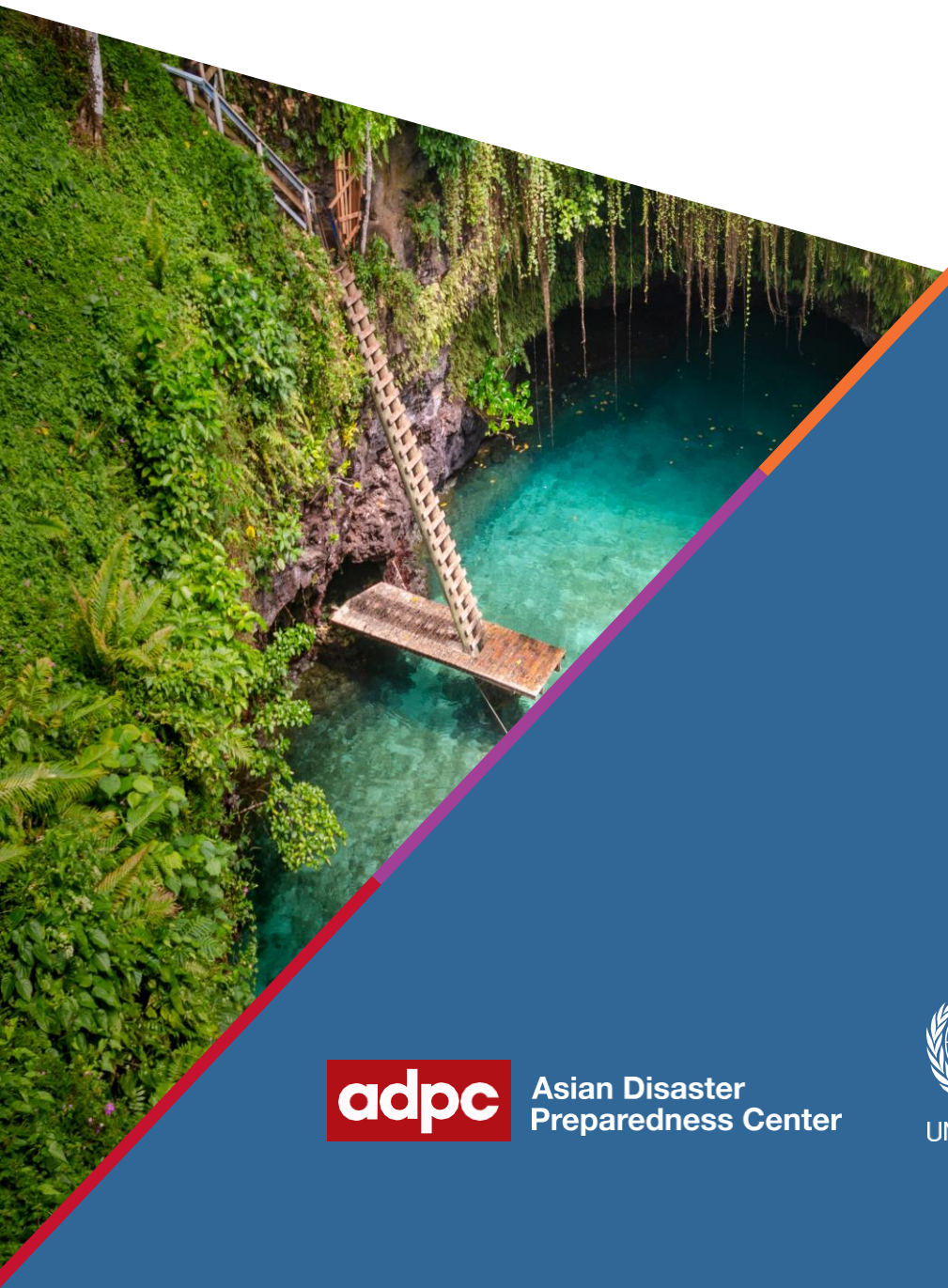
Disaster Risk Reduction in Samoa

Status Report



adpc Asian Disaster Preparedness Center

UNDRR UN Office for Disaster Risk Reduction

Disaster Risk Reduction in Samoa

Status Report

Status Report 2022

Cover photo: Shutterstock.com

About this report

The disaster risk reduction status report provides a snapshot of the state of disaster risk reduction in Samoa 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 and provides recommendations for strengthening disaster risk management governance by government institutions and stakeholders at national and local levels.

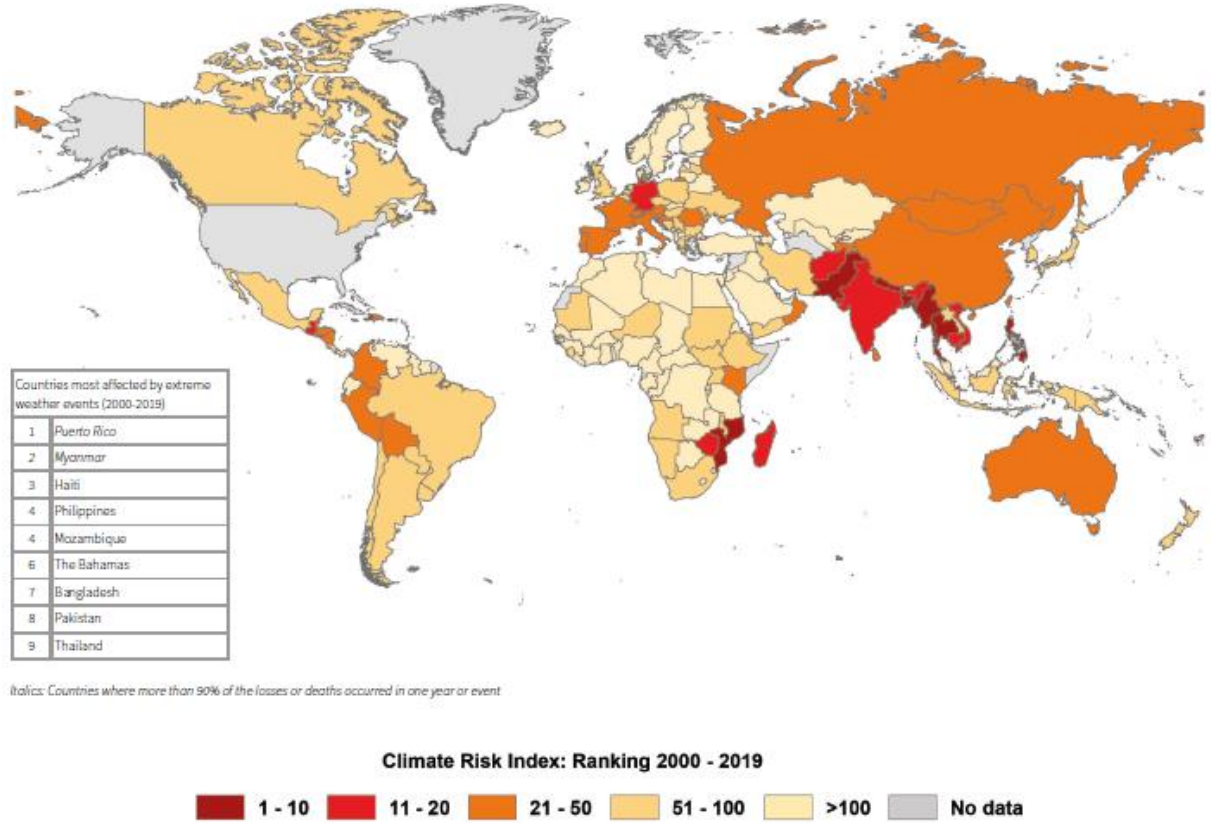
This report was prepared by the United Nations Office for Disaster Risk Reduction (UNDRR) with support from the Asian Disaster Preparedness Center (ADPC) and Tonkin + Taylor through country consultations and a desk review of key documents, including legal instruments and disaster risk reduction frameworks,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

This report was made possible with the support of the Government of Ireland, the Ministry of Foreign Affairs and Trade, and the Government of Australia, the Department of Foreign Affairs and Trade.

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.

UNDRR (2022). Disaster Risk Reduction in Samoa: Country Update 2022, United Nations Office for Disaster Risk Reduction (UNDRR), Sub-Regional Office for the Pacific

Contents



(GermanWatch, 2021)

POPULATION 2020	
Total Population	198 410
Urban Population	35 494 (17.9
Population Density per Km²	70
ECONOMIC INDICATORS	
Gross Domestic Product in Current $US	807.14 millio
GDP Per Capita ($US)	4 068
GDP Growth (Annual %)	-2.6%
HUMAN DEVELOPMENT	
Human Development Index	0.715
HDI Rank	111
Income Level Category	Lower Middl Income

Climate Risk Index

Rank 70, Score of 72.67*

INFORM Risk Index

Rank 111 / Low Risk**

World Risk Index

Rank 109 / Low***

* 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 2021 assesses the disaster risk for 181 countries based on Exposure, Vulnerability, Susceptibility, Lack of coping capacities, and Lack of adaptive capacities. (Bündnis Entwicklung Hilft, 2021)

1. Introduction

The Independent State of Samoa is in the South Pacific Ocean and is made up of 10 islands (two larger and eight smaller), out of which four are inhabited. These 10 islands together make a land mass of 2,900 km^2 spreading over 98,000 km^2 of water. This makes Samoa's exclusive economic zone (EEZ) smallest in the South Pacific region. Samoan main islands are characterised by mountainous topography from volcanic origin. The island of Upolu, where the capital Apia is located, has a mountain range that extends the entire length of the island with some peaks over 1,000 metres above sea level (Pacific Climate Change Portal, 2018).

Samoa has a relatively uniform climate with slight variations in seasonal temperatures. Surface air temperatures are generally constant year around with small seasonal differences between warmer and cooler months. The amount and distribution of rainfall are influenced by the South Pacific Convergence Zone and the mountains. Wetter areas are in the south-east and drier areas in the north-west. Atolls at the far north are much drier than atolls in the south and receive about half the rainfall, on average: about 50 inches (1,250 mm). The dry season runs from May to October and a wet season from November to April. Like most countries in the South Pacific, Samoa's weather is greatly driven by the El Niño Southern Oscillation (ENSO) with the El Niño events bringing drier seasons and La Niña events bringing wetter and colder seasons. Although La Niña seasons tend to be wetter, tropical cyclones have occurred more frequently during the El Niño years between the months of November and April. [Australian Bureau of Meteorology and CSIRO, 2011] [DFAT, 2021].

Samoa has various unique species of plants, animals, and marine life. The country has the most diverse flora in the Polynesia with over 500 species of native flowering plants and around 220 species of ferns in 96 families and 298 genera. Also, there are 13 species of terrestrial mammals, 44 species of land birds, 21 seabirds, 15 reptiles, 59 species of insects, 64 species of land snails and 28 species of butterflies. There are around 890 species of reef fish, 56 in the deep water and 45 in mid-water (pelagic), making the Samoa's fish fauna one of the richest in the world (Convention on Biological Diversity, 2022)

Samoa relies heavily on its natural resources. Main economic sectors and key contributors to the Gross Domestic Product (GDP) are agriculture and fisheries sectors. Most cultivated crops are taro, bananas, breadfruits, yams, cacao, and coconuts. Other contributors to GDP are construction, tourism, transportation and professional services. In 2020, Samoa's GDP was around USD 807.10 millionIt declined by 7% in 2021 due to the impact of COVID-19 pandemic and associated international travel restrictions, reduced trade, and national lockdown. (Samoa Bureau of Statistics, 2021) (The World Bank, Samoa, 2022).

Samoa's national income depends mostly on international trade, overseas aid, and remittances. Fishing is the main staple of the Samoan diet with households consuming fish most days of the week. It is also Samoa's most important export through subsistence and commercial fishing. The tourism sector made up around 24.5% of the nation's GDP prior to COVID-19 as of 2019. In 2019, around 173,900 people arrived by air and more than 13,200 passengers landed by cruises in Samoa mostly for leisure (38%), visiting friends and families (37%), and other activities (25%). [PSDI, 2021][Food and Agriculture Organization of the United Nations, 2018] [Samoa Tourism Authority, 2019] (Pacific Climate Change Portal, 2018).

1.1 Demographic Characteristics

The preliminary count of all the population living in Samoa is 200,010 (98,104 female and 101,906 male) as of November 2021, which is an increase of 2.05% since 2016. Unlike other Pacific Island Countries, urban population is decreasing. The Apia Urban Area on Upolu made up 18.5% of the Samoan population in 2016 and decreased to 17.4% in 2021. Most of the movement is towards to Northwest Upolu which rose from 35.09% in 2016 to 37.10% in 2021. (Samoa Bureau of Statistics, 2021).

Majority of people (89.8%) are of Samoan origin, 8.7% are part Samoan origin, and 0.9% are from another origin. About a third of the population are Ekalesia Faapotopotoga Kerisiano Samoa which is a Congregational Christian Church while the rest of the population is a mix of Methodist (12.4%), Roman Catholic (18.1%), LDS (16.0%), or part of the Assembly of God religion (10.9%) (Ministry of Health, 2015).

Most women (69%) have a secondary education; 28% of women have higher than a secondary education. Around 3% of women have less than a secondary education. Likewise, 70% of men have a secondary education with another 22% having more than a secondary education. However, around 8% of men did not finish secondary education. (Samoa Bureau of Statistics, 2021)

The Samoan government is a legislative assembly made up of 49 individuals. In 2013, an amendment was added to the constitution, named the Constitution Amendment Act, that requires 10% of the Parliament to be women. If during the election cycle this quota is not met, five more seats for women are added to the Parliament, bringing the number of seats up to 54. In 2016 elections, 164 candidates participated in the general election (out of which 24 were women), and only four women were elected to the Parliament. In 2021 elections, a total of six women were elected as Member of Parliament, where two were elected through the women's quota and others were elected outright. (PACWIP, 2022)

The culture in Samoa is based on the Fa'asamoa or 'the Samoan way of life' which emphasises the group over the individual. Samoan identity focuses on the needs of the social group and is very family oriented and achieving social obligations.

1.2 Economic Impact of Disasters

Samoa experienced 56 events with associated losses of USD 543 million between 1965 and 2015. In 2009, an 8.0 magnitude earthquake hit close to Samoa, generating tsunamis (11 metres) and causing significant amounts of damage to Samoa, as well as American Samoa and parts of Tonga. It is estimated that the tsunami caused USD 124 million in damage, or 22% of Samoa's GDP even though it only affected a part of Samoa. The GDP contracted by 5.1% following the tsunami. The economic loss for infrastructure sector (housing, community, water, electricity, transport, and communication) accounted for over half of the total damages (i.e., USD 65.22 million), followed by the economic sectors such as agriculture, commerce, and tourism with USD 43.99 million, and the social sectors such as education and health with USD 7.20 million. (Government of Samoa, 2009).

Figure 1 shows the summary of damage and loss due to the tsunami in Samoa by main economic sectors. Infrastructures and Productive sectors were most affected. There is a more than 20% chance of a potentially damaging tsunami occurring in the next 50 years. (EERI, 2009; The World Bank, 2015; Australian Bureau of Meteorology and CSIRO, 2011)

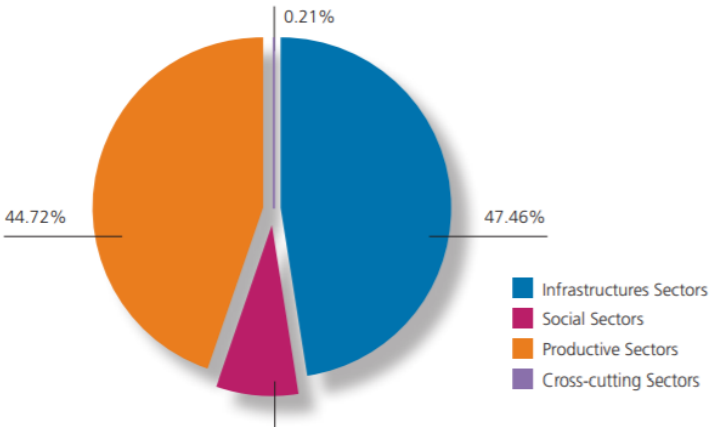


Figure 1: Distribution of disaster effects among the main economic sectors (Government of Samoa, 2009)

Of the hazards of significance to Samoa, tropical cyclones rank high. They have had a devastating effect on the Samoan economy. In 2012, Cyclone Evan caused USD 203.9 million in damages and losses, which is equivalent to 29% of the country's GDP. The Samoan economy felt the negative effects of the disaster for about three years. It is estimated that 9,600 jobs were lost across various sectors, especially in agriculture and tourism industries. Figure 2 presents the sectoral distribution of damage and loss by individual sector of economic activity. [The World Bank, 2015] [DFAT, 2021] [Government of Samoa, 2013]

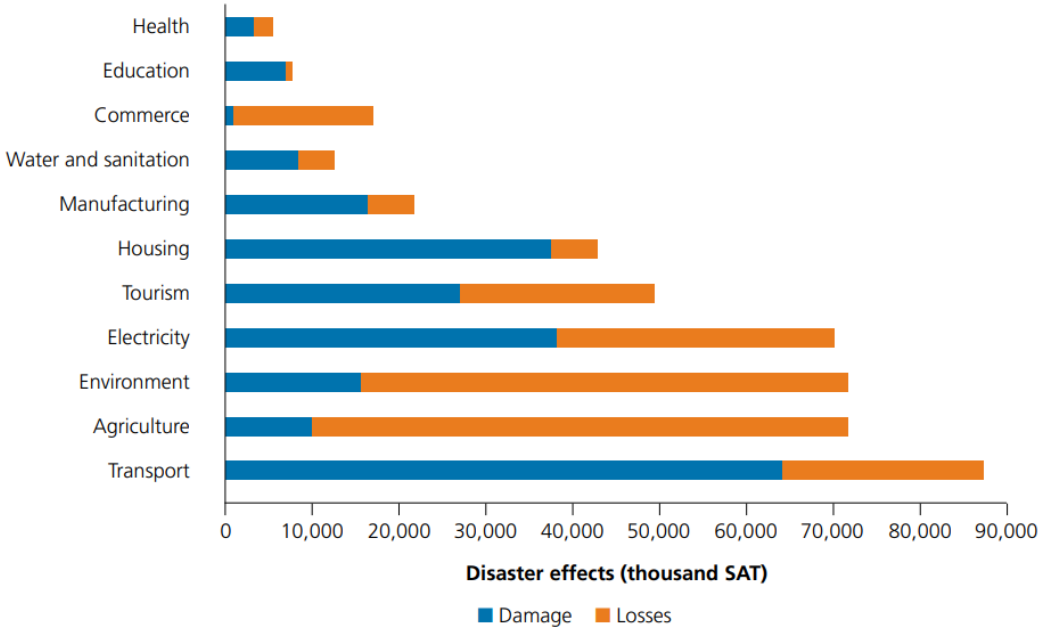


Figure 2: Sectoral distribution of damage and loss (Government of Samoa, 2013)

In the future, Samoa is projected to incur, on average, about USD 10 million per year in losses due to earthquakes and tropical cyclones. Additionally, over the next four decades, Samoa has a 50% chance of experiencing a disaster related loss exceeding USD110 million, and a 10% chance of experiencing a disaster related loss exceeding USD 350 million. (GFDRR, 2019)

Since the beginning of pandemic, the country's economy has collapsed by more than 8%. The travel restriction due to COVID-19 has plummeted the earning of tourism sector to zero (33 of 110 hotels and 131 of 141 handicraft businesses were closed). Nearly two-thirds of the household income was declined and more than 70% of the households had difficulties in accessing loans due to COVID-19 [RNZ, 2021] [Australian Government, 2021]

1.3 Social Impact of Disasters

In Samoa, there is a strong bond between community and participatory governance practices in which there are regular meetings where extended families elect a leader, and these leaders meet and form a Village Council. Usually, there is a strong cohesion between the Village Council and the Church, as they work with community services to provide health and education services at the village level. Disasters, however, have affected this social structure. For example, the 2009 tsunami caused USD 18.58 million in damages to community centres and village churches that play a central role in the village governance. The most severe damages and losses from the tsunami is experienced in the southern area of Upolu (which is one of the poorest areas in the country). Much of the income earning opportunities in this area were destroyed, which indirectly affected the students. Paying for school uniforms became very challenging and transportation charges to school and back became expensive. [Samoa Bureau of Statistics, 2008] [Government of Samoa, 2009]

Subsistence livelihoods suffered the most due to reduced income and food sources following disaster events. The elderly, children, and people with disabilities, were hit the hardest from tropical cyclones and faced challenges in getting their lives back to normal. The Tropical Cyclone Evan destroyed nearly 700 houses, affecting around 4,200 people. These households needed immediate technical and financial assistance. Some communities lacked clean water and sanitation facilities for longer than a month after the storm that led to a prevalence of water-borne and other diseases. Following the 2018 Tropical Cyclone Gita, accessing healthcare facilities was particularly challenging due to the damages to road and lack of money to travel to these facilities. Psychological such as trauma, grief, and devastation were also identified amongst the affected populations, volunteers, public servants, and the first responders [Government of Samoa, 2013] [MFAT & DFAT, 2018] [Tamasese, Parsons, Waldegrave, & Thompson, 2014] [Seiuli, Nikora, Awekotuku, & Hodgetts, 2016].

2. Disaster Risk Profile

2.1 Governance and Institutional Mechanism

The National Disaster Council (NDC) and the National Advisory Committee were established by the Disaster and Emergency Management Act of 2007. The NDC is responsible for reviewing and approving recommendations by the Disaster Advisory Committee and providing directions to ministries on implementation of the recommendations. Other responsibilities include implementation of risk reduction, preparedness, response, and recovery activities by all agencies related to disaster management. The National Advisory Committee is responsible to review approaching disasters and advise the NDC and to implement he National Disaster Management Plan (Government of Samoa, 2007).

Disaster Management Office (DMO) division under the Minister of Natural Resources and the Environment (MNRE) is responsible for coordination, development and implementation of the disaster risk management programmes and activities. It has, with other government and non-governmental organisations, created a "unified system" to implement disaster risk reduction in local communities. It consists of the following sections:

- Disaster Risk Reduction Section, which is responsible for ensuring effective coordination and management of risk reduction programmes to minimise the impacts of natural and human induced hazards. It supports in conducting hazard and vulnerability assessments, assists technical ministries in developing risk reduction measures, coordinating the planning and execution of the national disaster risk management platform, and promoting, initiating, and supporting the recovery activities. This section is also responsible for monitoring and evaluating (M&E) the progress of disaster risk reduction measures.
- Disaster Management Section, responsible for providing an overall assurance of effective coordination and management of programmes to prepare for, respond to and recover from natural and human induced disasters. It functions include, leading the implementation of preparedness, response, and early recovery components, facilitating in the development, maintenance, and testing of the disaster management/response plans, establishing and maintaining communication systems, supporting recovery activities, and Monitoring & Evaluating the disaster risk reduction activities.
- Community Disaster Preparedness section, which encourages villages to take responsibility for their protection from disasters. It monitors the implementation of Community Disaster and Climate Risk Management (CDCRM) Programme that facilitates community-driven process to identify hazards in each village, develop and implement risk reduction measures, establish, and train disaster committees and response teams, and support vulnerable groups. Under the CDCRM Programme, Village Disaster and Climate Committees are established in each village to coordinate disaster mitigation and preparedness activities and village response teams (Government of Samoa, 2017).

Climate Change and the Global Environment Facility (GEF) division was recently established under MNRE to coordinate and implement climate change related projects in the country. National Climate Change Coordination Committee was established to monitor the climate change activities at policy level.

Samoa Meteorology Division (SMD) is the National Meteorological and Hydrological Service mandated to provide meteorological, geo-science, climate change advice in support of sustainable development of natural resources. It has two offices, both on the Upolu Island. The headquarters is in Apia and there is a separate office at Faleolo International airport. SMD is responsible for the National Tropical Cyclone Warning Center that provides cyclone forecasts warnings and non-cyclonic severe weather events.

Multilateral partners including Asian Development Bank (ABD), European Union, the International

Monetary Fund (IMF), USAID, and the World Bank Group; bilateral partners such as Australia, Japan, New Zealand, the People's Republic of China; and various agencies of the United Nations provide development assistance in Samoa.

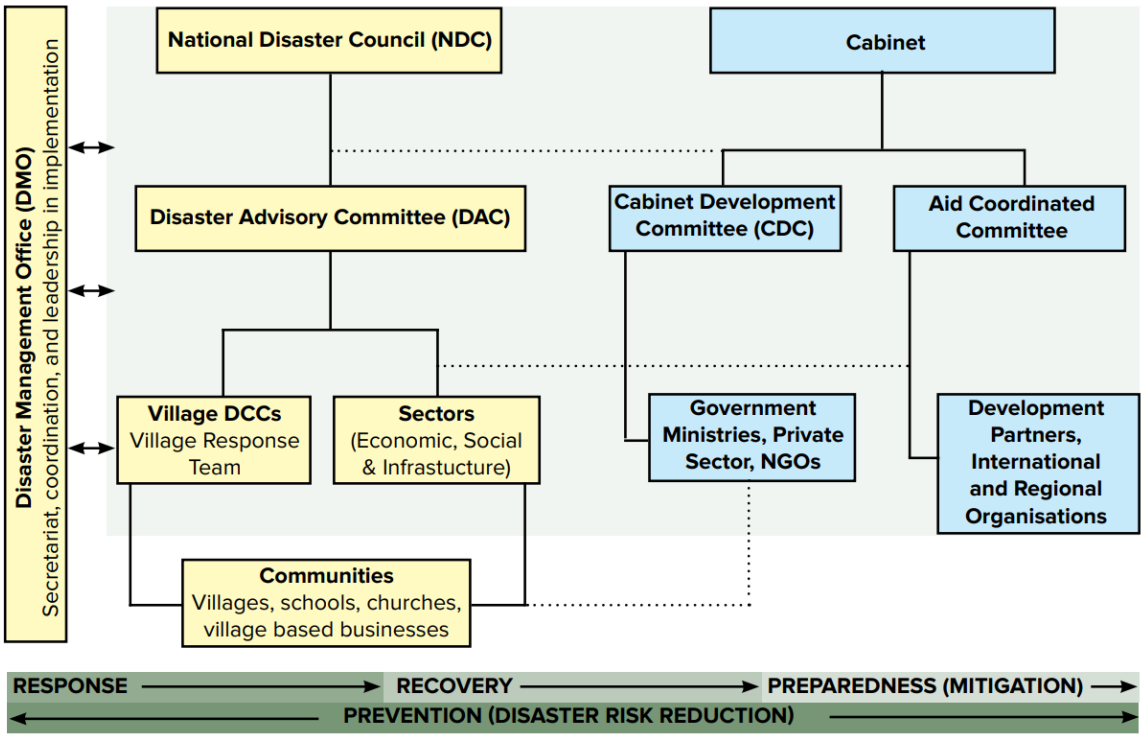


Figure 3: Organisational structure for disaster risk management in Samoa

Samoa National Actional Plan for Disaster Risk Management (2017-2021) supports the Government of Samoa, sectors, and local government to promote disaster risk management. It also provides a mechanism to enable responses to threats that may cause a disaster and recovery from the impacts of disasters. It helps define the roles and responsibilities of the various councils and committees. It was published in conjunction with the National Disaster Management Plan 2017 - 2020. Its strategic goals and outcomes are aligned with the National Strategy for the Development of Samoa, the National Environment Sector Plan, and are reflective of the Disaster and Emergency Management Act of 2007 (Government of Samoa, 2016).

Legislation/Policy	Scope	Purpose
Disaster and Emergency Management Act (2007)	National	Establish an efficient structure for the management of disasters and emergencies by creating NDC and Disaster Advisory Committee
Samoa National Actional Plan for Disaster Risk Management (2017-2021)	National, local	Implement the national disaster management plans, goals, and priority measures through a whole-of-government and whole-of-society approach
National Disaster Management Plan (2017-2020)	National, local	Policy framework that promotes a whole-of-country and multi-sectoral approach to disaster risk management at a local, national, and regional level

Legislation/Policy	Scope	Purpose
Samoa Climate Change Policy (2020)	National, local	Country's plan of action and the interventions to improve the resilience to the impacts of climate change
Samoa National Policy for Gender Equality (2016-2020)	National, local	Provides a comprehensive framework for accelerating and enhancing gender equality and the well-being of women in Samoa. The policy outcome 6 focuses on community resilience and climate change and disaster preparedness informed by gender sensitive information and approaches
Strategy for the Development of Samoa (2016-2020)	National, local	Updates the previous strategy to continue to progress the priorities and strategic outcomes of the government over the four years to achieve economic, social, community, and environmental improvements

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

2.2 Hazard and Exposure

Samoa, like it's Pacific neighbours, is exposed to several hazards such as cyclones, tsunami, earthquake, drought, and wildfire. According to EM-DAT, Samoa experienced 15 devastating disasters between 1940-2020. Storm events account for 73% of disasters and affected 391,707 people (Figure 4). In the future, Samoa is projected to incur, on average, about USD 10 million per year in losses due to earthquakes and tropical cyclones. Additionally, over the next four decades, Samoa has a 50% chance of experiencing a disaster related loss exceeding USD 110 million, and a 10% percent chance of experiencing a disaster related loss exceeding USD 350 million. (GFDRR, 2019; The World Bank, 2015; EM-DAT, 2022)

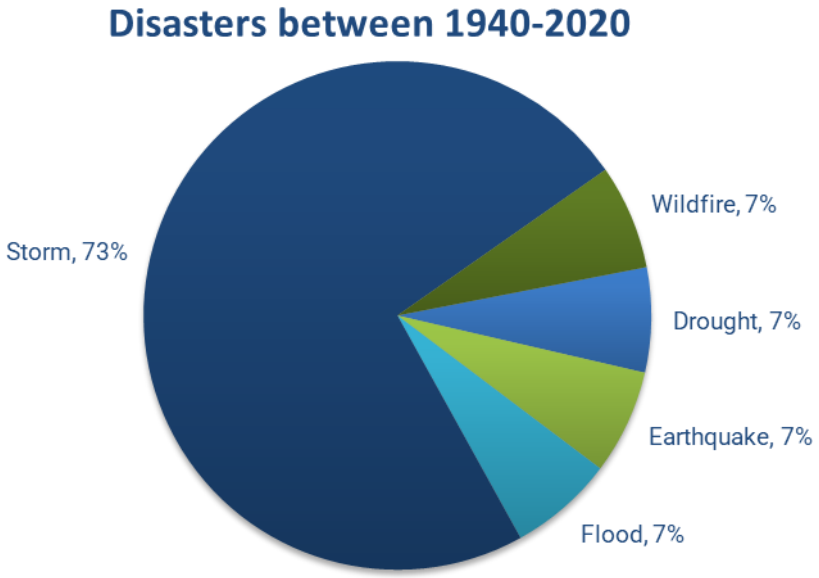


Figure 4: Number of disasters in Samoa between 1940 and 2020 (EM-DAT, 2022)

In Samoa, tropical cyclones form between November and April and usually result in heavy rainfall, flash flooding, coastal and riverine flooding, storm surge, flooding in coastal and low-lying areas, strong winds and landslides. Between 1969 and 2009, the country experienced a total of 26 tropical cyclones in its EEZ. In 2012, Tropical Cyclone Evan severely affected the country which killed more than 10 people and displaced thousands. Tropical Cyclone Gita in 2018 made landfall as a category

2 cyclone in Samoa caused localised flooding and damaged infrastructure and houses. According to GFDRR, Samoa has more than a 20% chance of experiencing potentially damaging wind speeds in the next 10 years. Cyclones will continue to pose a hazard to Samoa and its people in the long-term. [GFDRR, 2019] [Australian Bureau of Meteorology and CSIRO, 2011] [Government of Samoa, 2013] [OCHA, 2022]

The islands of Samoa are located northeast of the Tonga-Kermadec trench which is the main source of seismic activity directly affecting Samoa. Earthquake and earthquake generated tsunamis have impacted many villages along the coastlines. In 2009, a magnitude 8.1 outer-rise earthquake generated a tsunami wave that struck the Samoa island ground including Tonga and American Samoa. The earthquake and tsunami caused 143 fatalities, injured 310 people, affected 2.5% of the country's population, and wiped-out coasts of the main island of Upolu. The 2019 Inform Risk Index indicates that tsunamis pose the highest risk to the archipelago. In the future Samoa, there is more than a 20% chance of a potentially damaging tsunami occurring in the next 50 years. [OCHA, 2022] [EERI, 2009] [The World Bank, 2015] [Day, et al., 2019]

Droughts and floods associated with ENSO have impacted Samoa numerous times. Drought periods during 1982-83, 1997-98, 2001-02 and 2002-03 have caused major forest fires and water shortages. The floods following the tropical cyclones and La Niña events has severely damaged critical infrastructure in the several occasions. Drought projections are inconsistent for Samoa; however, the days with extreme rainfall days are projected to occur more often with more intensity. [Government of Samoa, Samoa Climate Change Policy, 2020] [PCCSP, 2014] [World Bank Group, 2021]

The sea level rise near Samoa is about 4 mm per year since 1993, which is higher than the global average. Under a high emissions scenario, there could be a rise in sea level of 13-15 cm by 2030. The sea level is projected to continue to rise to a range of 29-43cm by 2060 and a range of 55-110 cm by the end of the century (Figure 5) under all emission scenarios. An increase in sea level rise will impact the risk of storm surges and coastal flooding (NASA, 2022).

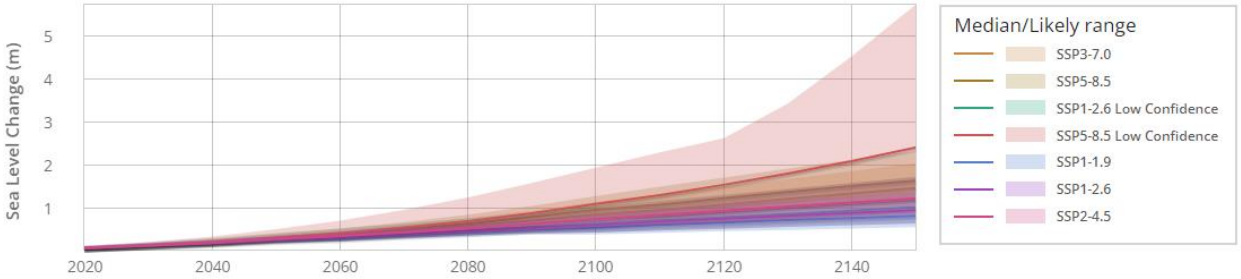


Figure 5. Observed and projected relative sea level change near Samoa (NASA, 2022)

In 2019, Samoan Ministry of Health declared a measles outbreak in the country, and more than 5,700 people contracted measles with 83 deaths reported, where the vast majority were children under 4. There have been more than 13,380 confirmed cases of COVID-19 with 25 deaths as of June 2022. (WHO, 2022) (Craig, Heywood, & Worth, 2020).

2.3 Physical Vulnerability

Samoan islands were formed by volcanic activity, with most of the soil derived from basaltic volcanic flows. Nearly 40% of Uplou and 50% of Savaii are made up of steep slopes. Around 61% of the people reside alongside the low-lying coastal areas i.e., within 1km of the coast, 97% people live within 5km of the coast, and 100% people live within 10km of the coast, exposing them to sea level rise, storm surges, saltwater intrusion, and tsunamis. Around 322 km of the 403 km of coastline in Samoa is either sensitive or highly sensitive to coastal erosion, flooding, or landslides. Informal settlements in rural areas, internally displaced people, and those living in marginal areas face a

higher degree of risk [UN Habitat, 2014] [DFAT, 2021].

As Apia is closer to the sea, the entire location is vulnerable to tropical cyclones, tsunami, and storm surge. Inadequate drainage systems and lack of land use planning (in the past) have created flooding during heavy rainfall periods. Overflowing sewage effluents from the septic tanks during flooding posed severe health risks to the residents. (Edwards, 2013)

The tsunami of 2009 and Tropical Cyclone Evan in 2012 caused large-scale infrastructure damage. The 2009 tsunami completely destroyed or badly damaged critical roads and communication systems and left more than 5,000 people without homes (from around 862 houses). The 2012 Tropical Cyclone Evan destroyed the power infrastructure causing disruptions in power supply, communications, and water supply, in addition to the destruction to roads, buildings and bridges. The disruption to water network and infrastructure caused a diarrhoea breach in the country. [Government of Samoa, 2013] [NCEI, 2019]

The impacts from future natural hazards and climate change events are likely to cause large-scale damage to infrastructure (due to urbanisation and building new infrastructure to carter the growing population). Transportation sector is considered the most vulnerable to these impacts due to its high exposure and the country's limited capacity to repair transport infrastructure. Power and water sector are also considered vulnerable due to the degree of physical exposure to hazards faced by the power generation and distribution systems, and water supply infrastructure. [The World Bank, 2015] [Fakhruddin, Babel, & Kawasaki, 2015]

2.4 Socio-economic Vulnerability

Samoan vulnerability to hazards is exacerbated by its socio-economic conditions. The country has a small but developing economy that relies heavily on development aid, family remittance, agriculture, tourism, and fishing. These sectors and sources of income are highly vulnerable to natural hazards, climate change impacts, and global crisis. [Samoa Bureau of Statistics, Statistical Abstract 2020, 2021] [RNZ, No positives for Samoa's tourism industry in 2019-2020, 2022]

One aspect of socio-economic vulnerability is low income and the lack of employment opportunities, as the country is geographically isolated, with limited natural resources, and narrow production and export base. In 2018, more than 22% of population was below national poverty line. Poverty rates in the Apria Urban Area and North-West Upolu (24%) were higher than the national average (23.7%), while poverty rate in Savaii was below the national average (12.5%). [ADB, 2022] [Samoa Bureau of Statistics, Statistical Abstract 2020, 2021]

Rural areas have limited formal employment opportunities and rely on subsistence livelihoods; in urban areas income is generated through wage income. Above 6,950 Samoans in the labour force were unemployed with a greater proportion of women being unemployed than men (i.e., 53% and 47% respectively). Around 41,100 people (66.91% male and 33.08% female) were in formal or paid employment and more than 15,000 (76% male and 24% female) were employed in the informal sectors. (Samoa Bureau of Statistics, Statistical Abstract 2020, 2021)

Many people are migrating abroad due to the limited full-time opportunities in the country. Majority of the Samoans visit New Zealand under Recognised Seasonal Employer (RSE) Scheme and Australia under Seasonal Worker Programme (SWP)/ Pacific Australia Labour Mobility (PALM)/ Pacific Labour Scheme (PLS)) to work in horticulture, agriculture or tourism sectors. In 2018/19, 2,315 Samoans arrived in New Zealand under the RSE Scheme and 677 arrived in Australia as SWP workers. There is a growing reliance on remittances from Samoans living abroad accounting for 17% of Samoa's GDP in 2018/2019 (mainly in Australia, New Zealand, and the USA). Samoa is one the largest recipient of remittance in the Pacific region, with 78% of the households as the recipients of remittance. The border closure in New Zealand and Australia due to COVID-19 halted the RSE Scheme and severely affected the remittance income. Also, majority of the seasonal workers in these countries lost jobs due to the COVID-19 impact. (Immigration New Zealand, 2020; PALM, 2022; PLS, 2019; De & Jackson-Becerra, 2021)

Village and community-based agriculture dominates traditional village economy and provides food for the family and generates cash income. The agricultural sector remains the largest employer in the formal sector, employing about 19% of the labour force. In 2019, tourism contributed more than 23% of Samoa's GDP and employed approximately 10% of the population. However, more than USD 145 million economic loss was reported due to the impact of COVID-19 on the tourism industry. More than 1,500 people were terminated from the tourism accommodation providers and support services due to the closure of borders and businesses.

Out of every ten-women in Samoa, six faced considerable level of domestic violence (initimate partner violence) once in their lifetime. Around nine out of ten women have experienced either physical or emotional violence by their family members. One in every five women has been raped and at least 33% of the rape victims contemplated suicide. (The Commonwealth, 2020).

2.5 Cultural Vulnerability

Samoa is rich in culture with a number of traditions and values, and *Fa'a Samoa* (the Samoan way) is the foundation of society and identity. At present, *Fa'a Samoa* is based on family and village chiefs (*matai*), the kinship group or extended family (*aiga*), and the Christian church. Duty to the family, village, and community is one of the central values of *Fa'a Samoa.* Traditionally, men were responsible for decision making and appointed as a *matai*, but there has been a change in the recent times, where women are allowed to take *matai*. The highest status of the family is given to matai, followed by matai's husband or wife. (Persson, Zampoukos, & Ljunggren, 2021)

At national level, a Westminster parliamentary system was employed, and traditional decision making is engaged at the local level (*fono*, the village councilThe committees at village level are divided by gender, where women's committees are responsible for inspecting and making sure the interiors are clean, while men's committees are responsible for decision making. As the representation of the women in *matai* is very low (around 5%), it is a challenge for women to participate formally in the village-based political decision making as well as for getting elected as members of Parliament. The limited representation of women in decision making roles at local and national level increases their vulnerability during disaster and emergency events. [Ministry of Women, 2016] [Boodoosingh, Beres, & Tombs, 2018] [CARE, 2022] [CFNHRI, 2020]). [Boodoosingh, Beres, & Tombs, 2018].

Traditional houses (*fale*) are mostly used for relaxing and chatting during the daytime. They are being replaced by modern houses (mostly western style or a variation to the traditional house), as only one-third of the country retains traditional construction styles. The western style houses experienced more severe damages during the tropical cyclones when compared to the traditional houses. If traditional skills and knowledge are not recorded or transferred, they can be lost. Loss of respect towards traditional values in younger generations, and western influence and value systems that override traditional systems are other contributing factors for the loss of traditional knowledge and skills [Wilson, 2014] [The Monsoon Project, 2016].

3. Progress in Sendai Framework for Disaster Risk Reduction

The following sections shed light on Samoa's process and capacity in disaster risk reduction and climate change adaptation as mandated and guided by the global policy frameworks such as Sustainable Development Goals (SDGs), the Paris Agreement, and Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), which aims to prevent new and reduce existing disaster risk, increase preparedness for response and recovery, and strengthen resilience. The sections are organised by four priority areas of SFDRR, 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 risks requires a thorough understanding of the hazard, vulnerability, exposure, and adaptive capacity of the country. The Samoa National Climate Change Country Team analysed vulnerabilities in 13 sectors and identified nine were highly vulnerable. Village communities was considered as one of the highly vulnerable sectors in Samoa due to the inadequate water supply, poor water quality, and weak housing infrastructure. Other vulnerabilities for the village communities include damage to the plantations which are used for subsistence and trade, coastal erosion and flooding.

In 2017, The Africa Caribbean Pacific – European Union Natural Disaster Risk Reduction (ACP-EUNDRR) Programme financed the vulnerability assessment road networks in Samoa (in Upolu and Savai'i-1150 kilometres), which supported the development of the Climate Resilient Road Strategy. A cost benefit analysis was also undertaken for developing an investment plan. Retrofitting and rehabilitating the existing infrastructure, identifying alternative inland routes, improving maintenance regimes, and building capacity were some of the short, medium, and long-term priority investments of the Climate Resilient Road Strategy. (EU, GFDRR, & Group, 2017)

In the past, Samoa Red Cross (SRC) in collaboration with the NDMP has collected and updated household level information, disaggregated data and information about the community structure, number of females headed households, people with disabilities, minorities, women's groups, and village council. However, due to the wide range of hazards and remoteness of Samoa, officials can face challenges in collecting and analysing comprehensive risk information. (SRC, 2013)

Priority 2. Strengthening Disaster Risk Governance to Manage Disaster Risk Disaster risk governance at national and regional levels is essential for disaster risk management in all sectors. By ensuring the coherence of national and local legal frameworks, regulations and policies can guide, encourage and incentivise public and private sectors to act towards reducing disaster risks.

National Disaster Management Plan 2017 -2020 aims to provide a policy framework that guides the Government of Samoa, various sectors, and local government to promote disaster risk management. It also provides a mechanism to enable responses to emergencies and disasters, and recovery from the impacts of disasters. It also defines the roles and responsibilities of the various councils, committees, and National Emergency Operations Centre (NEOC) units. The NEOC, also created under the Disaster Emergency Management Act of 2007, helped manage and contain the measles epidemic in 2019 as described in the State of Emergency protocols. NEOC's responsibilities, during this outbreak, was to organise disaster information and data, work with communities and government, and determine the logistics for getting and delivering resources. (Government of Samoa, National Disaster Management Plan 2017-2020, 2017).

The National Action Plan mainstreams disaster risk management across all sectors and aims to have risk considerations continuously factored into planning, implementation, and monitoring and evaluation (M&E) of these sectors. Its key three outcomes are derived from the National Environment Sector Plan: promoting sustainability by raising awareness of disaster risk management, improvement of coordination, leadership, and implementation activities for disaster risk management, and mainstreaming climate change and disaster risk management across public, private and community sectors (Government of Samoa, 2016)

Priority 3. Investing in Disaster Risk Reduction for Resilience Investing in disaster risk reduction for resilience is an important component in effectively implementing policies, frameworks, legislation, and strategies. Public and private investment in disaster risk prevention and reduction through structural and non-structural measures are fundamental to enhance resilience of individuals, communities, and the assets of Samoa. These measures have been found to be cost-effective at saving lives, preventing and reducing losses and ensuring effective recovery and rehabilitation.

The amount of net Official Development Assistance Samoa has received has changed every year. In 2015, Samoa received USD 93.7 million from over ten donors, which was decreased to USD 88.6 million in 2016, and followed by an increase to USD 129.5 million Official Development Assistance in 2017. Australia, Japan, the International Development Association, the Asian Development Bank (ADB) and New Zealand are some of the main contributors. For instance, ADB has disbursed around USD 293 million in terms of loans and grants in Samoa since 1966 [Government of Samoa, 2016] [Government of Samoa, 2018] [ADB, 2022]

The World Bank is one of the largest contributors to Samoa to support them in building their resilience. In 2012 the World Bank in collaboration with Ministry of Agriculture and Fisheries and provided USD 8 million in funding for the Agriculture Competitiveness Enhancement Project. This project was to last five years to benefit over 2,000 farmers by promoting superior breeds of livestock, improving husbandry practices and stock management, increase access to higher yielding varieties of fruit and vegetables, and adopt improved technology for production. This project focuses heavily on increasing food and income security as well as improving the private sector capacity in improving productivity. In 2020, the World Bank approved USD 25 million to support the country's socio-economic response and recovery from the COVID-19 and support efforts in building resilience to climate change, disasters, and health-related risks. For instance, the funding has support Samoa in developing legislation to enhance the early warning systems and improve building standards. (The World Bank, 2020)

The Green Climate Fund has supported Samoa with USD 57.7 million (out of USD 65.7 million) for the implementation of Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment Project. It aims to minimise the impacts of recurrent flood, strengthen adaptive capacity, and minimise exposure to climate risks faced by built infrastructure and communities in the Vaisigano River catchment. (GCF, 2020)

Priority 4. Enhancing disaster preparedness for effective response to "Build Back Better" in recovery, rehabilitation, and reconstruction The disaster recovery, rehabilitation, and reconstruction phase are an opportunity to "build back better" through integrating disaster risk reduction measures. After the 2009 tsunami UNDP, Samoa Hotel Association, New Zealand Aid Programme, and several government ministries collaborated to implement the Tourism Tsunami Rebuilding Programme (TTRP). The aim of the TTRP was to help rebuild and reconstruct beach *fale* and accommodations that were damaged by the tsunami. A total of USD 1.4 million was provided for this programme. In line with "building back better" the new buildings were built with higher quality materials and environmental safety standards.

In 2012, Tropical Cyclone Evan heavily damaged or destroyed many homes in Samoa, which led many to seek temporary shelter. The Government of Samoa along with UNDP and Adventist Development and Relief Agencies reconstructed houses that were designed and engineered to withstand cyclone winds, earthquakes, as well as flooding. Also, the houses were rebuilt considering the Samoan culture i.e., based on the concept of traditional Samoan Faleo'o, pole style construction. This project also supported in improving the capacity of government agencies to monitor the reconstruction process and educated the households on the "principles of disaster resilient construction". (UNDP, 2014)

Projects such as SPC/GIZ Coping with Climate Change in the Pacific Islands Region (CCCPIR) programme, which focused on building awareness on the impacts of climate change, communicating scientific information, and proposing and assisting with the implementation of

alternative livelihood adaptation in selected villages were implemented to improve resilience in communities to the impacts of climate change related events. Apart from that, SRC supported the Community Development sector specific plan, which was led by Ministry of Women, Community and Social Development to establish specific commitments around of sexual and gender-based violence. (SPC, 2013)

In 2020, the Government of Samoa and ADB collaborated to improve one of the country's most important roads i.e., the Central Cross Island Road in Upolu Island under the Samoa Central Cross Island Road Upgrading Project. It includes construction of 8.4 kilometres of footpath, climate-proofing 20 kilometres of road, installing 18 streetlights, 18 safe bus stops, and 11 pedestrian crossings. Upgrading and climate-proofing the road in Upolu will safeguard and protect nearly 7,000 residents and several businesses. [ADB, 2020]

4. Coherence with Sustainable Development Goals and the Paris Agreement

4.1 Strategic Coherence

Strategic coherence explores whether disaster risk reduction and climate change adaptation are explicitly addressed jointly or if there is an aim to strengthen the relationship and linkages between the two fields [UNDRR, 2020].

Samoa, in its latest Strategic Development Framework and sector plans, has aligned the direction of the strategies with SDGs and the Paris Climate Agreement. In the Strategic Development Framework (2016-2020), there are four key priority areas that look at the economy, social, infrastructure and environmental improvement and have a total of 14 outcomes. Economic growth that looks to be more inclusive to vulnerable groups, broaden employment opportunities, and development initiatives support the SDGs to end poverty, promote inclusive and sustainable economic growth, and strengthening global partnerships. Developing and researching alternative renewable energies will also be promoted as an outcome for environmental improvement in the Strategic Development Framework. This supports SDG to conserve ocean, seas and marine resources as well as restore and promote sustainable use of ecosystems and halt land degradation. (Government of Samoa, 2016)

The Samoa Energy Sector Plan 2017 - 2022 provides a framework to achieve access to quality energy and achieve sustainable and affordable energy for all. The framework looks to achieve this by increasing renewable energy, improving electricity services, an efficient transport sector, management of the petroleum products, and improved coordination in the energy sector. Coherence to the SDGs by increasing share of renewable energy, increasing public awareness, and promoting fuel efficiency in land transport.

Samoa Climate Change Policy (2020-2030) provides an action plan and the interventions needed to build resilience to the impacts of climate change across all sectors, private sector, civil society, and at the community level. The policy is aligned with the Samoa's international commitments under the UNFCCC set out in the Paris Agreement, SDGs, and SIDS Accelerated Modalities of Actions Pathway (SAMOA Pathway). It promotes inclusion of women, persons with disability, youth, children, and the elderly in climate change planning. (Government of Samoa, 2020)

Apart from that, National Environment Sector Plan, National Biodiversity Strategy and Action Plan (2015-2020), Agriculture Sector Plan (2011-2015), and the Samoa National Policy for Gender Equality (2016-2020) are coherent with at least one of the international frameworks (SFDRR, SDGs and the Paris Agreement). However, there is no dedicated joint policy or action plan that links the DRR and CCA activities in the country. Table 2 presents the coherence analysis of the Samoa's national policies and plans with the global frameworks.

Sectoral aim	Policies with Linkages to Sendai Framework forDisaster Risk Reduction	Policies with Linkages to Sustainable Development Goals	Policies with Linkages to the Paris Climate Agreement for Environment
National Development	National Adaptation Programme of Action (2005)	Strategy for the Development of Samoa (2016-2020)	Strategy for the Development of Samoa (2016-2020)
	Samoa National Action Plan (2017-2021)	Samoa National Action Plan (2017-2021)	

Sectoral aim	Policies with Linkages to Sendai Framework forDisaster Risk Reduction	Policies with Linkages to Sustainable Development Goals	Policies with Linkages to the Paris Climate Agreement for Environment
Environmental Protection	National Environment Sector Plan (2017 - 2021)	National Environment Sector Plan (2017 - 2021) Agriculture Sector Plan (2011-2015)	National Environment Sector Plan (2017 - 2021) Strategy for the Development of Samoa (2016-2020)
Disaster and Climate Risk Reduction	National Disaster Management Plan (2017-2020) Samoa Climate Change Policy (2020-2030) Samoa National Policy for Gender Equality (2016-2020)	National Disaster Management Plan (2017-2020) Samoa National Action Plan (2017-2021) Samoa Climate Change Policy (2020-2030) Samoa National Policy for Gender Equality (2016-2020)	Second Nationally Determined Contribution (2021) Samoa Climate Change Policy (2020-2030) Strategy for the Development of Samoa (2016-2020)
Vulnerability Reduction	Samoa National Action Plan (2017-2021) Strategy for the Development of Samoa (2016-2020)	Samoa National Action Plan (2017-2021) Samoa Energy Sector Plan (2017-2022) Samoa National Policy for Gender Equality (2016-2020)	Second Nationally Determined Contribution (2021) Samoa Energy Sector Plan (2017-2021)
Land Use Planning	National Biodiversity Strategy and Action Plan (2015-2020) National Environment Sector Plan (2017-2021) National Disaster Management Plan (2017-2020)	National Biodiversity Strategy and Action Plan (2015-2020) National Disaster Management Plan (2017-2020)	National Disaster Management Plan (2017-2020)

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 risk and resilience [UNDRR, 2020].

These concepts are strongly addressed in the Samoa National Action Plan for Disaster Risk Management (2017-2021) and Samoa Climate Change Policy (2020-2030). For instance, the outcome 3.1 of Samoa National Action Plan for Disaster Risk Management (2017-2021) is to address vulnerability, contribute to risk reduction, and improving resilience by mainstreaming disaster risk reduction and climate change adaptation across public, private, and community sectors. The purpose of the Samoa Climate Change Policy (2020-2030) "to set out Samoa's plan of action and the interventions needed across all sectors, civil society, private sector and at the community level, to build resilience to the impacts of climate change". It also describes the vulnerabilities of population in rural areas towards sea level rise, storm surges, and eroding coastal

areas. Apart from that, other plans and policies in Samoa also focuses on embedding resilience into the nation and attempted to integrate disaster risk reduction and climate change adaptation. Overall, a strong conceptual coherence is observed in Samoa. (Government of Samoa, 2020; Government of Samoa, 2016; Government of Samoa, 2016; Government of Samoa, 2016)

4.3 Operational Coherence

Operational coherence looks at measures and activities which bring together disaster risk reduction and climate change adaptation practices and to which extent planning is cross-sectoral [UNDRR, 2020].

Samoa National Action Plan for Disaster Risk Management (2017-2021) highlights the imperative to mainstream disaster risk reduction and climate change adaptation across agriculture and fisheries sector, coastal and water resource management, health, sanitation, tourism, transport, energy, trade and commerce, and other sectors. Samoa Climate Change Policy (2020-2030) includes a few disaster risk reduction strategies and outcomes under eight objectives. For example, “integration of Disaster Risk Reduction” is one of the strategies under the Objective 2. Samoa National Action Plan for Disaster Risk Management (2017-2021) includes a detailed plan (including responsible organisation, timeline, activities, assumptions/risks) for implementing the outcomes, which was not available in the Samoa Climate Change Policy. [Government of Samoa, 2020] [Government of Samoa, 2016] [Government of Samoa, 2017].

4.4 Institutional Coherence

Institutional coherence assesses whether coordination between disaster risk reduction and climate change adaptation is achieved, and if and how institutional arrangements support coherence [UNDRR, 2020].

In Samoa, the disaster risk management activities are coordinated by DMO, whereas the newly established Climate Change and GEF division plays a crucial role in ensuring the climate change issues are considered by Government and well-coordinated. Even though DMO and Climate Change and GEF division are separate institutions, they are under MNRE. However, the coherence at institutional level is partial, as the country does not have a joint policy for disaster risk reduction and climate change adaptation.

4.5 Financial Coherence

Financial coherence explores whether and how funding strategies and investments bring together disaster risk reduction and climate change adaptation (UNDRR, 2020).

Samoa National Action Plan for Disaster Risk Management (2017-2021), Samoa Climate Change Policy (2020-2030), Enhanced Nationally Determined Contribution (2021) does not include a detailed financial cost for implementing each strategy/objectives. Overall, Samoa does not demonstrate a substantial financial coherence. [Government of Samoa, 2020] [Government of Samoa, 2016]

5. Future Challenges and Priorities

5.1 Challenges for Disaster Risk Reduction Implementation

Disaster preparedness is low at the community level, even after many efforts such as training and capacity building programmes taken by the Government of Samoa, non-governmental organisation, and development partners on this component. In particular, rural villages are less prepared than urban Apia. Many villagers did not understand a difference between the 'soft' (such as nature-based coastal protection measures) and 'hard' (engineered structures such as sea walls) environmental approaches. The limited technical and human capacity at local level limits the implementation of disaster risk reduction activities, and most work is carried out in a top-down approach. (Government of Samoa, 2013).

Extensive quality data is needed for conducting comprehensive risk assessment/vulnerability assessment. In Samoa, availability of quality data is limited, as the country lacks technical and financial capacity to implement collect, store, and process the data. However, in the instances where data is readily available, the lack of coordination between stakeholders created challenges in obtaining the data. Information sharing across MNRE divisions currently requires formal requests. (EU, GFDRR, & Group, 2017; Tonkin+Taylor, 2019)

The hazard detection and classification need to be reviewed, as the late classification of Tropical Cyclone Gita (imminently before landfall) and its late notification provided limited time for the first responders sectors to ensure necessary measures are in place. Also, the lack of a warning system for flash flooding and subsequent larger scale flooding in 2018 caused by storms and Tropical Cyclone Gita provided only two hours of lead time (between rainfall and flash flood). The lack of standard operating procedures and the limited availability of experienced and skilled staff (capable of flood modelling and assessment) are some of the main reasons for these challenges. Currently, flood forecasting is the responsibility of the Water Resources Division. Early warning and risk mapping are not legislated. Monitoring and evaluation of early warning systems is conducted on an ad-hoc basis. (Tonkin+Taylor, 2019)

Limited technical and financial capacity is one of the major challenges for the effective implementation of disaster risk reduction activities. As the disaster risk reduction projects are mostly funded through donor organisations, it led to the coordination, implementation, and monitoring challenges. At the community level, only a few NGOs have the capacity to develop and implement DRR projects. Although Samoa receives regional and international assistance, the capacity to implement the DRR activities is low. (UNISDR, 2014)

5.2 Priority Areas of Work

Priority areas of work to be carried out by Government of Samoa with support from stakeholders (such as Non-Governmental Organisations, Community-based Organsiations, development partners, and relevant government organisations) are:

Enhance critical infrastructure: Promote the resilience of new and existing critical infrastructure, including water, transportation and telecommunications infrastructure, educational facilities (such as schools), hospitals, and other facilities, to ensure that they remain safe, effective and operational during and after disasters in order to provide life-saving and essential services.

Raise community awareness: Conducting community awareness programmes, annual emergency drills, and improving disaster risk reduction and climate change adaptation education in the curriculum; training and capacity building programmes for disaster risk preparedness in isolated communities to provide the communities with skills and systems for support when disasters occur.

Improve technical capacity: An assessment needs to be conducted to analyse the current capacity and gaps from the national level to the community level. Based on capacity needs assessment, a

development plan can be developed with necessary skillsets and competencies required to implement disaster risk reduction and climate change adaptation activities.

Improve 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). Introduce an impact-based forecast and warning system for all-natural hazards, which would evolve the focus from information about the hazard to information about the impact of the hazard. This would help the public more readily understand what actions to take to reduce the risk to lives and livelihoods. Also, the flash flood monitoring and forecasting systems needs to be improved, which requires the implementation of hydrological observing network and the addition of new technologies, including weather radar (i.e., Doppler). Promote usage of advanced models to improve climate adaptation adoption and service delivery.

Improve data sharing: It is important for relevant stakeholders involved in the work to be well informed about the importance of data sharing and its contribution to the service delivery. Alignment of data sharing systems across multiple agencies and within a single agency would also enhance the ability for data sharing. With an improved ICT infrastructure – communication lines and data centres - effective data sharing between agencies that are not hosted at the same locations is possible.

Integrate risk assessment with impact-based forecasting and early warning systems: There is a need to carry out comprehensive risk assessments for Samoa, which should include assessment of hazard, vulnerability, exposure, and adaptive capacity. PARTneR (Pacific Risk Tool for Resilience) is currently working with Samoa to customise the RiskScape to their needs and to model the effects to estimate impacts such as damages, economic and human loss, and displacement times. Such assessments would enable issuance of impact-based forecasting and early warnings in the country.

Ensure inclusion of marginalised groups: Engaging people from marginalised groups is important for effective disaster risk reduction. Although the Government of Samoa is taking various initiatives and published the Samoa National Policy for Gender Equality (2016-2020), women have historically been excluded from policy and decision making. They, and other groups left out of decision making including persons with disabilities, the elderly, and youth, need to be included in disaster risk reduction planning and implementation. Also, it is crucial to collect data on marginalised groups along with the disaggregated data.

Implement coastal infrastructure management plans: Coastal infrastructure management plans are developed in partnership between the Government of Samoa and the villages within the Plan area to improve resilience and adaptive capacity of the villages to face natural hazards and climate change. Providing funding for implementing the recommendation of the coastal infrastructure management plan will support in improving the community's awareness, reduce the coastal hazard risks, and enhance the response and recovery measures from cyclones and other disasters.

Accessing climate finance: In the Pacific region, climate finance is mostly accessed through multilateral and bilateral donor organisations. Nearly 86% of the climate finance in the Pacific region is delivered through project type interventions, while only 1% is channelled as direct budget support, and 1% for sector budget support. Samoa needs significant financial resources to adapt to the adverse effects and reduce the impacts of climate change. Samoa can access finance from national, regional, and international public and private financiers/donors.

References

ABD. (2020). *ADB Announces $40 Million Grant to Boost Road Safety in Samoa*. Retrieved from Asian Development Bank: https://www.adb.org/news/adb-announces-40-million-grant-boost-road-safety-samoa

ADB. (2022). *Samoa and ADB*. Retrieved from Asian Development Bank: https://www.adb.org/offices/south-pacific/poverty/samoa#:~:text=In%20Samoa%2C%2022.7%25%20of%20the,national%20poverty%20line%20in%202018

Australian Bureau of Meteorology and CSIRO. (2011). *Climate Change in the Pacific: Scientific Assessment and New Research. Volume 1: Regional Overview. Volume 2: Country Reports.* .

Australian Government. (2021). *Samoa COVID-19 Development Response Plan.* Australian Government. Retrieved from https://www.dfat.gov.au/sites/default/files/covid-response-plan-samoa.pdf

Boodoosingh, R., Beres, M., & Tombs, D. (2018). Research Briefing: Violence against Women in Samoa. *Women's Studies Journal*, 33-56.

CARE. (2022). *Samoa*. Retrieved from CARE: https://careclimatechange.org/where-we-work/samoa/

CFNHRI. (2020). *Village Government in Samoa: Do women participate?* Commonweath Forum of National Human Rights Institutions. Centre for Samoan Studies, National University of Samoa. Retrieved from https://cfnhri.org/wp-content/uploads/2020/01/Village-Government-in-Samoa..pdf

Convention on Biological Diversity. (2022). *Status and trends of biodiversity, including benefits from biodiversity and ecosystem services*. Retrieved from Convention on Biological Diversity: https://www.cbd.int/countries/profile/?country=ws#:~:text=The%20country's%20flora%20consists%20of,endemic%20to%20the%20Samoan%20archipelago

Craig, A. T., Heywood, A. E., & Worth, H. (2020). Measles epidemic in Samoa and other Pacific islands. *The Lancet Discovery Science*, 273-275. doi:https://doi.org/10.1016/S1473-3099(20)30053-0

Day, S., Forster, T., Himmelsbach, J., Korte, L., Mucke, P., Dr. Radtke, K., . . . Weller, D. (2019). *WorldRiskReport.* Bündnis Entwicklung Hilft and IFHV.

De, L. L., & Jackson-Becerra, F. J. (2021). COVID-19 and Transnational Remittances in Samoa: Maintaining Family Ties in the Face of Crisis. In *COVID in the Islands: A comparative perspective on the Caribbean and the Pacific.* Singapore: Palgrave Macmillan. doi:10.1007/978-981-16-5285-1_16

DFAT. (2021). *Pacific Risk Profile Samoa.* Australian Aid. Retrieved from https://www.dfat.gov.au/sites/default/files/pacific-risk-profile_samoa.pdf

Edwards, P. (2013). Pressure Sewer System Review & I/I Study, APIA, SAMOA. *Proceedings of the Water Environment Federation*, 1-16. doi:10.2175/193864713813504412

EERI. (2009). *Learning from Earthquakes.* Earthquake Engineering Research Institute.

EM-DAT. (2022). *EM-DAT Public*. Retrieved from EM-DAT: ublic.emdat.be

EU, GFDRR, & Group, W. B. (2017). *Supporting Road Netwrok Vulnerability Assessments in Pacific Island Countries.* EU, GFDRR, the World Bank Groups.

Fakhruddin, B. S., Babel, M. S., & Kawasaki, A. (2015). Assessing the vulnerability of infrastructure to climate change on the Islands of Samoa. *Natural Hazards and Earth System Sciences*, 1343-1356. doi:10.5194/nhess-15-1343-2015

Food and Agriculture Organization of the United Nations. (2018, May). *The Independent State of Samoa*. Retrieved from Fishery and Aquaculture Country Profiles: http://www.fao.org/fishery/facp/WSM/en

GCF. (2020). *Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment in Samoa*. Retrieved from Green Climate Fund: https://www.greenclimate.fund/project/fp037

GFDRR. (2019). *Think Hazard: Samoa*. Retrieved from http://thinkhazard.org/en/report/212-samoa

Government of Samoa. (2007). *Disaster and Emergency Act 2007.* Apia: Government of Samoa.

Government of Samoa. (2009). *Post-Disaster Needs Assessment Following the Earthquake and Tsunami of 29th September 2009.* The World Bank, Government of Samoa, GFDRR.

Government of Samoa. (2009). *Samoa Post-Disaster Needs Assessment Following the Earthquake and Tsunami of 29th September 2009.* Apia: Government of Samoa.

Government of Samoa. (2013). *National Progress Report on the Implementation of the Hyogo Framework for Action (2011-2013) - Interim.* Apia: Government of Samoa.

Government of Samoa. (2013). *Samoa Post-Disaster Needs Assessment - Cyclone Evan 2012.* Apia: Government of Samoa.

Government of Samoa. (2013). *Samoa Post-Disaster Needs Assessment Cyclone Evan 2012.* Government of Samoa, Australian Aid, The World Bank, GFDRR. Retrieved from https://www.gfdrr.org/sites/default/files/publication/SAMOA_PDNA_Cyclone_Evan_2012_0.pdf

Government of Samoa. (2016). *Samoa National Action Plan for Disaster Risk Management 2017 - 2021.* Apia: Government of Samoa.

Government of Samoa. (2016). *Samoa National Policy for Gender Equality (2016-2020).* Government of Samoa.

Government of Samoa. (2016). *Strategy for the Development of Samoa 2016/17 - 2019/20.* Apia: Ministry of Finance.

Government of Samoa. (2016). *Summary of National Voluntary Review Process.* Apia: Government of Samoa.

Government of Samoa. (2017). *2016 Census Brief No. 1.* Apia: Government of Samoa.

Government of Samoa. (2017). *National Disaster Management Plan 2017-2020.* Government of Samoa. Retrieved from https://www.mnre.gov.ws/wp-content/uploads/2017/08/Samoa-national-disaster-management-plan-2017-2020-final-web.pdf

Government of Samoa. (2017). *Samoa National Action Plan for Disaster Risk Managament (2017-2021).* Government of Samoa. Retrieved from https://www.mnre.gov.ws/wp-content/uploads/2017/08/Samoa-national-action-plan-for-DRM-2017-2021-final-web.pdf

Government of Samoa. (2018). *Partner Country-Led Evaluation of Japan's Official Development Assistance in the Economic and Social Infrastructure Sector in the Independent State of Samoa.* Apia: Government of Samoa.

Government of Samoa. (2020). *Samoa Climate Change Policy.* Samoa: Ministry of Natural Resources and Environment. Retrieved from https://www.mnre.gov.ws/wp-content/uploads/2021/03/Samoa-Climate-Change-Policy-2020-2030.pdf

Immigration New Zealand. (2020). *RSE Impact Study: Pacific stream report.* Immigration New Zealand,. Retrieved from https://www.immigration.govt.nz/documents/statistics/rse-impact-study-pacific-stream-report.pdf

MFAT, & DFAT. (2018). *TCRRP and TCRP Evaluation Report.* New Zealand Foregin Affairs and Trade Aid Programme. Retrieved from https://www.mfat.govt.nz/assets/Uploads/Cyclone-Recovery-Samoa-Evaluation-report.pdf

Ministry of Health. (2015). *Samoa Demographic and Health Survey 2014.* Apia: Samoa Bureau of Statistics.

Ministry of Women, C. a. (2016). *Samoa National Policy for Gender Equality 2016-2020.* Ministry of Women, Community, and Social Development; Australian Aid.

NASA. (2022). *Sea Level Projection Tool*. Retrieved from Sea Level Change Observations from Space-Earth Data: https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool?psmsl_id=1840

NCEI. (2019). *On This Day: 2009 Samoa Islands Tsunami*. Retrieved from National Centers for Environmental Information; National Oceanic and Atmospheric Administration: https://www.ncei.noaa.gov/news/2009-Samoa-Tsunami#:~:text=A%20Tsunami%20of%20Deadly%20Proportions&text=The%20devastation%20extended%20beyond%20human,ravaged%20both%20physically%20and%20economically

OCHA. (2022). *Samoa*. Retrieved from OCHA: https://www.unocha.org/office-pacific-islands/samoa

Pacific Climate Change Portal. (2018, November). *Samoa*. Retrieved from Country Overview: https://www.pacificclimatechange.net/country/samoa

PACWIP. (2015). *Pacific Women in Politics*. Retrieved from Samoa: https://www.pacwip.org/country-profiles/samoa/

PACWIP. (2022). *Pacific Women in Politics Samoa*. Retrieved from Pacific Women in Politics: https://www.pacwip.org/country-profiles/samoa/

PALM. (2022). *Welcome to PALM Scheme*. Retrieved from Pacific Australia Labour Mobility: https://www.palmscheme.gov.au/

PCCSP. (2014). *Current and future climate of Samoa.* Samoa Meteorology Division, Ministry of Natural Resources and Environment, Australian Bureau of Meteorology, Commonwealth Scientific and Industrial Research Organisation (CSIRO). Retrieved from https://world.350.org/pacific/files/2014/01/3_PCCSP_Samoa_8pp.pdf

Persson, K., Zampoukos, K., & Ljunggren, I. (2021). No (wo)man is an island – socio-cultural context and women's empowerment in Samoa. *Gender, Place & Culture*, 482-501. doi:https://doi.org/10.1080/0966369X.2021.1873744

PLS. (2019). *Policy Handbook: Pacific Labour Scheme.* Pacific Labour Scheme. Retrieved from https://www.dfat.gov.au/sites/default/files/pacific-labour-scheme-policy-handbook.pdf

PSDI. (2021). *Samoa: Pacific Toursim Sector Snapshot.* Retrieved from https://pacificpsdi.org/assets/Uploads/PSDI-TourismSnapshot-SAM3.pdf

RNZ. (2021). *From pandemic to economic crisis, Samoa's covid journey one year on*. Retrieved from RNZ: https://www.rnz.co.nz/international/pacific-news/438422/from-pandemic-to-economic-crisis-samoa-s-covid-journey-one-year-on

RNZ. (2022, January 05). *No positives for Samoa's tourism industry in 2019-2020*. Retrieved from Radio New Zealand: https://www.rnz.co.nz/international/pacific-news/459062/no-positives-for-samoa-s-tourism-industry-in-2019-2020

Samoa Bureau of Statistics. (2008). *Household Income and Expenditure Survey Tabulation Report 2008.* Apia: Government of Samoa.

Samoa Bureau of Statistics. (2021). *Gross Domestic Product- March 2021 Quarter.* Samoa Bureau of Statistics. Retrieved from https://www.sbs.gov.ws/images/sbs-documents/Finance/GDP/2021/GDP-Report-March2021quarter.pdf

Samoa Bureau of Statistics. (2021). *Samoa DHS-MICS 2019-2020: Snapshot of Key Findings*. SBS, SPC, UNFPA, UNICEF. Retrieved from https://www.sbs.gov.ws/images/sbs-documents/DHS-MICS/Samoa_2019-20_DHS-MICS_Statistical_Snapshots_English.pdf

Samoa Bureau of Statistics. (2021). *Statistical Abstract 2020.* Apia, Samoa: Samoa Bureau of Statistics.

Samoa Bureau of Statistics. (2021). *Village directory-preliminary count census 2021.* Samoa Bureau of Statistics. Retrieved from https://www.sbs.gov.ws/images/sbs-documents/Population_and_Demography/2022/FinalPrelim_V3Final_final.pdf

Samoa Tourism Authority. (2016). *Samoa Tourism Sector Plan 2014 - 2019.* Apia: Government of Samoa.

Samoa Tourism Authority. (2019). *Total Visitor Arrivals by Purpose/Year*. Retrieved from Samoa Tourism: http://samoatourism.org/articles/89/total-visitor-arrivals-by-purposeyear

Secretariat of the Pacific Community. (2006). *The Samoa Family Health and Safety Study.* New Caledonia: Secretariat of the Pacific Community.

Seiuli, B., Nikora, L. W., Awekotuku, N. T., & Hodgetts, D. (2016). Fia Ola: Grief Recovery Following a Tsunami Disaster in Samoa. *Journal of Pacific Rim Psychology*. doi:10.1017/prp.2016.2

SPC. (2013). *SPC/GIZ Coping with Climate Change in the Pacific Islands Region (CCCPIR) programme*. Retrieved from https://www.spc.int/cccpir/samoa

SRC. (2013). *Samoa: Strengthening Protection, Gender and Inclusion in Disaster Law.* Samoa: Samoa Red Cross. Retrieved from https://www.ifrc.org/sites/default/files/SamoaRC_PGISnapshot_FINAL.pdf

Tamasese, T. K., Parsons, T. L., Waldegrave, C., & Thompson, A. (2014). *Trauma, Livelihoods and Resilience in Post-tsunami Samoa: A Review for the New Zealand Aid Programme.* Wellington. Retrieved from https://familycentre.org.nz/wp-content/uploads/2019/04/Tsunami_Review_Trauma_livelihoods_and_resilience_in_Samoa.pdf

The Commonwealth. (2020). *Blog: Samoa's response to violence against women and girls can guide other countries*. Retrieved from The Commonwealth: https://thecommonwealth.org/news/blog-samoas-response-violence-against-women-and-girls-can-guide-other-countries#:~:text=Almost%20nine%20in%2010%20Samoan,13%20per%20cent%20attempt%20suicide

The Monsoon Project. (2016). *The traditional Samoan fale: The Key to cyclone resilient housing in the Pacific?* Retrieved from https://www.themonsoonproject.org/the-traditional-samoan-fale-key-to-cyclone-resilient-housing-in-the-pacific/

The World Bank. (2015). *Country Note - Samoa.* The World Bank.

The World Bank. (2020). *Support for a stronger Samoa in the wake of COVID-19*. Retrieved from The World Bank: https://www.worldbank.org/en/news/press-release/2020/12/07/support-for-a-stronger-samoa-in-the-wake-of-covid-19#:~:text=WASHINGTON%20D.C.%2C%20December%205%2C%202020,disasters%20and%20health%2Drelated%20risks

The World Bank. (2022). *Samoa*. Retrieved from The World Bank Data: https://data.worldbank.org/country/WS

Tonkin+Taylor, A. A. (2019). *General Consultant/System Integrator Early Warning Preparedness for Samoa.*

UN Habitat. (2014). *Cities and Climate Chnage Initiatve-Climate chnage vulnerability assessment.* Apia, Samoa: UN Habitat.

UNDP. (2014). *Build Back Better for cyclone Evan affected people.* Relief web. Retrieved from https://reliefweb.int/report/samoa/build-back-better-cyclone-evan-affected-people

UNDRR. (2020). *Disaster Risk Reduction and Climate Change Adaptation: Pathways for policy coherence in Sub-Saharan Africa.* UNDRR.

UNISDR. (2014). *Progress and Challenges in Disaster Risk Reduction: A contribution towards the development of policy indicators for the Post2015 Framework on Disaster Risk Reduction.* Geneva: The United Nations Office for Disaster Risk Reduction (UNISDR).

United Nations Children's Fund. (2017). *Situation Analysis of Children in Samoa.* Suva: UNICEF.

WHO. (2022). *COVID-19*. Retrieved from World Health Organisation: https://covid19.who.int/region/wpro/country/ws

Wilson, C. (2014). *Samoa's architects look to the past to boost climate resilience.* Thomson Reuters Foundation, trust.org.

World Bank Group. (2021). *Climate Risk Country Profile.* The World Bank.


UNDRR
UN Office for Disaster Risk Reduction


adpc
Asian Disaster
Preparedness Center