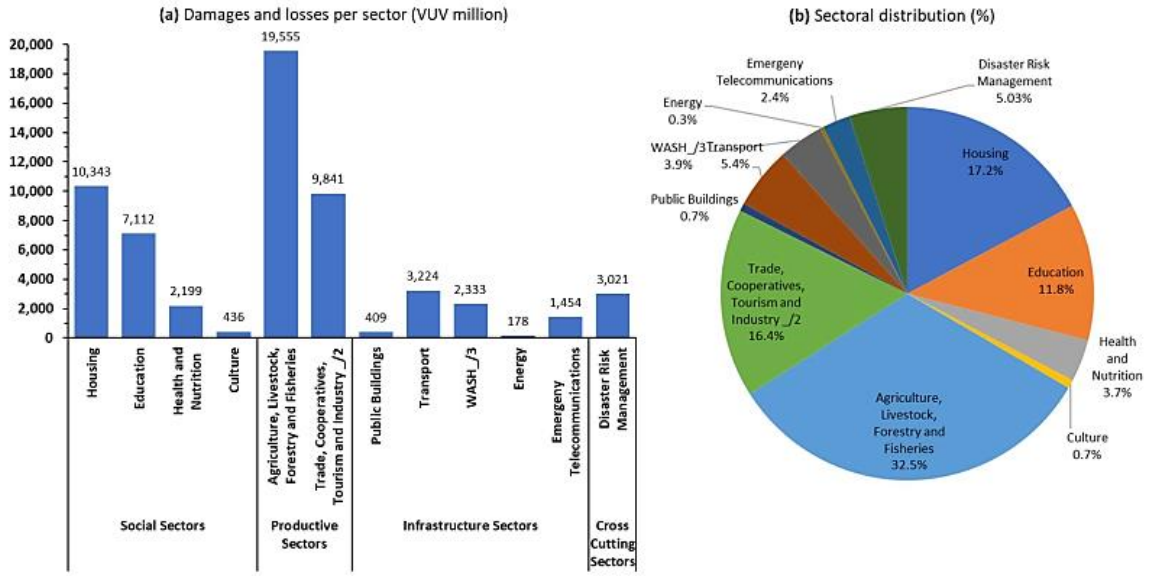

Figure 2: TC Harold and COVID-19 disaster effects [Government of Vanuatu]

1.3 Social Impact of Disasters

Disasters can affect communities and individuals that require support and intervention. Disasters often lead to displacement which involves diminishing livelihoods and losing access to natural resources and agricultural land. Unplanned displacement leaves many without any time to prepare and has serious impacts on security, health and wellbeing of individuals. This is exasperated by lack of access to shelter, food, water and sanitation and basic services like utilities. Women, children, the elderly and people with a disability, are at an even higher risk of being impacted and have specific needs during disasters that are rarely prioritised. Finally, displacement from a disaster highly disrupts education and health services that are of high priority. This displacement was greatly seen after the volcanic eruption of Manaro Voui in 2018. Displacement left many in crowded conditions and vulnerable positions. For example, many families lost assets and lost family protection which left many women, girls and children with an increase in risk of sexual and gender-based violence. Minimisation of social impacts of relocation are being provided such as water, access to health services and food supply. Toilets are being built for communities with prioritisation for people with disabilities and the elderly. [Government of Vanuatu, 2018] [Vanuatu National Disaster Management Office, 2018]

During TC Pam over 40,000 and during TC Harold over 31,000 population were affected, limiting the capacity for the families to generate income. There was further damage to community infrastructure which disrupted daily life and led to many losing their income making the process to repair and replace damaged homes and business longer. Those who had a lower income and depended on subsistence livelihoods suffered by the reduction in food sources. The post-disaster needs assessment of TC Pam reported that 50% of those who relied on agriculture in the disaster-affected provinces lost all or part of their crops and require support to meet their minimum needs. With the destruction of infrastructure from TC Pam and TC Harold, new vulnerabilities are created for vulnerable groups. For example, personal safety, public health like sanitation and food production are all greatly impacted for these individuals. [Government of Vanuatu, 2022] [Government of Vanuatu, 2015]

2. Disaster Risk Profile

2.1 Governance and Institutional Mechanism

In Vanuatu, the National Disaster Management Office (NDMO) was established by the Government of Vanuatu under the Ministry of Climate Change Adaptation, Meteorology and Geohazards, Environment, Energy and Disaster Management to coordinate responses to emergencies and disasters across the country. It focuses on strengthening the climate change and disaster networks at national, provincial and local levels; mainstreams climate change adaptation (CCA) and disaster risk reduction (DRR) activities in sectoral policies, plans and budgets; improves risk awareness; ensures effective and reliable communication and establishes partnerships with stakeholders. NDMO is working with the communities to create Community Disaster Committees in rural and urban areas to enhance community resilience. [NDMO, 2022] [NAB, 2022]

The newly established Department of Climate Change (DOCC) is responsible for coordination and implementation of the adaptation, disaster risk management and mitigation of the impacts of climate change in Vanuatu. It sits under the Ministry of Climate Change Adaptation, Meteorology and Geohazards, Environment, Energy and Disaster Management along with NDMO. [DOCC, 2022]

The National Disaster Committee responsibilities are to develop policies and strategies for prevention, preparation, response and recovery to disasters. It ensures that they are properly implemented by NDMO and other government and nongovernment agencies.

The National Advisory Board (NAB) on Climate Change and Disaster Risk Reduction is the leading institution responsible for policy development and advisory for CCA and DRR programmes, projects, initiatives and activities. It is the focal point for information sharing and coordination on climate change and DRR, facilitates and endorses the DRR and climate change programmes, projects, initiatives and activities, and manages development of national climate finance processes. [NAB, 2022]

The Vanuatu Meteorology and Geohazards Department (VMGD) is the National Meteorological and Hydrological Service (NMHS) in the country. It has six technical Divisions responsible to provide the required services and products (Observation, Forecasting, Climate, IT and Engineering, Administration and Geohazards Division). VMGD provides regional and national: atmospheric forecasts; marine forecasts; tidal information; TC outlooks; tsunami information and warnings; climatological information. [VMGD, 2022]

The Department of Environmental Protection and Conservation (DEPC) is responsible for developing an appropriate legislative framework to lead and guide, clean, resilient and sustainable development. Department of Energy (DOE) is responsible for development of energy policies, legislation and regulations to guide the development of energy services and improve service delivery; identification, implementation, management and evaluation of energy projects, monitoring and facilitating energy activities; providing awareness and training activities. [DEPC, 2022] [DOE, 2022]

Vanuatu Humanitarian Team (VHT) is a collaboration between non-governmental organisations (NGOs) and funded by Australian Government Department of Foreign Affairs and Trade, European Commission for Humanitarian Aid and Civil Protection, and The Margaret A. Cargill Foundation. It assists in humanitarian coordination, disaster preparedness and humanitarian response. VHT includes Oxfam, Vanuatu Red Cross, French Red Cross, Vanuatu Association of NGOs (VANGO), CARE International, Save the Children Australia (SCA), the Adventist Development and Relief Agency (ADRA), the United Nations International Children's Emergency Fund (UNICEF), the World Health Organisation (WHO), Peace Corps, World Vision and Act for Peace, IOM and OCHA. [NDMO, 2022]

Engaging private sector is crucial for effective disaster risk management. Vanuatu Business Resilience Council (VBRC) is the country's official private sector vehicle and coordinator for

managing climate change and DRR activities and programmes. VBRC assists the private sector in building their capacity to engage in the DRR and climate change activities contributing towards sustainable development. [VBRC, 2022]

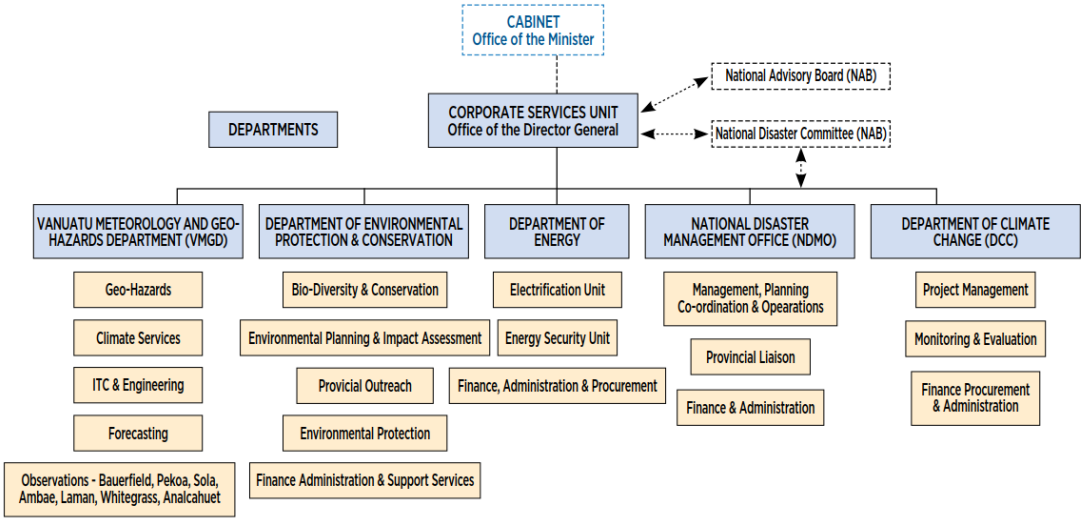

Figure 3: Ministry of Climate Change Adaptation, Meteorology & Geohazards, Environment, Energy and Disaster Management Organisational Chart

The National Disaster Act (also known as National Disaster Risk Management Act), which became effective in 2000, is the regulatory framework for disaster risk management in Vanuatu. After TC Pam in 2016, the National Disaster Risk Management Act underwent a review process, and was republished in 2019. The act defines what a disaster is and, more importantly, establishes NDMO, National Disaster Committee, Provincial Disaster and Climate Change Committee, and Municipal Disaster and Climate Change Committee. Also, the Meteorology, Geological Hazards and Climate Change Act developed in 2016 sets out the framework for forecasting and hazards. [Government of Vanuatu, 2019] [NDMO, 2022]

Policies related to DRR which have enhanced the disaster risk governance are presented in the table below:

Legislation/Policy	Scope	Purpose
Disaster Risk Reduction and Disaster Management National Action Plan (2006-2016)	National, Local	Promote and ensure a safe and resilient Vanuatu by reducing the impact of disasters on the social,economic and environmental sectors.
Vanuatu Climate Change and Disaster Risk Reduction Policy (CCDRR) (2016- 2030)	National, Local	Provide a framework for incorporating Climate Change and DRR into development processes and improve the planning of fundingfor the projects.
National Sustainable Development Plan (2016- 2030)	National, Local	Highest level of policy framework that focuses on a balance between social, environmental andeconomic pillars of sustainable development while keeping traditional knowledge and culture as the foundation.
National Policy on Climate Change and Disaster-Induced Displacement (2018)	National	Guides emergency and development planners to work collaboratively with the Government of Vanuatu to address the needs of communities affected by displacement.

Legislation/Policy	Scope	Purpose
National Adaptation Programme for Action (2007)	National, Local	Develop and fund countrywide programmes that are high priority and based on adaptation activities to address the current andfuture effects of climate change and disasters.
Vanuatu National Environment Policy and Implementation Plan (2016-2030)	National, Local	Linked with the National Sustainable Development Plan through the environmental pillar and looks to promote the safe management and conservation of the natural resources and environment of Vanuatu.
Vanuatu Enhanced Nationally Determined Contributions 2020-2030 (updated) (NDC)	National, Local	Presents targets and strategies to support Vanuatu's implementation of the Paris Agreement. It includes mitigation targets for energy, transport, industry, forestry, livestock and waste sectors. For adaptation, targets are identified for the agriculture and water sectors.
Vanuatu National Energy Road Map (2016-2030)	National, Local	Facilitate the growth of Vanuatu's development of secure, affordable, widely accessible, high quality, clean energy services.
National Gender Equality Policy (2020–2030)	National, Local	Provides a unifying strategic framework for government, civil society and development partners to coordinate actions to advance gender equality and the wellbeing of women and girls. Strategic areas 5 of this policy aims at "fostering gender responsive and community-driven solutions to climate and disaster resilience".

Table 1. National disaster and climate risk reduction policies, plans and legislation in Vanuatu

2.2 Hazard and Exposure

Vanuatu is highly exposed to hazards including cyclones, volcanic eruptions, earthquakes, tsunami, urban and coastal flooding and landslides, and is the highest ranked country at risk to natural hazards and climate change in the world. According to EM-DAT, Vanuatu experienced nearly 50 devastating disasters between 1940-2020. Storm events alone account for 59% of the disasters in Vanuatu, which affected more than 600,000 people (Figure 4). In the future, Vanuatu is projected to incur, on average, about USD48 million per year in losses due to earthquakes and TC. Additionally, over the next four decades, Vanuatu has a 50% chance of experiencing a disaster related loss exceeding USD330 million, and a 10 % chance of experiencing a disaster related loss exceeding USD 51.8 billion. [Day, et al., 2019] [GFDRR, 2019] [The World Bank, 2015] [EM-DAT, 2020]

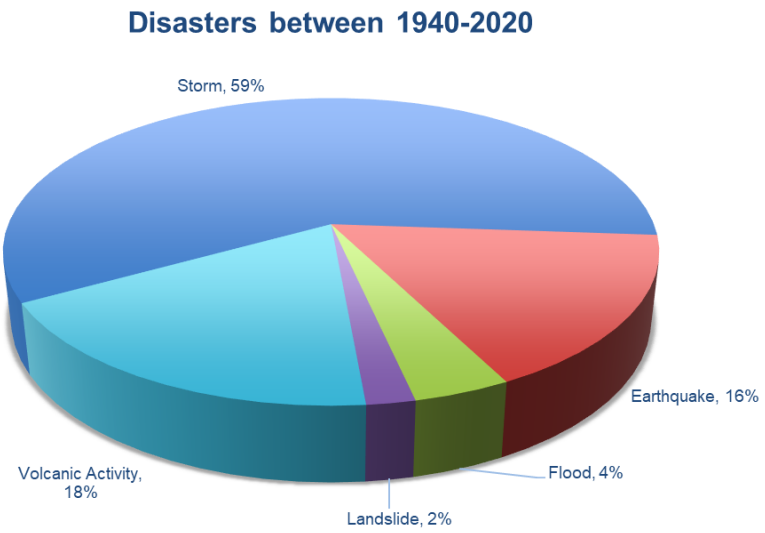

Figure 4: Number of disasters in Vanuatu between 1940 and 2020 (EM-DAT, 2021)

Vanuatu is exposed to between 2-3 cyclones in a cyclone season i.e., between the months of November and April. TCs usually result in heavy rainfall, flash flooding, coastal and riverine flooding, flooding in low-lying areas, storm surge, strong winds and landslides. A great annual variation is seen in the number of cyclones affecting Vanuatu. Between 1969 and 2010, Vanuatu experienced a total of 101 TC in its exclusive economic zone. It is reported that the average annual storm occurrence between 1980-2020 is around 20. TC have had a devastating effect on the Vanuatu economy when they have made landfall. While TC Pam remains the most economically devastating storm in Vanuatu's recorded history, it is by no means alone. The impacts of Tropical Cyclone Harold in 2020 is similar to TC Pam where nearly 16,000 people were affected, 17,000 houses were damaged or destroyed , and more than 175,000 hectares of cropland were damaged. TC Uma, in 1998, and Prema, in 1993 caused an estimated USD 150 million and USD 60 million in damages respectively. [Pacific Climate Change Portal, 2020] [GFDRR, 2011] [The World Bank, 2015] [VMGD, 2022] [DFAT, 2021] [PACCSAPP, 2013]

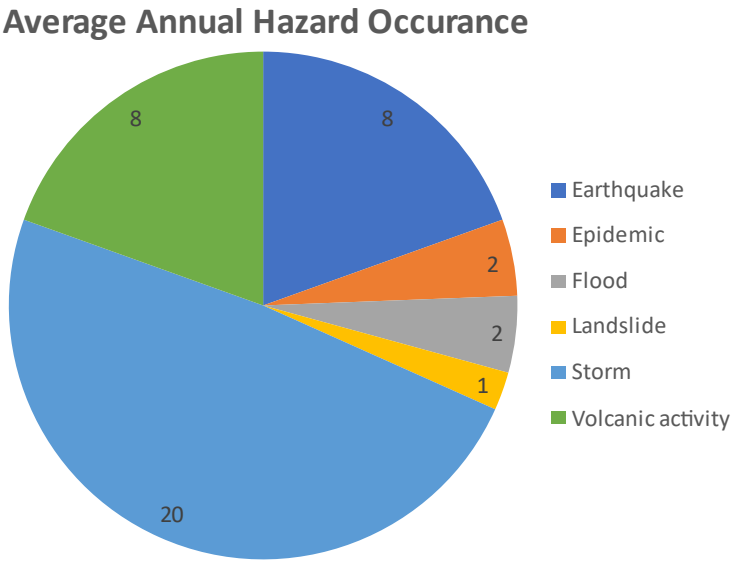

Figure 5: Average annual hazard occurrence between 1980-2020 [The World Bank]

Future disaster and climate risk projections show that there will most likely be a decrease in the number of TC by the end of the century. However, the TC that occur are projected to have a greater average maximum speed by between 2% and 11% and an increase in rainfall intensity by 20% in areas that are within 100km of the cyclone.

Vanuatu also sits on the Pacific Ring of Fire, a seismically active area with the potential to generate devastating earthquakes, tsunami waves and volcanic eruptions. Vanuatu has experienced severe damages and fatalities in recent history due to both earthquakes and tsunamis. A total of seven tsunamis have been recorded in Port Vila between 1993 and 2006 and according to the EM-DAT database a similar number of earthquakes have also been recorded for this period. In 1999, a magnitude 7.5 earthquake that generated a large tsunami, with waves measuring six metres destroyed the Baie Martelli village, killing 10, injuring over a 100 and affecting over 23,000 people. In 2002, a magnitude 7.3 earthquake struck near Port Vila causing extensive damages to infrastructure and economy. It is reported that there is a more than 20% chance of a potentially damaging earthquake and tsunami occurring in the next 50 years in Vanuatu. [GFDRR, 2019] [GFDRR, 2011] [The World Bank, 2015]

Volcanic eruptions are also a cause for concern as the country is still recovering from and responding to the aftermath of the Manaro Voui eruption on Ambae Island that started in late 2017. Continuous eruption has led to the mass and seemingly permanent evacuation of the islands over 10,000 people which was completed in August 2018. The response and recovery estimate to cost about USD 39.7 million. Additionally, in 2008 and 2009, volcanic activity on Ambrym affected 9,000

people. Currently, Vanuatu has six active volcanoes that are being monitored by the Government as depicted in the Figure 6. [NDMO, 2018] [Guha-Sapir, Hoyois, Wallemacq, & Below, 2016]

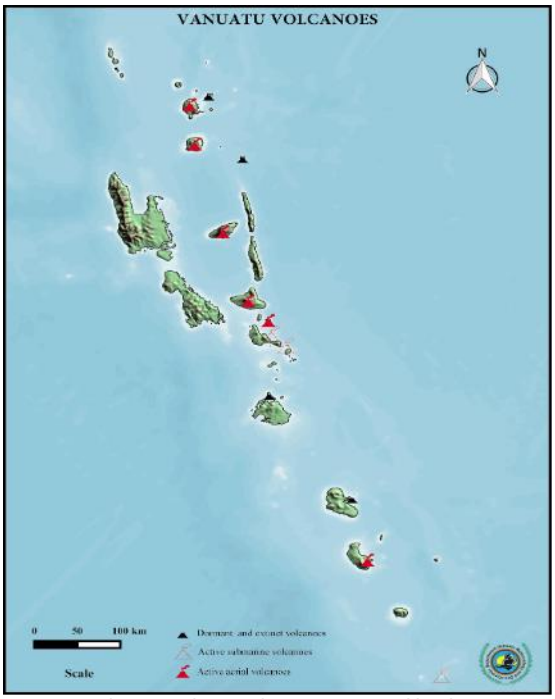

Figure 6. Six active volcanoes that are being monitored by the Government in red

[Vanuatu Meteorology & GeohazardsDepartment]

In Vanuatu, the risk of landslides is considered as high, due to the rainfall patterns, terrain, geology, soil and land cover. The frequency of landslides increases because of geophysical hazards such as volcanic activity, earthquakes and tsunamis and climate hazards such as TC and heavy rainfall. Following the flooding in Maewo in 2018, a landslide destroyed the assets (mostly houses) of more than 450 people in three villages. [IDMC, 2018] [ADB, 2018] [GFDRR, 2019]

Vanuatu has two distinct seasons, a warm wet season from November to April, and cool dry season from May to October. Surface air temperatures on average range between 23.5–27.5°C, and the change in temperature is strongly influenced by temperature of the ocean surrounding the country. The future of disaster and climate risks, under three different emission scenarios, show that the annual average air temperature as well as sea surface temperature will increase. The future temperature rise over the islands of Vanuatu is forecasted to be below the global average, i.e., under the highest emission pathway it is projected that there will be an increase of 2.8°C around Vanuatu, compared to around 3.7 °C across the world. This increase in average temperature will result in hot days and warm nights increasing while decreasing cooler weather days. Under all three different emission scenarios ocean acidity levels is projected to rise. This will result in the reef ecosystem's health becoming worse when also considering coral bleaching, storm damage and fishing pressure [PACCSAPP, 2013] [The World Bank, 2021] [Australian Bureau of Meteorology and CSIRO, 2011]

Rainfall patterns in Vanuatu are affected by the South Pacific Convergence Zone, which intensifies during Vanuatu's wet season bringing higher levels of rainfall. Vanuatu's mountainous ranges also moderate rainfall patterns across the larger volcanic islands in the Vanuatu group with the windward (south-east) side of the mountain receiving higher amounts of rainfall then the dryer leeward (north-west) side. The rainfall projections are not as consistent under the different emission models but, overall, there will be a decrease in the dry season rainfall and an increase in prevalence of wet season rainfall over the decade. Projections do show an increase in days of extreme rainfall. [PACCSAPP, 2013] [The World Bank, 2021] [Australian Bureau of Meteorology and CSIRO, 2011]

Sea level rise is a great concern for an atoll country, and since 1993, there has been a rise in sea level by 6mm per year. Under a high emissions scenario, there could be a rise in sea level between 3-17cm by 2030. The sea level will continue to rise to a range of 21-34cm by 2060 and a range of 40-96cm by the end of the century (Figure 7) under all emission scenarios. An increase in sea level rise and an increase in rainfall will impact the risk of storm surges and coastal flooding. [Australian Bureau of Meteorology and CSIRO, 2011] [The World Bank, 2021] [NASA, 2022]

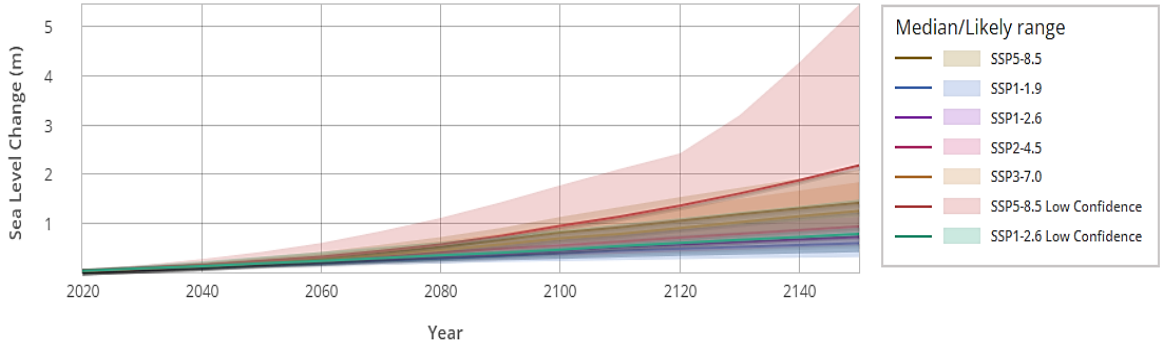

Figure 7. Observed and projected relative sea level change near Tuvalu (NASA, 2022).

Since 1970, Vanuatu has experienced five major outbreaks (such as dengue, measles). In 2016, Ministry of Health declared a dengue outbreak in the country, and more than 600 people are considered positive for dengue fever. Since January 2020, there have been more than 7,500 confirmed cases of COVID-19 with 13 deaths (as of May 2022). Population displacement caused by flooding, landslides, earthquake and other hazards can result in overcrowding in resettlement areas. The overcrowding can increase the risk of transmission of communicable diseases such as acute respiratory infection, measles, diphtheria and others. [IFRC, 2017] [MOH, 2022] [IDCM, 2018]

2.3 Physical Vulnerability

Vanuatu's estimated 307,105 inhabitants are spread across 80 islands in six provinces—Malampa, Penama, Sanma, Shefa, Tafea, and Torba - with 80% of residents living in rural areas. Vanuatu's rural population is largely dependent on subsistence agriculture, which is adversely affected by natural and climate hazards. More than 100,700 buildings and 78,434 hectares of major crops are exposed to natural hazards and climate change. It is estimated that USD 3,303 million is required to replace and rebuild the exposed buildings and crops. [Government of Vanuatu, 2015] [Pacific Climate Change Portal, 2020] [The World Bank, 2015]

In Vanuatu, about 94 % of Vanuatu's population resides along its 3,132km coastline, exposing a large number of people to sea level rise, storm surges and tsunamis. For example, during TC Pam, storm surges that were generated inundated communities as far as 150 metres from the shoreline, causing structural damage to roads, buildings and other infrastructure. Additionally, about 75 % of the population lives in rural areas that have poor access to services and are difficult and expensive to access to provide development and technical support. While it can be generalised from these numbers that the entire island population is vulnerable to hazards and climate impacts; certain subgroups face higher degree of risk. These subgroups include the rural poor in informal settlements, women headed households and the elderly. [Andrew, Bright, de la Rua, Teoh, & Vickers, 2019] [Rey, Le De, Leone, & Gilbert, 2017] [Vanuatu National Statistics Office, 2017]

Infrastructure on small island states like Vanuatu are also highly susceptible to damage from hazards and climate change. Based on the data from the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), future natural hazards and climate impacts will cause large-scale damage to infrastructure. As indicated by the post-disaster assessment after TC Pam, about 20% of losses and damages was sustained by the infrastructure sector. Assessments have revealed that in part adhoc application of building codes and building

standards played a role in the degree of devastation experienced. Additionally, very few buildings were designed to withstand category 5 cyclones or severe earthquakes at the time. The general recommendation from the post-disaster needs assessment is to apply a build back better principle in the recovery phase across the infrastructure subsectors given that Vanuatu is prone to disasters and Pam was likely not a once-off event. [The World Bank, 2015] [Governmentof Vanuatu, 2015]

The lack of functional drainage infrastructure and ineffective waste management practices often leads to health issues such as scabies, skin diseases and malaria in Vanuatu. Although the unimproved sanitation has been decreasing in both urban and rural areas, only 57.9% of the population has access to improved sanitation. The increasing frequency and intensity of extreme weather events may threaten the sanitation facilities and may increase the risk of vector borne diseases like dengue and other water related diseases. [SPC, 2022] [WHO, 2017] [United Nations-Habitat, 2015] [NACCC, 2007] [Republic of Vanuatu, 2014]

In Vanuatu, surface and groundwater are used for domestic purpose. The larger islands and a few small islands in Vanuatu can access groundwater, and volcanic islands have small rivers and streams. Shallow aquifers are mainly used as water source in urban areas, while bores, wells, springs, rivers and rainwater catchment are used in rural areas. However, only 90.5% of the population in the country has access to basic water supply. The health sector assessment showed that there would likely be a higher demand for potable water with the increase in overall temperature. Groundwater is likely to decrease due to lower widespread rainfall and greater run-off from high-intensity rainfall events. The lack of appropriate water infrastructure, the decrease in rainfall and prolonged periods of drought can severely affect the availability of water in the country. [The World Bank, 2021] [Water Aid, 2108] [SPC, GEF, United Nations Development Programme (UNDP), and SPREP, 2007]

2.4 Socioeconomic Vulnerability

Ni-Vanuatu vulnerability to hazards is exacerbated by their socioeconomic conditions. Low income and high poverty levels are one aspect of socioeconomic vulnerability. Geographically isolated and internally dispersed, with reliance on livelihood sectors prone to disasters -agriculture and tourism - and limited markets and routes accessible for creating economies of scale, ni-Vanuatu have limited economic opportunities. According to the 2010 household income and expenditure survey, 12.7% of households in Vanuatu lived below the basic needs' poverty line. Income in the urban areas is generated mainly through wage income from the services sector including government employment. However, despite having a regular source of income, people in urban areas, especially those working for the national government shared their difficulty in meeting basic needs -6.8 % of government employees and 17.1% of private sector employees were below the basic needs poverty line. [Vanuatu National Statistics Office and UNDP, 2014] [The World Bank, 2019]

In rural areas livelihoods are generally reliant on subsistence activities such as agriculture, livestock and fisheries - which also makes them highly vulnerable to the impact of disasters. For example, the post-disaster needs assessment found that TC Pam affected about 50% of all agricultural households located in disaster-affected provinces (11,256 out of 21,184 households) causing absolute or partial damage to their crops. The needs assessment found that on average each smallholder household suffered an income loss of VUV 412,32.2 (around USD 358.76). Currently, there are no microinsurance schemes to help protect from disaster losses to their livelihoods. The crop production rate is projected to drop by 15% following the TC Harold due to its high impacts in rural areas. [Vanuatu National Statistics Office and UNDP, 2014] [SPC, 2011] [Government of Vanuatu, 2022] [Government of Vanuatu, 2015]

In recent times, TC Harold and the ongoing COVID-19 pandemic severely affected the people's access to resources, shelter, health and income-generating opportunities and pushed many households into poverty and increased the levels of vulnerability. In 2020, the economic growth was revised to 0.6% from 3.8% (as of 2019) due to the dual impacts of TC Harold and COVID-19.

[Government of Vanuatu, 2022]

Insufficient full-time employment for people, especially young people contributes to migration and reliance on remittances, increasing disaster risk. According to the 2016 mini census, of the 146,283 individuals in the labour force, only about 30 % are employed in the formal sector, about 35% produce goods and about 32% of the population participate in unpaid labour which most likely comprises women undertaking domestic duties. In general, men had a higher economic participation rate than women - 80%, compared to 61.4%. Worth noting also is that even though the census characterises about 96% of the workforce as being economically active, only 30% of this segment receives a regular paid income. Other sources also point out that the formal economy produces less than 700 new jobs per year with about 5,000 young people joining the labour force annually, leading to a poverty of opportunity. With the lack of opportunities in the Vanuatu labour market, many are venturing to participate in the seasonal employment schemes such as Recognized Seasonal Employers (RSE, New Zealand) and Seasonal Workers Program (SWP, Australia) and the Pacific Labour Scheme (PLS, Australia) to work in horticulture and viticulture sectors. Vanuatu is the largest provider of seasonal workers with around 10,000 people undertaking seasonal work in both New Zealand and Australia. [Vanuatu National Statistics Office, 2017] [Government of Vanuatu 2015] [Vanuatu National Statistics Office and UNDP, 2014] [Government of Vanuatu, 2015] [ESU, 2022]

Given the lack of employment opportunities and low levels of income in comparison to the cost of living, especially in Port Vila and Luganville, a large swath of population occupies substandard housing and live in unhealthy conditions, due to a lack of affordable housing options. The 2009 census reports that 39% of the population in Port Vila are renters, and another 10% have not recognised land use rights across the 30 or more informal settlements. Research shows that most housing in these informal settlements is built from whatever material is available: corrugated iron, wood, traditional thatch and bamboo and recycled pieces of tin, plastic and wood. These settlements also lack basic services like piped water and sanitation. Houses in these settlements are often built on marginal land, including riverbanks and floodplains that are regularly flooded even in moderately heavy rain. During disasters households in informal settlements tend to be at higher risk given the structural integrity of their houses as well as the precarious location of their abodes and not to mention their limited capacities to cope with external shocks. In fact, it is documented that TC Pam affected rental stock in informal settlements in peri-urban and urban areas around Port Vila, destroying thousands of houses. Researchers found that in the aftermath of Pam, rent for a single room cost between 18,000 and 20,000 VT, when minimum wage in the area was only 26,000 VT. The lack of secure tenure and affordable housing options in the urban areas in Vanuatu add to the socio- economic vulnerability of its people. [Chung & Hill, 2002] [Government of Vanuatu, 2015] [Vanuatu National Statistics Office and UNDP, 2014] [Rey, Le De, Leone, & Gilbert, 2017]

2.5 Cultural Vulnerability

Cultural heritage is an important component of the community's identity and has a significant function for social cohesion. Traditional knowledge, skills and practices have supported the people in Vanuatu to survive and thrive in the changing environment. Communities share and transfer knowledge in "traditional nakamals" (buildings that serve as community centres) and custom schools. Vanuatu Cultural Centre and Malvatumauri are the two national government organisations that are given responsibilities to protect the cultural heritage of Vanuatu. [Government of Vanuatu, 2022]

Women in Vanuatu have a crucial role in the family as "protectors of culture and religious worship". However, social norms, values and practices, and male dominance in leadership positions, create a barrier for women to enter the formal economic sphere. Despite many efforts taken by the Government of Vanuatu, it is reported that "there is a resistance to change due to prevailing gender norms which grant men control over female behaviour, notions of masculinity linked to power and

decision making, and an acceptance of violence as a way to resolve conflict". Also, around 60% of the women in Vanuatu have experienced physical or sexual intimate partner violence at least once, and one in three girls under 15 years of age have encountered sexual abuse. [Molony, T, 2014] [Australian Aid, 2016] [World Vision, 2020]

During TC Harold, traditional and culturally significant buildings and plants were extensively damaged. These damages account for an estimate of USD 3,956,141 and an USD 4,600,696 is needed to recover. The damages to the traditional plants caused disruptions to the livelihoods of women, as they earn income from weaving (pandanus is used for weaving mats). [Government of Vanuatu, 2022]

If traditional skills and knowledge is not recorded or transferred, it can be lost. Other contributing factors for the loss of traditional knowledge and skills include loss of respect towards traditional values in younger generations, and western influence and value systems that override traditional systems. [Government of Vanuatu, 2022]

3. Progress in Sendai Framework for Disaster Risk Reduction

To illustrate the government's will and commitment to protecting the population and the country from future disasters, the following sections shed light on the Republic of Vanuatu's progress in CCA and DRR, as mandated and guided by the global policy frameworks: Sendai Framework for Disaster Risk Reduction. This section is organised by four priority areas of the Sendai Framework, in which focused actions are required within and across sectors by states at local, national, regional and global levels.

Priority 1. Understanding Disaster Risk. Understanding disaster risk means understanding vulnerability, capacity, exposure, hazards and the environment. Vanuatu, due to its geographical location, is exposed to natural hazards and the climate change events. Monitoring, collecting and analysing risk information supports in shaping policy and implementing goals to make Vanuatu more resilient. Vanuatu has worked with various agencies, from the private sector to NGOs to collect this data.

Vanuatu has been collecting data to understand its disaster risk for a long time. For example, Vanuatu's average temperature records have been kept for Efate since 1949 and Luganville since 1973. The temperature records show a gradual increase in temperature in the South of the country and a decrease in overall rainfall. Assessments were also conducted for the various development sectors as well (e.g., agriculture sector, health sector). [GEF, UNDP and SPREP, 2007]

Other assessments to help understand disaster risk have been completed in Vanuatu as well. One assessment, Pacific Islands Renewable Energy Programme (PIREP), looked at key energy issues and barriers to the development of renewable energy, was completed. By determining the barriers to renewable energy, the development needs for removing these barriers was launched. A similar assessment, Pacific Islands Energy Policies and Strategic Action Planning (PIEPSAP) Project was also completed to help with the development of energy policies as well as an action plan to implement these new policies. [NACCC, 2007] [Republic of Vanuatu, 2014]

Priority 2. Strengthening Disaster Risk Governance to Manage Disaster Risk. Strengthening national policy and legislation to coordinate effective DRR and disaster risk management is an important aspect to managing disaster risk. The National Disaster Act (also known as National Disaster Risk Management Act) published in 2000 is responsible for establishing NDMO, National Disaster Committee (NDC), Provincial Disaster and Climate Change Committee, and Municipal Disaster and Climate Change Committee. The National Disaster Act undergone a review in 2016 and was published in 2019. [Parliament of Vanuatu, 2020]

Vanuatu Climate Change and Disaster Risk Reduction Policy (2016- 2030) was developed by the Government of Vanuatu to provide a framework for the stakeholders to implement CCA and DRR actions in the country. It promotes good governance, determines a clear set of priorities for future actions, and promotes the engagement of all groups in society and stakeholders. [SPC, 2015]

Vanuatu's People's Plan (also known the National Sustainable Development Plan (2016 to 2030)) is the highest level policy framework developed to provide an overarching policy framework for achieving sustainability in the country. [Government of Vanuatu, 2016]

Priority 3. Investing in Disaster Risk Reduction for Resilience. Investing in DRR for resilience is an important component in effectively implementing policies, frameworks, legislation and strategies. The Government of Vanuatu has emphasised implementing economic, fiscal and financial policies that help achieve priority outcomes. Improving the infrastructure is expected to receive

around 20% of the budget, as around 90% of infrastructure, measured in economic terms, is located 500 metres from the coastline. This includes improving access to energy and electricity in rural areas and continuing the support of the National Green Energy Fund by promoting alternative sources of energy like solar, hydropower and other renewableenergy sources. Other infrastructure improvements include fixing roads, upgrading wharves and jetties and completing transport infrastructure maintenance funding strategies. [Government of Vanuatu, 2019] [The World Bank, 2018]

Vanuatu has also funded disaster risk management through Provincial Council Expenditure and Donor funding. In 2016, Vanuatu received a USD 23 million grant from the Green Climate to strengthen Climate Information Services (CIS) in the tourism, agriculture, infrastructure, water and fisheries sectors. Further co-financing of over USD 3.5 million has supported the programme. The grant aims to build the technical capacity in Vanuatu to help manage climate data and develop the CIS tool and resources.The project is estimated to take four years and has been underway since 2018, with the Ministry of Climate Change, Change Adaptation, Meteorology, Geohazards, Environment, Energy and Disaster Management taking the lead in the implementation [SPREP, 2016].

Funding has also been received from other international organisations to help implement Vanuatu's vision to invest in DRR for resilience. For example, the World Bank invested around USD 10 million through the Disaster Risk Management Development Policy Grant with a Catastrophe-Deferred Drawdown Option in 2019. The fund's primary goal is to support Vanuatu in enhancing the framework and institutional capacity to manage and become resilient to disasters and climate change and help manage the public debt. Some indicators for this grant are to measure the number of provincial and municipal disaster and climate change committees that are established as well reaching a minimum 35% grant element for any new financing that is external. Another example is USD 1.2 million in funding from the Global Facility for Disaster Reduction and Recovery for the Global Programme for Safer Schools which looks to promote investments in safety and resilience in new and current school infrastructure at risk from disasters as well as contributing to quality learning environments. [The World Bank, 2019] [The World Bank, 2017].

Priority 4. Enhancing disaster preparedness for effective response to "build back better" in recovery, rehabilitation and reconstruction. It is critical for Vanuatu to focus on disaster preparedness as well as effective response to "build back better" in recovery, rehabilitation and reconstruction efforts. Following the TC Pam and volcanic eruption on Ambae Island, farmers were supported by setting up a provincial breeding centre where new resilient animals could breed quickly and produce multiple offspring. These new animals could be sold much quicker at a reduced rate in the country community. The Department of Fisheries created a fish nursery that provided tilapia to inland communities who lacked access. Furthermore, farmers received seedlings from the Department of Forestry who employed women and individuals with disabilities collect the hardwood seeds to help improve the economic development and employment opportunities. These seeds were flown to a nursery in Port Vila, planted, and distributed to other communities for reconstruction of forests [Australian Aid, 2018].

"Building Back Better" was a key theme for rebuilding and recovering after TC Pam. For example, the Market House in Luganville was renovated in 2019 to improve its resilience to the impacts of natural hazards and climate change events. The renovation included a "Category 5 cyclone-resistant roof, more durable flooring and a new water drainage system" to minimize the risks of flooding and impacts during extreme weather events. During TC Harold in 2020 (with wind speed up to 270 kmph), the Market House sustained only minimal roof damage, allowing more than 3,000 market vendors to restart their selling goods and produce under one week of the storm. [UNDRR, 2020]

The Governments of Vanuatu and New Zealand collaborated to strengthen the seafront of Port Vila after TC Pam. The new public space was built keeping in mind the ni-Vanuatu culture. It was contracted with local materials and utilised local skills and labour to create a public gathering

space where locals can host tourists. [Government of Vanuatu, 2010] [New Zealand Institute of Landscape Architects, 2019]

4. Coherence with Sustainable Development Goals and the Paris Agreement

4.1 Strategic Coherence

Strategic coherence explores whether CCA and DRR activities are explicitly addressed jointly or if there is an aim to strengthen the relationship and linkages between the two fields. [UNDRR, 2020]

Vanuatu and other Small Island Developing States (SIDS) contribute to less than 1% of total greenhouse gas emissions but experience adverse weather events such as TC more frequently. Vanuatu is the highest rated country among the SIDS that are affected (in terms of loss of GDP) by the consequences of climate change. Therefore, the Government of Vanuatu has put great effort into making their policies and strategies coherent with the SDGs and the Paris Climate Agreement. For instance, the Vanuatu's National Policy on Climate Change and Disaster Risk Reduction 2016 - 2030 (CCDRR) is coherent with the SDGs and the Paris Agreement. It provides a framework that helps communities, the environment and the economy to be more resilient to the impact of climate change and disaster risks. The policy is to be implemented by all government and nongovernment organisations looking to identify, assess, reduce and manage risks by focusing on accountability, sustainability, equity, community focus, collaboration and innovation. [SPC, 2015]

The National Sustainable Development Plan (NSDP) addresses climate change and disaster risks joints under one of the "Environment Pillar". It also addresses the challenges and constraints to improve human rights in their "Social Inclusion" section. NSDP looks to uphold human dignity where everyone, including marginalised groups, are supported, protected and promoted. Vanuatu considers human rights as an important aspect to its governance and promotes peaceful and inclusive societies for sustainable development. [Government of Vanuatu, 2016]

In Vanuatu's National Adaptation Programme for Action, Vanuatu Enhanced Nationally Determined Contributions 2020-2030 (updated) (NDC), and the National Energy Road Map 2016- 2030, there is a strong coherence to the Paris Climate Agreement. There is a promotion of the Renewable Energy Efficiency and Greenhouse Gas Abatement project whose main purpose is to invest in renewable energy, energy efficiency as well as greenhouse gas abatement technologies. These policies also promote the Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) which looks to reduce growth of greenhouse gas emissions by using cost-effective renewable energy resources. In Vanuatu's Energy Road Map, there is reiteration of the government's commitment to reducing the energy sectors greenhouse gas emissions by increasing the share of electricity generation from renewable sources. The Road Map even sets targets for emission reductions, increases in renewable energy as well as energy efficiency. [NACCC, 2007] [Government of Vanuatu, 2016] [Government of Vanuatu, 2020]

Apart from that, Vanuatu's Sustainable Tourism Policy 2019-2030, National Policy on Climate Change and Disaster-Induced Displacement, Vanuatu National Environmental Policy and Implementation Plan 2016–2030, and the National Gender Equality Policy 2020–2030 are coherent with at least one of the international frameworks (SFDRR, SDGs and the Paris Agreement) as it jointly addressed CCA and DRR. Vanuatu was one of the first Pacific Island Countries to mainstream CCA and DRR into national planning. Based on the analysis presented in the Table 2, Vanuatu's national policies and plans are coherent with the global frameworks. [Government of Vanuatu, 2020] [Government of Vanuatu, 2019] [Government of Vanuatu, 2018] [Government of Vanuatu, 2016]

Sectoral Aim	Policies with Linkages to Sendai Framework for Disaster Risk Reduction	Policies with Linkagesto Sustainable Development Goals	Policies with Linkages to the Paris Climate Agreement for Environment
National Development	National Adaptation Programme for Action	National Adaptation Programme for Action	National Adaptation Programme for Action
	National Sustainable Development Plan (2016-2030)	National Sustainable Development Plan (2016-2030)	
	Disaster Risk Reduction and Disaster Management National Action Plan (2006-2016)		
	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction (2016 –2030)	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction (2016 – 2030)	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction (2016 – 2030)
Environmental Protection	Vanuatu National Environment Policy and Implementation Plan (2016-2030)	National Adaptation Programme for Action	National Adaptation Programme for Action
		Vanuatu National Environment Policy and Implementation Plan (2016-2030)	Vanuatu National Environment Policy and Implementation Plan (2016-2030)
Disaster and ClimateRisk Reduction	Vanuatu National Energy Road Map (2016-2030)	Vanuatu National Energy Road Map (2016-2030)	Vanuatu National Energy Road Map (2016-2030)
		Vanuatu's Sustainable Tourism Policy 2019-2030	Vanuatu's Sustainable Tourism Policy 2019-2030
		National Sustainable Development Plan (2016-2030)	Strategic DevelopmentPlan (2014-2023)
	Vanuatu National Environment Policy and Implementation Plan (2016-2030)	Vanuatu Climate Changeand Disaster Risk Reduction Policy (2016-2030)	
	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction 2016 - 2030	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction 2016 - 2030	Vanuatu's National Policy on Climate Change and Disaster Risk Reduction 2016 - 2030
Vulnerability Reduction	National Adaptation Programme for Action	Vanuatu National Disability Inclusive Development Policy (2018-2025)	National Adaptation Programme for Action
	Vanuatu Climate Change and Disaster Risk Reduction Policy (2016-2030)	Vanuatu Climate Change and Disaster Risk Reduction Policy (2016-2030)	
		National Gender Equality Policy (2020-2020)	Strategic Development Plan (2014-2023)

Sectoral Aim	Policies with Linkages to Sendai Framework for Disaster Risk Reduction	Policies with Linkagesto Sustainable Development Goals	Policies with Linkages to the Paris Climate Agreement for Environment
Land Use Planning	Vanuatu National Environment Policy andImplementation Plan (2016-2030)	Vanuatu National Environment Policy and Implementation Plan (2016-2030)	Vanuatu National Environment Policy and Implementation Plan (2016-2030)
	Vanuatu Climate Change and Disaster Risk Reduction Policy (2016-2030)	National Sustainable Development Plan (2016-2030)	
	National Land Use Planning Policy	National Land UsePlanning Policy	National Land Use Planning Policy

Table 2. Synergies between the national policies, plans and frameworks by sector

4.2 Conceptual Coherence

Conceptual coherence explores how countries link DRR and CCA conceptually, through the concept of risk and resilience. These concepts are strongly addressed in NSDP and Vanuatu's CCDRR policy. For instance, the NSDP's policy objectives of the "Environment Pillar 3" aims to enhance the "resilience" of the country to face the risks posed by the natural and man-made (e.g., climate change) hazards. The Vanuatu's Climate Change and Disaster Risk Reduction's vision is to build a "resilient" nation to tackle the impact of climate change and disaster risks. Apart from that, other plans and policies in Vanuatu also focuses on embedding resilience into the nation and attempted to integrate CCA and DRR. Overall, a strong conceptual coherence is observed in Vanuatu. [UNDRR, 2020] [SPC, 2015] [Government of Vanuatu, 2020] [Government of Vanuatu, 2019] [Government of Vanuatu, 2018] [Government of Vanuatu, 2016]

4.3 Operational Coherence

Operational coherence looks at measures and activities which bring together CCA and DRR practices and to which extent planning is cross-sectoral. The CCDRR policy includes several CCA and DRR activities under the six strategic priorities. For example, one of the actions of "strategic priority 7.4.2-Integrated CCA and DRR" is "incorporating an integrated curriculum approach to formal and non-formal education programmes". The NSDP has a few CCA and DRR activities, such as "promote and ensure strengthened resilience and adaptive capacity to climate related, natural and man-made hazards". Although there are no sectoral goals and objectives in Vanuatu's CCDRR Policy and the NSDP, the dedicated sectoral policies such as Agriculture Sector Policy 2015-2030, National Forest Policy 2013–2023, National Water Strategy 2018–2030, etc., include several CCA and DRR activities. For instance, the Agriculture Sector Policy 2015-2030 includes 17 policy directives that mainstreams climate variability, climate change and DRR using adaptation and mitigation strategies in all agriculture initiatives and developments. [UNDRR, 2020] [Government of Vanuatu, 2016] [SPC, 2015]

4.4 Institutional Coherence

Institutional coherence analyses whether coordination between CCA and DRR is envisioned and if and how institutional arrangements support coherence. In Vanuatu, the lead agency for managing the disaster risks is the NDMO, and the newly established DOCC manages the impacts of climate change. Even though NDMO and DOCC are separate institutions, they are under the Ministry of Climate Change and Natural Disasters (MoCC). NDMO and DOCC's vision is to ensure communities are resilient to face the impacts of natural hazards and climate change by integrating the coordination of DRR and CCA into sectoral plans, policies and budgeting. National Advisory Board on Climate Change and Disaster Risk Reduction (NAB), the main policy making and advisory

organisation for all climate change and DRR programmes, projects and activities, is given the responsibility to coordinate and implement Vanuatu's CCDRR Policy. Overall, there is a strong coherence between the country's climate change and disaster management institutions. [UNDRR, 2020] [NDMO, 2022] [DOCC, 2022]

4.5 Financial Coherence

Financial coherence explores whether and how funding strategies and investments bring together CCA and DRR. Ministry of Climate Change (MoCC) manages the adaptation and mitigation projects of value above USD 17,500, and the relevant sectoral institutions undertakes the responsibilities of managing the projects that are valued less than USD 17,500. Vanuatu receives nearly 63% of their climate finance through multilateral sources (such as the World Bank, Asian Development Bank, Global Environment Facility), and around 37% of climate finance through bilateral sources (such as Australia, Japan, China and New Zealand). [UNDRR, 2020] [SPC, 2021] [GIZ, SPC, USAID, UNDP, 2018]

5. Challenges and Priorities

5.1 Challenges

The Vanuatu Climate Change and Disaster Risk Reduction Policy 2016-2030 presents many challenges that the country may face in the future. For example, the remoteness of many islands and communities, the lack of communication infrastructure, and expensive and limited transport, makes it a challenge for the stakeholders from the national and provincial level to carry out preparedness and response activities. [SPC, 2015] [Jackson.G, Namara.K.E, Witt.B, 2019] [Australian Aid, 2018]

Poor coordination between stakeholders such as non-governmental organisations and community-based organisations created many bottlenecks during TC Harold response operations. Many stakeholders and agencies that support Vanuatu following a disaster often fail to communicate with each other which leaves many disasters affected locations untouched, and some locations are overwhelmed with support. [Australian Aid, 2018] [NDMO, 2021]

In Vanuatu, while there is a high degree of skills in meteorological forecasts and warnings exists. However, translating these forecasts and warnings into impacts are limited. There is a need to introduce and develop an impact-based forecasting and warning system asper the guidelines proposed by the World Meteorological Organisation (WMO) in 2015.

The limited technical and human capacity at local level limits the implementation of DRR activities, as majority of the work is carried out in a top-down approach. It is reported that, the literary and numeracy levels at local levels is one of the hindering factors for limited capacity. Besides, there is limited technical and financial capacity to effectively implement DRR activities. [Jackson.G, Namara.K.E, Witt.B, 2019] [Australian Aid, 2018]

Currently, there is no effective institutional framework for managing the recovery process/projects of housing sector in Vanuatu. There are no approved building codes or land use policies, and the government has limited finances to build resilient houses that can withstand the impacts of the natural and climate hazards. Also, financial assistance packages for disaster-affected households are lacking to meet the repair and rebuilding needs following a disaster. [Government of Vanuatu, 2022]

5.2 Priority Areas of Work

The priority areas of work summarised needs to be carried out by Government of Vanuatu in support with other stakeholders (such as non-governmental organisations (NGO), communty-based organisations, development partners, and relevant government organisations).

Safeguard traditional knowledge and heritage sites: Promoting and preserving cultural and traditional knowledge as well as conserving sites of cultural and historical significance is important to carry out historical knowledge. Vanuatu Cultural Centre in collaboration with NDMO, needs to conduct regular awareness programmes together with civil society organisations (CBO) and NGOs to the community and record the traditional knowledge to prevent losing the information. [Government of Vanuatu, 2016]

Improve critical infrastructure: To promote the resilience of new and existing critical infrastructure, including water, transportation and telecommunications infrastructure, educational facilities, hospitals and other health facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide live-saving and essential services.

Training and capacity building programmes: Training and capacity building programmes were especially important when it comes to disaster risk preparedness in more isolated communities so that they have the proper skills and systems in place for support when disasters do occur.

Improve technical capacity: An assessment needs to be conducted to analyse the current capacity and gaps at the national, provincial and community level. Based on this, a development plan can be completed with skill sets and competencies required to implement DRR and Climate Policy.

Inclusion of marginalised groups: The active and meaningful participation of people from marginalised groups is also an important issue that needs to be addressed by the stakeholders (such as NGOs, CBOs, development partners, and government organisations) in Vanuatu. Although the Government of Vanuatu is taking initiatives and published the National Gender Equality Policy (2020-2030), women, have historically been excluded, need the opportunity to participate in policy development, decision making and implementation. This goes for other groups left out of decision-making including persons with disabilities, the elderly, and youth. [SPC, 2015] [Government of Vanuatu, 2020].

Improve economic activities: By creating strong links between urban and rural business and promoting internal trading between islands as well as increasing production of niche commodities and expanding the tourism sector, more jobs and business opportunities will be created. [Government of Vanuatu, 2016]

Enhance Multi-Hazard Early Warning System: More attention is required for further development of key components of early warning systems namely risk knowledge (risk informed early warning systems), monitoring (hydrological monitoring systems), forecasting and warning and cross-cutting theme of governance (risk informed policies and plans, financing and sustainability). In Vanuatu, flash flood and fluvial (i.e., riverine) flood monitoring and forecasting systemneeds to be improved. This requires the introduction of hydrological observing network and the addition of new technologies, including weather radar (i.e., Doppler). Weather monitoring also requires an upgrade to the current synoptic observing network to include automated meteorological data observations. Promote usage of advanced models to improve climate adaptation adoption and service delivery. [WMO, 2017] [Fakhruddin et al., 2021)

Improve data management: The existing mechanism for data and information sharing in support of early warning and response appear to be impromptu and needs more formal approach through regulations. Partnerships among agencies should, wherever possible, be formalised so that critical data are always available. Improve the observation stations, network stations, and other technical elements for obtaining accurate data on climate change and disaster to make informed decisions and environmental management.

Conduct risk assessment: There is a need to carry out comprehensive risk assessments for Vanuatu. This should include assessment of hazard, vulnerability, exposure and adaptive capacity. Such assessments would enable issuance of impact-based forecasting and early warnings in the country.

Community based disaster risk management: Community-based adaptation and DRR measures should be identified and presented in the CCDRR Policy for effective implementation. Such measures should be identified by conducting the vulnerability and needs assessment and by including the community.

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