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TECHNICAL ASSISTANCE REPORT—CLIMATE MACROECONOMIC ASSESSMENT PROGRAM

March 2022

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F I S C A L A F F A I R S D E P A R T M E N T

Samoa
Climate Macroeconomic Assessment Program (CMAP)

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March 2022

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CONTENTS

TABLES

ANNEX

ABBREVIATIONS AND ACRONYMS

AAL	Annual Average Losses
ADB	Asian Development Bank
AFOLU	Agriculture, Forestry and Other Land Use
APDRF	Asia-Pacific Disaster Response Fund
BEV	Battery Electric Vehicle
Cat-DDO	Deferred Drawdown Option
CBS	Central Bank of Samoa
CDC	Cabinet Development Committee
CDF	Contingent Disaster Financing
CERC	Contingency Emergency Response Components
CIM	Community Integrated Management
CMAP	Climate Macroeconomic Assessment Program
CMIP	Coupled Model Intercomparison Project
CRICD	Climate Resilience Investment and Coordination Division (in MOF)
CRSC	Climate Resilience Steering Committee
CRW	Crisis Response Window
DAC	Development Assistance Committee
DIGNAD	Debt, Investment, Growth, Natural Disasters
DMO	Disaster Management Office
DPO	Development Policy Operation
DRFI	Disaster Risk Financing and Insurance
DSA	Debt Sustainability Analysis
EIA	Environmental Impact Assessment
EPC	Electric Power Corporation
ERSP	Economic Recovery and Support Program
ESF-RAC	Rapid Access Component of the Exogenous Shocks Facility
ESSSAP	Enhancing Safety Security and Sustainability of Apia Ports
EV	Electric Vehicles
FAO	Food and Agriculture Organization of the United Nations
FSAP	Financial Sector Assessment Program
FX	Foreign Exchange
GAR	Global Assessment Report on Disaster Risk Reduction
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
HEV	Hybrid Electric Vehicle
ICE	Internal Combustion Engine
IDA	International Development Association
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
LPG	Liquefied Petroleum Gas
LTA	Land Transport Authority
M&E	Monitoring and Evaluation
MAF	Ministry of Agriculture and Forestry
MESC	Ministry of Education, Sports & Culture
MNRE	Ministry of Natural Resources and Environment
MOF	Ministry of Finance
MPE	Ministry of Public Enterprises
MPMC	Ministry of the Prime Minister and Cabinet

MTEF	Medium Term Expenditure Framework
MWTI	Ministry of Works, Transport and Infrastructure
NAP	National Action Plan for Disaster Risk Management
NAPA	National Adaptation Programme of Action
NCCP	National Climate Change Policy
NDC	Nationally Determined Contribution
NDMP	National Disaster Management Plan
NESP	National Environment Sector Plan
PC	Public Corporations
PCRAFI	Pacific Catastrophe and Risk Financing Initiative
PCRIC	Pacific Catastrophe Risk Insurance Company
PCRP	Pilot Climate Resilience Program
PEFA	Public Expenditure and Financial Accountability
PFI	Public Financial Institutions
PFM	Public Finance Management
PHEV	Plug in hybrid electric vehicle
PPA	Power Purchase Agreement
PPCR	Enhancing Climate Resilience of Coastal Resources & Communities
PPP	Public-Private Partnership
PREP	Pacific Resilience Program
PSIP	Public Sector Investment Plan
PUMA	Planning and Urban Management Agency
PV	Present Value
RCF	Rapid Credit Facility
RE	Renewable Energy
REDD	Reducing Emissions from Deforestation and forest Degradation
SAO	Samoa Audit Office
SAT	Samoan Tala
SCCP	Samoa Climate Change Policy
SDG	Sustainable Development Goals
SDS	Strategy for the Development of Samoa
SFESA	Samoa Fire and Emergency Services Authority
SIDS	Small Island Developing States
SNPF	Samoa National Provident Fund
SOE	State-Owned Enterprise
TC	Tropical Cyclone
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-Added Tax
WB	World Bank

PREFACE

The Climate Macroeconomic Assessment Program (CMAP) aims to assist countries, especially small and low-income countries to build resilience and develop policy responses to cope with the economic impact of climate change. The CMAP is a successor to the Climate Change Policy Assessment (CCPA) with more focus on macroeconomic implications of climate change policies. Samoa is the first pilot country where a CMAP has been conducted.

CMAP
The Climate Macroeconomic Assessment Program

Staff from the IMF's Fiscal Affairs Department (FAD) supported by the Research and Asia and Pacific Departments held remote discussions for the CMAP during October 4-29, 2021. The team was led by Y. Kinoshita and comprised C. Alonso, C. Chen, K. Funke, A. Hosny, K. Kirabaeva, D. Prihardini, S. Suphachalasai, E. Tandberg, G. Zinabou (all FAD), Z. Aligishiev (RES), and A. Swiston (APD). V. Allena and Y. Kim (all FAD) provided editorial and research assistance. Mr. Lae Tui Siliva, Advisor to the Executive Director facilitated the mission arrangements. Mr. Lulai Lavea, PFTAC PFM advisor, and Mr. Neves, the mission chief for Samoa PEFA, provided useful comments. In the Ministry of Finance, the team met with Mr. Ah Ching, Acting CEO, Ms. Lee Hang, ACEO, Ms. Taulealo, ACEO, Ms. Suapaia, ACEO, and their staff. The mission also met with officials from the Executive Council, the Ministry of Customs and Revenues, the Ministry of Natural Resources and Environment, the Ministry of Public Enterprises; the Ministry of Commerce, Industry, and Labour, the Ministry of Works, Transport, and Infrastructure, the Ministry of Agriculture and Fisheries, the Ministry of Health, the Ministry of Education, Sports, and Culture, the Central Bank of Samoa, the Disaster Management Office, the Office of the Regulator, the Samoan Audit Office, the Samoan Bureau of Statistics, the Electric Power Corporation, the Samoa Land Corporation, the Land Transport Authority, the Samoa Ports Authority, the Samoa Tourism Authority, the Samoa Water Authority, the Meteorology Division of the MNRE, the National Bank of Samoa; and the National Pacific Insurance.

The team is grateful to the authorities for open discussion and close cooperation. In particular, the team would like to express appreciation to Ms. Faataga and Mr. Mulitalo for their invaluable help in organizing the mission schedule and information exchanges. The team also thanks Mr. Papalii of the Samoan Bureau of Statistics for providing a valuable data set from the 2018 Household Income and Expenditure Survey to conduct the analysis of the impact of mitigation policies. The mission benefitted from discussion with J. Daniel, N, Feruglio, G. Huang, and I. Parry (all FAD), L. Alton, M. Boyer, H. Gitay, J. Pelvin, J, Vun, Y.Yiao (all WB), E. Veve (ADB), C. Brandon and V. Laxton (all WRI).

EXECUTIVE SUMMARY

Samoa is highly exposed to natural hazards such as tropical cyclones, earthquakes, tsunamis, droughts, and floods. These damage economic growth and impact debt sustainability adversely. Increasing frequency and intensity of coastal storms are likely to amplify damage to infrastructure and livelihoods. Slow-moving climate stresses such as sea level rise and increasing heat hazard are also likely to impact potential growth in the main economic sectors such as agriculture, fisheries, and tourism.

Samoa places climate resilience building and disaster management as a key priority in its national development and economic strategies. Samoa's strong commitment to building climate resilience is reflected in various national strategy documents, and disaster management planning is well-developed. The Nationally Determined Contribution (NDC) has a clear strategy for mitigation. These climate responses are well-aligned with broad development strategies. However, a summary of costed adaptation plans could usefully be articulated at the national level.

Samoa has clearly defined mitigation plans in the NDCs, which can be further enhanced by tax reforms. Samoa plans to continue expanding renewable energy generation and improving efficiency. In the 2nd NDC, Samoa has broadened its mitigation commitments to cover the transport, waste, and AFOLU sectors, in addition to the electricity sector. These efforts would be strengthened by complementing them with feebates to encourage the take up of fuel-efficient cars and energy-efficient appliances. Selected tax reforms such as increasing excise taxes on kerosene and LPG, as well as applying VAT to electricity can help meet mitigation objectives. The revenue raised from these tax measures can be used to strengthen the social safety net to make low-income households better off.

The disaster risk management framework incorporates several important elements of a risk-layering strategy, but some gaps remain. Integrating disaster risk assessments into the budget process would encourage adequate provisioning for fiscal risks. The social protection of the most vulnerable parts of the population should be strengthened by introducing a digital ID system. While Samoa improved its financial resilience by having several global and regional risk transfer instruments at its disposal, public assets insurance should be extended to cover major infrastructure and domestic private insurance can be further developed.

Adaptation plans could be further improved by conducing climate risk assessments and the cost-benefit analysis of adaptation projects more consistently. The community-based approach to adaptation ensures an inclusive decision-making process. But adaptation planning is fragmented at the sectoral level and often driven by available external financing without common planning strategies across the board. Samoa would benefit from conducting climate risk assessments more consistently in adaptation planning and a common methodology for cost-benefit analysis of adaptation projects. Due to the private sector's participation in key development sectors, it is crucial to incentivize adaptation by the private sector through

measures such as better enforcement of regulations. Sectoral plans should also consider long-term strategies of adaptation in addition to short-term disaster management.

Samoa has made significant advances in coping with climate change and natural disasters with donor support, but sizable funding gaps remain to achieve its climate targets. The estimated total climate spending needs for 2022-2026 are about US$650 million, equivalent to about 17 percent of GDP per year. Of this, roughly $400 million in funding has already been committed by donors or is likely to materialize, leaving a funding gap around US$250 million or 6 percent of GDP per year. While these additional funding needs are achievable with stepped-up international support, the estimated scale up of public investment required to implement all projects over the next five years could prove overly ambitious.

Investing in adaptation ex-ante would mitigate the impact of natural disasters, leading to higher long-term growth and lower overall financing needs. Expected negative impacts from climate change and repeated natural disasters put Samoa at high risk of debt distress over the long term. Additional ex-ante adaptation investment financed by grants would improve the long-term economic outlook and reduce debt vulnerabilities. Financing additional adaptation investment prior to natural disasters is also beneficial for international donors as post-disaster reconstruction funding needs will be significantly reduced, resulting in a net saving for donors.

Given limited fiscal space, grants and/or concessional loans are needed to support additional ex-ante investment. Without grants, Samoa's debt would likely become unsustainable over the medium-term. Though Samoa has been relatively successful in accessing global and regional concessional climate funds, the government would benefit from taking a strategic view in matching its climate project pipeline to those financing sources that can be accessed with reasonable effort and at acceptable cost, given its capacity constraints and administrative requirements associated with climate funds.

Public financial management has a comprehensive and well-developed institutional and planning process, though with limited focus on climate issues. Some key aspects of public investment management are in place, but project appraisal, selection, and review need to take into account climate-specific elements. The main stakeholders, particularly line ministries and SOEs, would benefit from technical guidance and support to integrate climate change into public investment planning. Decision-making on climate-related public investment is well-coordinated across the public sector. Some project appraisals include climate impact analysis. However, this analysis does not follow a standard methodology. Similarly, while climate-related factors are among the criteria used by the government for the selection of infrastructure projects, there is no formal project selection mechanism, undermining the transparency of project selection. Information on climate-related public investment projects is also fragmented. Samoa can improve transparency on climate-related spending by conducting ex-post reviews or audits of projects to ensure that projects meet climate objectives.

Box 1. Summary of Key Recommendations 1/
(Short term: within 1-2 years; Medium term: within 2-5 years)

National Climate Strategy	Time Frame
• **Adaptation plans that include costs of adaptation investment, should be included in the PSIP or other suitable document**	**Short term**
• Formalize a disaster risk financing strategy consistent with NDMP, improving availability of information on damages and losses	Short term
• Keep national and sectoral plans updated	Short to Medium term
Mitigation	
• Increase excise taxes on kerosene and LPG and adjust these excise taxes in line with annual inflation	Short term
• Tax electricity at the standard VAT rate of 15% and **ensure the electricity tariff covers cost of provision**	**Short term**
• Consider recycling tax revenue from mitigation measures to strengthen the social safety net	Short term
• Use feebates to encourage the uptake of fuel-efficient vehicles and energy efficient appliances	Medium term
Disaster Risk Management	
• **Develop and maintain a centralized registry of public fixed assets**	**Short term**
• Disaster and climate risks should be included in budget documents for a comprehensive contingent liability framework	Short to Medium term
• Strengthen social protection for vulnerable households in disaster response and by introducing digital ID	Short to Medium term
Adaptation	
• Strengthen planning through risk zoning, resource mapping, and risk monitoring	Short term
• **Conduct climate risk assessment consistently** as part of the adaptation planning, particularly at the sector level	**Short to medium term**
• **Use a common methodology for the cost-benefit analysis of adaptation projects**, obtaining information from consistent project monitoring & evaluation	**Short to medium term**
• Incentivize adaptation in the private sector by enforcing regulations and improving financial inclusion for farmers and small businesses	Short to medium term
Financing Climate Policies	
• **Scale up ex-ante investments in climate adaptation by pursuing additional grant financing**	**Short to Medium term**
• Take a strategic view in matching climate project proposals to those financing sources that can be accessed with reasonable effort and at acceptable cost	Short to Medium term

1/ Bold indicate recommendations with the highest priority.

Box 1. Summary of Key Recommendations (concluded)

• Complete costing of adaptation and mitigation policies to enable accurate estimation and communication of financing gaps	Medium term
Public Investment and Financial Management	
• **Update project preparation and Environmental Impact Assessments (EIA) guidelines** to include explicit requirements for climate impact analysis and define standard methodologies for this analysis	**Short term**
• **Improve transparency of climate-related spending by including PSIP in budget documents,** defining climate-related selection criteria in prioritizing projects. Develop climate tagging over time.	**Short to medium term**
• Strengthen climate-sensitive budgeting, through an updated budget circular, appropriate maintenance allocations, rigorous project monitoring, climate spending reviews and systematic ex-post audit and review of climate investment	Medium term

Table 1. Samoa: Strategic Gaps in Nationally Determined Contribution and Other Climate Plans

Mitigation	
Does the NDC have well-specified mitigation targets?	
Are current policies consistent with NDC?	
Are current policies and financing consistent with moving towards net-zero emission by mid-century? (for a small developing economy)	
Adaptation	
Do adaptation plans in NDC and other climate plans adequately reflect climate shocks?	
Are current policies consistent with NDC and other climate plans?	
Disaster Risk Management	
Are risk management policies adequately reflected in NDC and other climate plans?	
Are current risk management policies adequate?	
Macro-fiscal Implication	
To what extent were macroeconomic vulnerabilities eased by existing climate policies?	
To what extent are climate projects in NDCs and other climate plans costed?	
Are the financing plans adequate?	
Are polices in the NDC and other climate plans consistent with debt sustainability?	
National Process	
Are planning processes adequate to support NDC and other climate plans?	
Is PIM adequate to support NDC and other climate plans?	
Is Public Financial Management (PFM) adequate to support NDC and other climate plans?	

Note: Green indicates little or no gaps; yellow indicates some gaps; red indicates significant gaps

CLIMATE CHANGE RISKS AND IMPACT

Samoa is highly exposed to natural hazards such as tropical cyclones, earthquakes, tsunamis, droughts, and floods. These damage economic growth and debt sustainability. Increasing frequency and intensity of coastal storms will likely amplify damage to infrastructure and livelihoods.

A. Impact of Climate Change Risks on the Macro Framework and Long-Term Outlook

What are the Main Climate Risks Faced by the Country?

1. Samoa is highly exposed to multiple natural hazards, including tropical cyclones, flooding, droughts, and earthquakes. Samoa suffers from damaging winds, rain, and storm surges, especially during the tropical cyclone season. First, with approximately 70 percent of Samoa's population and infrastructure located in low-lying coastal areas (Figure 1), Samoa's economy is highly susceptible to coastal flooding. Second, extreme rainfall and long dry spells occur, coinciding with the El Niño Southern Oscillation leading to floods and droughts. Lastly, seismic disasters such as earthquakes and consequential tsunamis typically leave sizable damage to Samoa's economy. In the past 40 years, Samoa had 13 major disaster events,[1] ranking 6th among the 20 Pacific Island States on the frequency of disasters (Figure 2a).

Figure 1. Building, Roads, and Coastal Lines

Source: Pacific Risk Information System

2. The intensity and frequency of extreme weather events are changing in Samoa. Samoa has already been experiencing more frequent long dry-spells and more intense tropical cyclones. Over the next 2-3 decades, Samoa is expected to experience more heatwaves, more irregular rainfalls that bring heightened hazards of flooding and droughts, and stronger tropical cyclones (Table 2). Intensified climate hazards interact with socioeconomic vulnerability in Samoa, imposing significant climate risks to the country's economy, physical assets, and population.

[1] Data from the International Disasters Database (EMDAT). Major disaster events require at least one of the following criteria must be fulfilled: Ten or more people reported killed; hundred or more people reported affected; declaration of a state of emergency; call for international assistance.

Table 2. Samoa: Climate Risk Profile 1/

Climate condition and hazardous events	Risk profile (Data source: CCKP 2/, The Current and Future Climate in Samoa, OCHA Situation Report)
Temperature and heatwave	· Compared to the 30-year average (1960-1990), the average temperature between 1991-2016 increased by 0.81°C. · The numbers of hot days and hot nights have increased significantly across the Pacific. But heatwaves were not considered major disaster events. · By mid-century, mean annual temperature rise is likely to be between 0.89°C and 1.89°C in a more severe climate change scenario. · By mid-century, increase of extreme warm days (with the Heat Index >35°C) rises by more than 135 days in a severe climate change scenario.
Precipitation and drought	· Samoan meteorological data collected over 101 years indicate a decreasing trend in precipitation by 49 mm a year. · Samoa's general weather patterns are vulnerable to anomalously long dry spells that coincide with the El Niño Southern Oscillation. · In 2015, Samoa experienced a 6-month extended dry period, which caused large-scale drought and severely impacted agricultural productivity. · By mid-century, annual precipitation is expected to further decrease by more than 50mm on average, though no significant increase of drought hazard is projected.
Flooding	· During the past two decades, the biggest documented rainfall flooding was in 2001, when heavy flash floods inundated the lowlands around the two towns (Lepea and Moata'a), and rivers and streams also overflowed causing flooding along the coast in the east and in the south. · By mid-century, the magnitude of a 25-year extreme rainfall event will increase by 51 mm on average, causing intensified flooding events in lowlands in both coastal and non-coastal regions.
Storm	· Samoa is prone to severe tropical cyclones that generally occur during the southern hemisphere summer months of December to February · Four coastal storms caused by cyclones were documented in the past two decades, with wind speed ranging between 190-310 km/hour. · By mid-century, there is likely to be an increase in the average maximum wind speed of cyclones by between 2% and 11% and an approximate 20% increase in rainfall intensity within 100 km of the cyclone center.

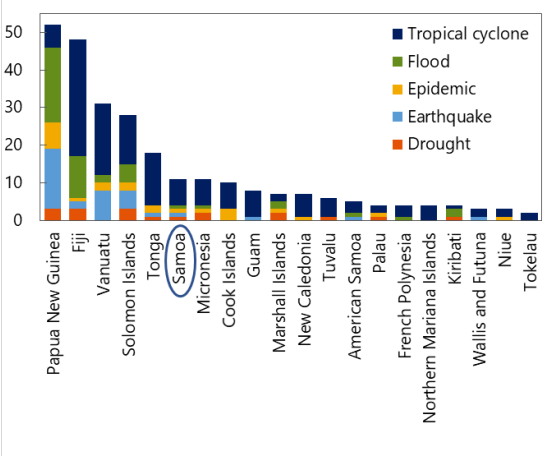
1/ Projected changes of climate condition and hazardous events are with respect to the base year period 1986-2005

2/ Based on data accessible in October 2021

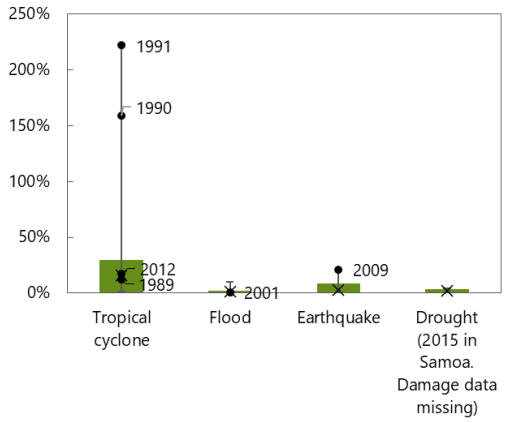
3. Samoa has experienced significant economic damages caused by several disasters in the past 20 years. Though Samoa has experienced less frequent natural disasters than other countries in the region, it tends to suffer more severe economic damage. Two disaster events in Samoa in the early 1990s caused some of the largest losses and damages recorded in the region (Figure 2). The earthquake in 2009 caused loss and damage (including property, crops, and livestock) equivalent to about 35 percent of GDP. In 2012, Tropical Cyclone Evan caused a similar size economic damage. No official damage report is available for the 2015 drought, however, there was a recognition amongst authorities that the drought caused high stress in agriculture, the power sector, and elevated wildfire risks.

Figure 2. Frequency and Total Damages of Natural Disasters, 1980-2020

a. Frequency of Natural Disasters by Country 1/



b. Total Damage in percent of GDP 2/, 3/



Source: EM-DAT, IMF staff calculation.
Note:

1/ The figure a) PICs include 20 countries as defined in Enterprise Business Vocabularies

2/ The figure b) includes 82 natural disaster events in the 12 Pacific Island countries.

3/ The whiskers represent the maximum and minimum values, and the top and bottom points of the boxes plot the 90th and 10th percentiles, respectively.

What is the Potential Impact of Climate Change on the Economy?

4. More frequent disasters are expected to lower growth and widen fiscal and current account deficits. Samoa's experience with natural disasters shows that the impact of a single event can be substantial. On average, Samoa's economic damage, including property, crops, and livestock, are estimated to be about 30 percent of GDP per disaster over the past four decades. Samoa could be trapped in a repeated disaster-recovery cycle, losing fiscal space and missing time windows for development. For example, due to repeated natural disasters, the 2021 Article IV for Samoa projects GDP growth to be lower by 1.3 percentage points in the long run and fiscal and current account deficits to widen by 3.5 percent of GDP compared to a counterfactual without natural disasters.

5. Natural disaster shocks also threaten Samoa's debt sustainability. Although Samoa's debt-to-GDP ratio was 49 percent of GDP in FY2020/21, based on the above-mentioned assumptions, it is expected to trend upwards over the next twenty years and cross the applicable DSA threshold of 70 percent of GDP by 2034. An additional near-term natural disaster comparable to historical magnitudes would accelerate these trends and could permanently increase the debt-to-GDP ratio by up to 20-25 percentage points in the absence of grant financing for reconstruction (see Section VI).

6. Slow-moving climate stresses, especially rising temperature, could also lower potential long-term growth in the critical economic sectors of tourism, agriculture, and fisheries:

- **Tourism:** Samoa's tourism sector accounts for 20 percent of GDP and heavily relies on its marine and terrestrial resources such as coral reefs and tropical fish stocks, which are vulnerable to climate risks. Critical infrastructure including hotels, roads, airports, and ports would likely be damaged by more frequent flooding from cyclones. As Samoa's tourism sector is making a recovery plan from the pandemic crisis, the sector also needs to have a long-term vision to cope with negative climate change effects.
- **Agriculture:** Samoa's agriculture sector is vulnerable to slow-moving climate stresses and natural disasters. Agricultural output accounts for less than 10 percent of GDP, with the employment share of 20 percent but it is a source of income for over 70 percent of population. Long-term temperature rises and precipitation volatility can lead to water resource scarcity, soil erosion, and changes in pest and disease profiles. Samoa continues to use largely traditional farming practices and crop types, which constrain the overall adaptability of the sector. In addition, outdoor workers are vulnerable to exacerbating heat stresses, and financial constraints on farmers prevent them from taking adaptation measures, such as using climate-resilient crops.
- **Fisheries:** Marine heat stress could reduce the potential fish catch in the Northeast Pacific by about 20 percent. Fisheries accounted for about 3.4 percent of GDP in 2014, but fish constitutes a large part of the citizens' dietary protein. Samoa has already been experiencing declining production of fish since 2007. Marine heat stress and ocean acidification would present additional threats. However, heat stress has not yet been taken into account in the resilience building strategy. Lack of preparedness amplifies the vulnerability of the fishery sector to climate risks.

NATIONAL STRATEGY FOR CLIMATE CHANGE

Samoa's strong commitment to climate resilience building is reflected in various national strategy documents and disaster management planning is well-developed. The NDC has a clear strategy for mitigation. These climate responses are well-aligned with broader development strategies. However, costed adaptation plans could usefully be articulated at the national level and sectoral adaptation plans need updating for credibility in communication and coordination across sectors.

B. The NDC and Other Climate Resilience Building Strategies

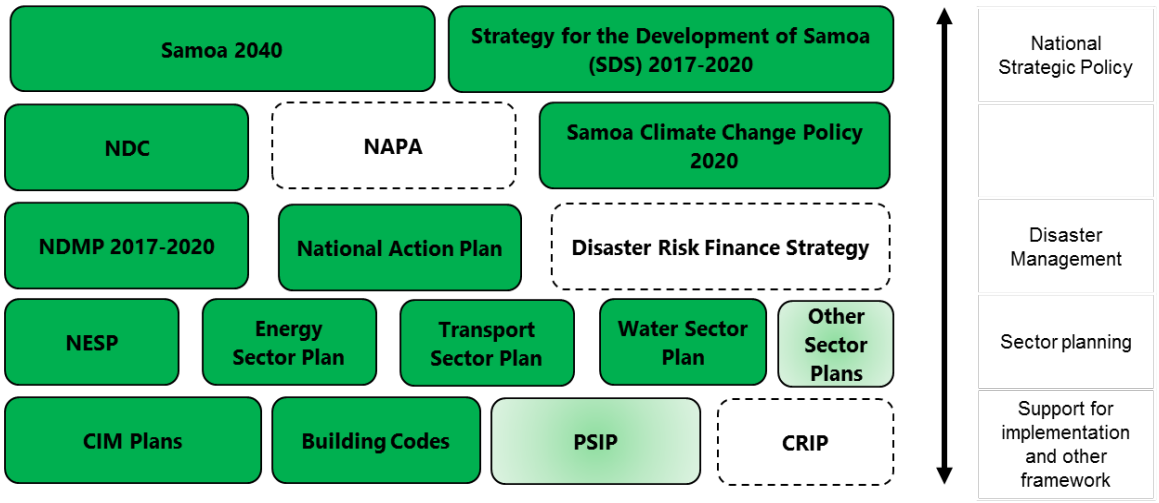
Do the NDC and Other Climate Plans Present a Comprehensive and Costed Strategy for Climate Change Response?

7. The NDC has a comprehensive coverage of mitigation while other national documents articulate Samoa's adaptation strategies. Samoa recently submitted the 2nd NDC which includes a broadened sectoral coverage in its mitigation plans compared to the 1st NDC. The NDC roadmap presents a costing of mitigation needs by sector. In contrast, the scope of

adaptation plans in the NDC remains limited. However, adaptation strategies are reflected in other national strategic documents and adaptation is mainstreamed in sectoral plans.

8. Samoa has made climate resilience building and disaster management planning a focus of its national policies and frameworks. The high-level awareness of the importance of climate resilience is reflected in various national strategy plans such as Samoa 2040, Strategy for Development of Samoa (SDS), and Samoa's Climate Change Policy (NCCP) (Figure 3). The National Disaster Management Plan (NDMP) and the National Action Plan for Disaster Risk Management (NAP), prepared by the Disaster Management Office (DMO), define the disaster risk management framework and its implementation[2].

Figure 3. Key Elements of Samoa's Strategic Planning Framework



Note: *Green* indicates relatively well-developed framework, strategy, or plans; *light green* – partially developed; *dotted lines*- significant gaps or lack of framework, strategy, or plans.
Source: IMF staff.

9. Samoa embraces a bottom-up approach to adaptation planning in which each sector develops its own adaptation plan within the sector plan. There are coordinating units in the Ministry of Finance (MOF) and MNRE to oversee adaptation plans at the aggregate level. However, the estimate for aggregate adaptation cost is not available. There is a role for the Public Sector Investment Plan (PSIP) to be updated on a more regular basis to inform stakeholders of current adaptation plans and to reflect better climate resilience considerations similar to the previously published Climate Resilience Investment Plan under the pilot Climate Resilience Program (PCRP) (See Section VII).

10. Samoa's climate change and disaster management strategies are supported by a whole-of-economy framework including key sectors and communities. Samoa's adaptation planning involves sectors as well as communities, ensuring adaptation planning includes the segments of the population most vulnerable to climate change and natural disasters. The

[2] The DMO is currently being transitioned from the Ministry of Natural Resources and Environment (MNRE) to the Prime Minister's and Cabinet Office under the umbrella of the National Security Committee.

planning of specific measures and activities is done and reflected in sectoral strategies, corporate plans of line ministries, implementing agencies, and public corporations. Community Integrated Management (CIM) plans aim to help the government and communities improve resilience by identifying the most effective actions in response to climate and natural disaster related issues that can be taken at the community level while ensuring sustainable economic development (See Section V).

11. An institutional framework for coordinating adaptation plans across sectors is in place but the implementation process could be enhanced further. In 2014, a Climate Resilience Steering Committee (CRSC), including the CEOs in all the 14 sectors, was established with the Climate Resilience Investment Coordination Division (CRICD) of the MOF acting as a Secretariat. CRICD is responsible for overall coordination of the climate resilience investment program. The MNRE is the lead technical agency for implementing the mainstreaming of climate change and disaster management policies. It is also responsible for cross-agency coordination, including for the development of CIM plans. Improving cross-sectoral coordination could further enhance the existing framework by addressing trade-offs between sectoral objectives at the operational level (e.g., agriculture and forestry). Furthermore, some key sectoral plans (e.g., transport, agriculture, and tourism) should be kept up to date to facilitate better coordination and implementation.

12. Adaptation plans at the national level could usefully be presented in the PSIP or other suitable document by drawing on existing sectoral plans. Samoa published the National Adaptation Programme of Action (NAPA) in 2005. Since then, adaptation plans have been fully incorporated in sectoral plans and the authorities opted not to update the NAPA. Adaptation financing is also done on a sector-by-sector basis, often according to the areas of interest of international donors. A document consolidating information on the costing and funding gaps of adaptation plans at the national level can be useful to facilitate discussions with potential investors and donors. An updated PSIP could serve this purpose by summarizing the main projects and activities in resilience building and disaster management.

Is the Climate Change Strategy Consistent with Broader National Development and Growth Goals (e.g., vs. SDGs)?

13. The climate-related national strategy is broadly consistent with Samoa's development goals (SDGs). The country's vision of sustainable development is well-defined in high-level documents such as the SDS and Samoa 2040 with a special focus on climate change and environmental consideration. The SDS links outcomes to individual SDGs, and climate resilience and disaster risk objectives are reflected in every sectoral plan as part of development goals. The NDC is also consistent with the SDS, and electricity and transport sector plans are aligned with mitigation objectives of the NCCP 2020. The SDS is currently being updated under the new government to be published by end-2021.

MITIGATION PLANS

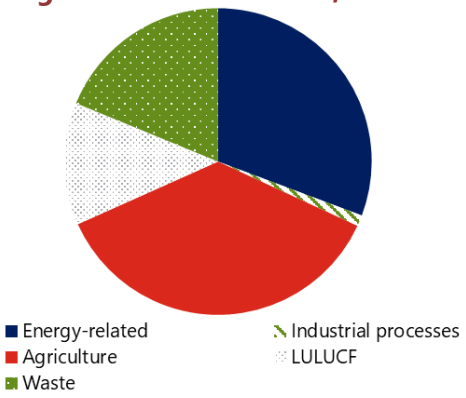
Samoa's mitigation plans focus on expanding renewable electricity generation; increasing forest cover; enhancing livestock manure management and accelerating electrification of government and commercial fleets. This could be supported with feebates to encourage the take up of fuel-efficient cars and energy-efficient appliances. Selected tax reforms in kerosene, LPG, and electricity can help meet mitigation objectives. The revenue raised from these tax measures can be used to strengthen the social safety net, mitigating the adverse impact of higher energy prices on vulnerable households.

C. Meeting Emission Reduction Targets

How Does the Country Intend to Meet its Emission Reduction Targets? Is the Long-Term Decarbonization Plan Consistent with Achieving the Target of 'Net-Zero' by Midcentury?

14. Samoa has broadened mitigation commitments for its second NDC to cover the transport, waste, and Agriculture, Forestry and Land Use (AFOLU) sectors, in addition to the electricity sector (Table 3). These commitments are aligned with its overall GHG emissions, whereby emissions from the agriculture (livestock) sector dominates, followed by road transport, and electricity generation (Figure 4). Samoa's total GHG emissions in 2007 reached 352 Gg CO2e (0.001 percent of global GHG emissions) or 1.6 metric tons per capita, comparable to other Pacific island small states and well below other small states at 5.9 metric tons per capita[3]. While emission levels are low, Samoa recognizes the importance of progress on mitigation commitments, which can bring benefits to the domestic economy (e.g., reduced reliance on imported fuel), provide international credibility, and potentially leverage external financing.

Figure 4. GHG Emissions, 2018



Source: Climate Watch

Table 3. Samoa: Mitigation Objectives, Proposed Actions and Estimated Costs

Sector	Mitigation Objective	Proposed Action	Estimated Cost
Energy	Reduce GHG emissions in 2030 by 30% compared to 2007 levels.	• 100% RE generation by 2025 • Improve grid stabilization and network efficiency • Electrification of vehicles • Various low carbon options for marine transport, including,	US$126 million

[3] World Bank estimates based on Climate Watch GHG emissions data.

Table 3. Samoa: Mitigation Objectives, Proposed Actions and Estimated Costs (concluded)

		e.g., use of solar panels on vessels and biodiesel • **Install energy efficient appliances in hotels**	
Waste	Reduce GHG emissions in 2030 by 4% compared to 2007 levels.	• Install landfill gas capture technologies	US$3 million
AFOLU	Reduce GHG emissions in 2030 by 26% compared to 2007 levels.	• Improve manure management and fertilizer use • Reforestation, forest restoration and promoting agroforestry	US$5 million

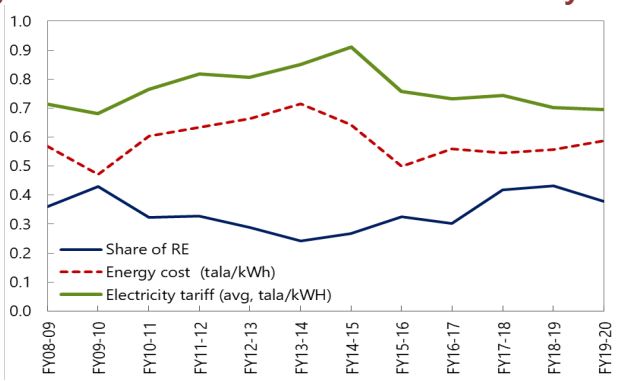
Source: Samoa's Second Nationally Determined Contribution.

15. Samoa has taken significant steps to decarbonize the electricity sector towards 'net-zero' but more can be done in other sectors. Under the first and second NDCs, Samoa aims to decarbonize the electricity sector by switching entirely to renewable energy generation by 2025. The Electric Power Corporation (EPC), the provider of electricity in Samoa, is actively planning the investments necessary to meet this target. Decarbonization plans for other sectors by 2030 are listed in Samoa's second NDC but these plans are conditional on the availability of external financing.[4] These include electrification of the vehicle fleet and improvements in energy efficiency for the private sector. The current plans are not sufficient to reach net-zero but would allow Samoa to reduce GHG emissions by almost 50 percent relative to 2007 levels by 2030. Decarbonization plans to support net zero by mid-century have not been developed. Such plans would strengthen Samoa's emissions commitments. There are a number of small island countries with net-zero targets such as Fiji, Marshall Islands, and Solomon Islands.

What are the Country's Plans to Decarbonize the Energy Sector?

16. Samoa is highly dependent on imported petroleum products to meet its energy needs. In 2016, petroleum products were used to meet 69 percent of energy needs. Most petroleum products (51 percent) are used in the road transport sector. Biomass continues to be the main source of energy used by households, although its importance has fallen over time as households adopt different cooking methods, such as LPG, kerosene, and electricity.

Figure 5. Effect of RE Penetration on Electricity Tariff



Source: EPC annual reports, IMF Staff estimates.

[4] The first NDC target to generate 100% of electricity from renewable sources by 2017 was not achieved and is now reset for 2025.

17. Increasing the share of renewable electricity (RE) generation to 100 percent would allow Samoa to meet around half of its NDC commitments and also brings wider economic benefits. Higher RE penetration leads to lower fuel costs and hence lower electricity tariffs. As the share of RE (hydroelectric and solar) increased from 24 to 43 percent between FY2013/14 and FY 2018/19, the energy component of the tariff fell from 72 to 56 sene/kWh (Figure 5). A RE share of 93 percent can reduce the cost of electricity to 31 sene/kWh, around half the cost of

18. diesel generation (Vaiaso and Jack, 2021). It is important that investment in RE generation keeps up with increased electricity demand. In the past, strong growth in electricity demand has been met by diesel rather than renewables. Going forward, electricity demand is expected to increase by 25 percent over the next ten years.

19. EPC has developed a strategy to boost the share of RE in electricity generation. EPC is working together with a private company (Gridmarket) to design and procure the necessary investments including in solar generation capacity. Under this strategy, Samoa could reach 90 percent RE in this sector by 2025, falling short slightly of the 100 percent target. Furthermore, diesel generation is likely to remain part of the power mix for some time as two generators, with a life span of 20-30 years, were commissioned only in 2013.

20. Electrification of the transport sector would lower GHG emissions and can also act as backup energy storage. Samoa's current grid factor at 0.4 kg CO2e/kWh, is sufficiently low that introducing electric vehicles (EVs), even without 100 percent RE, would reduce emissions (Grutter and Kim, 2019; Gay, Rogers and Shirley, 2018). Small island states are particularly suitable for the deployment of EVs given their short driving distances and low driving speeds. In the long term, EVs can potentially act as a distributed energy storage system, feeding power into the grid during peak times. But the cost of EVs is prohibitively high for most Samoan households. Also, technical and financial challenges need to be overcome for a widespread adoption of EVs Samoa is currently looking into strategies by analyzing various scenarios for the potential for EVs in the NDC roadmap[5].

Does the Country Have Policies and Regulations to Decarbonize the Power, Industry, Transport, Buildings, and Agriculture Sectors?

21. Samoa's NDC roadmap elaborates on mitigation policies in agriculture, forestry, and livestock sectors, including prioritized projects in each sector. These projects are the agroforestry support program, national forestry plan, and manure management. The agroforestry program involves supplying farmers with coconut seedlings, as well as raising awareness of the productivity benefits of agroforestry. The national forestry plan builds on the campaign to plant a further two million trees by 2027. The authorities plan to explore the possibility of accessing the Reducing Emissions from Deforestation and Forest Degradation plus (REDD+) program to

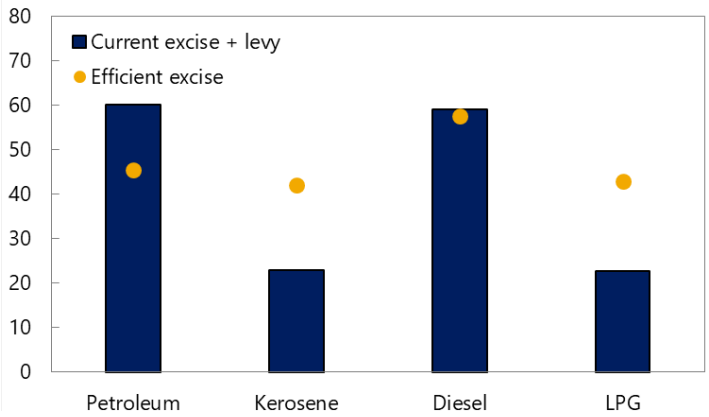
[5] Samoa's NDC roadmap found that lifetime costs of an EV are around US$11,000 higher than that of an ICE vehicle. An alternative to private ownership is the introduction of shared EVs which removes the high upfront costs for households and reduces the lifetime ownership cost for the provider of the service. Indeed, this is one of the mitigation projects explored in the NDC, which found that using shared electric cars can be more affordable than private ICE ownership.

incentivize the expansion of forest cover.[6] The manure management project, commissioned under the Improving the Performance and Reliability of RE Power Systems in Samoa project, will be expanded to cover 10 percent of the pig herd.

D. Carbon Taxation and Fuel Subsidy Policies

Does the Country Have a Carbon Pricing Regime and is this Aligned with its Mitigation Plans?

Figure 6. Current vs Efficient Excise Level



Source: Parry and others (2021); Samoa Ministry of Finance

22. Samoa's tax system delivers appropriate carbon pricing for road fuels. The prices for petroleum, diesel, and kerosene are regulated, with prices being reviewed monthly and fluctuations in international prices passed on to consumers with a 1–2-month lag[7]. Petroleum and diesel are subject to excise (55 and 54 sene/litre, respectively), an Accident Compensation Corporation levy (5 sene/litre), and a VAT of 15 percent[8]. The level of excise and levy taxation in Samoa (at around US 23 cents) is at its efficient level, of which US 15 cents/liter is to reflect the cost of GHG emissions priced at USD 62/tCO2e (Figure 6) [9]. Diesel used for power generation is also subject to the excise tax but receives a refund for the levy. In contrast, the taxation of kerosene and LPG are below the efficient level.

23. Passenger motor vehicles are subject to an excise tax, the VAT, and an annual registration fee. Excise taxes for passenger motor vehicles range between 10 – 50 percent and increase with engine size. Buses enjoy a lower excise rate of 8 percent, so do hybrid vehicles (5 percent) and no excise is applied to EVs. The annual registration fee also increases in line with engine size, but does not distinguish between EVs and ICE vehicles. Taxes based on engine size encourage the take up of smaller, more fuel-efficient cars but do not encourage the take up of vehicles with other characteristics that improve fuel economy (e.g., smaller cabin, lighter vehicles).

[6] So far, REDD+ has only been implemented on the larger islands of Fiji, Vanuatu, Papua New Guinea, and Solomon Islands.
[7] There is a cross-subsidy for fuel; Savai'i fuel prices are the same as Apolu's despite higher transportation costs of Savai'I'.
[8] The Accident Compensation Corporation covers the medical costs of Samoans who suffer a motor vehicle or sea vessel accident.
[9] For some externalities, such as congestion and motor vehicle accidents, excises on fuel are not the first best solution. Hence, the estimated excise levels are 'second-best' efficient levels.

24. Electricity receives favorable tax treatment by being zero-rated under the VAT. There is no tax on sales of electricity, but the EPC receives a tax credit for any VAT paid on their inputs. Zero-rating under the VAT should be applied only to exported products. The energy component of the tariff is reviewed each month by the Office of the Regulator to reflect the cost of fuel and IPP feed-in tariffs. In certain circumstances, the government intervenes in the price setting (e.g., during the pandemic)[10]. Recently, mitigating the economic impact of the pandemic on the most vulnerable, the authorities introduced a 20 percent tariff reduction for domestic customers. Adverse impact of the pandemic on households and businesses would better be addressed through more targeted support mechanisms, also to avoid unintended incentives for electricity consumption. The tariff reduction should be reviewed to ensure that tariffs remain sufficient for EPC to recover its costs. In case the reduced tariff does not cover the EPC's production cost, the government should cover these losses and report them as a transfer to EPC to avoid the accumulation of resulting liabilities in EPC.

What Other Carbon Pricing Strategies - Including Feebates and Other Regulations - Can Usefully Contribute to Mitigation?

25. Revenue-neutral feebates could encourage the take up of fuel-efficient cars. While EVs can be imported excise-free, the excise rates are not sufficient to close the price wedge between EVs and ICE vehicles[11]. In contrast, a feebate involves levying a tax on relatively less fuel-efficient vehicles in proportion to the difference between their fuel consumption rate (or CO2 emission rate per kilometer) and the historical average fuel consumption rate, and conversely providing a subsidy to relatively more fuel-efficient vehicles in proportion to the difference between the average and their fuel consumption rate. For example, with a carbon price of US$ 300/tCO2e, this would give a subsidy of around US$ 1,140 for a vehicle that meets Europe's efficiency standards (95g-CO2e/km), and tax a vehicle emitting 200g-CO2e/km at US$ 1,160[12]. Administrative costs of implementing feebates should be modest as it builds off the existing excise tax (e.g., the subsidy can be deducted from the excise duty) and data on fuel economy is available.

26. Similarly, feebates on appliances can encourage the adoption of energy-efficient appliances. Samoa implemented minimum energy performance standards for refrigerators, freezers, air conditioners, and lighting between 2018 and 2019, based on Australia and New Zealand standards. Energy efficiency labelling is mandatory for refrigerators, freezers, and air conditioners. However, these standards and labelling do not cover large commercial refrigeration equipment or cool rooms. Feebates would reduce the cost of more efficient appliances and penalize inefficient appliances.

[10] Tariffs were reduced by 10 sene/kWh for all sectors and a 50 percent reduction in the fixed charges for the hospitality sector.
[11] To close the gap for a small SUV, an excise differential of around 44 percent is needed.
[12] This is around 1/3 of the implied carbon price in Mauritius' feebate scheme. The duty paid for an average vehicle is around USD 1,250 and hence at these parameters there is no need to process refunds for the typical vehicle.

What Would the Tax System Look Like with Recommended Carbon Pricing?

27. Samoa could support its mitigation efforts by increasing the excise taxes on kerosene and LPG and applying the standard VAT rate on electricity. This involves increasing the kerosene excise by 20 sene/liter and changing LPG excise rate from an ad-valorem rate of 8 percent to a specific rate of 43 sene/liter. This would raise around 0.3 percent of GDP in revenue, which can be redistributed to support vulnerable households (see next subsection) and help meet 4 percent of Samoa's NDC target.

E. Distributional Impact of Recommended Mitigation Strategies

What Would be the Distributional Impact of the Recommended Changes in Mitigation Policies? How Can Changes in Taxes, Expenditures, and Complementary Policies Help the Policy Reform Contribute to Equity Objectives?

28. The proposed mitigation package would have a small negative impact on low-income households. Increasing excises on kerosene and LPG and introducing VAT in electricity would increase their prices by 7, 9 and 15 percent, respectively. And if so, it would reduce household welfare by around 0.5 percent of their initial consumption on average due to higher prices (Figure 7, Panel A).[13] The burden would be distributed relatively evenly across poor and rich households. The poorest quintile would experience a loss of 0.51 percent of their initial consumption compared to 0.59 percent for the richest quintile, with the difference reflecting slightly higher electricity bills for richer households.

29. The revenue raised by these mitigation policies could be used to compensate the most vulnerable. Figure 7, Panel B shows how different compensation measures of redistributing revenue raised from carbon pricing would impact the Gini coefficient (an indicator of inequality). For instance, redistributing the revenue by topping up the existing Senior Citizen Benefits Fund (i.e., their old age pension) or introducing a cash grant per child would reduce inequality. Inequality could be reduced further by introducing a cash grant targeted to the poorest 40 percent of the population based on easily verifiable household characteristics (proxy-means testing).[14] The bar labeled "Transfer Poorest 40%" shows by how much inequality could

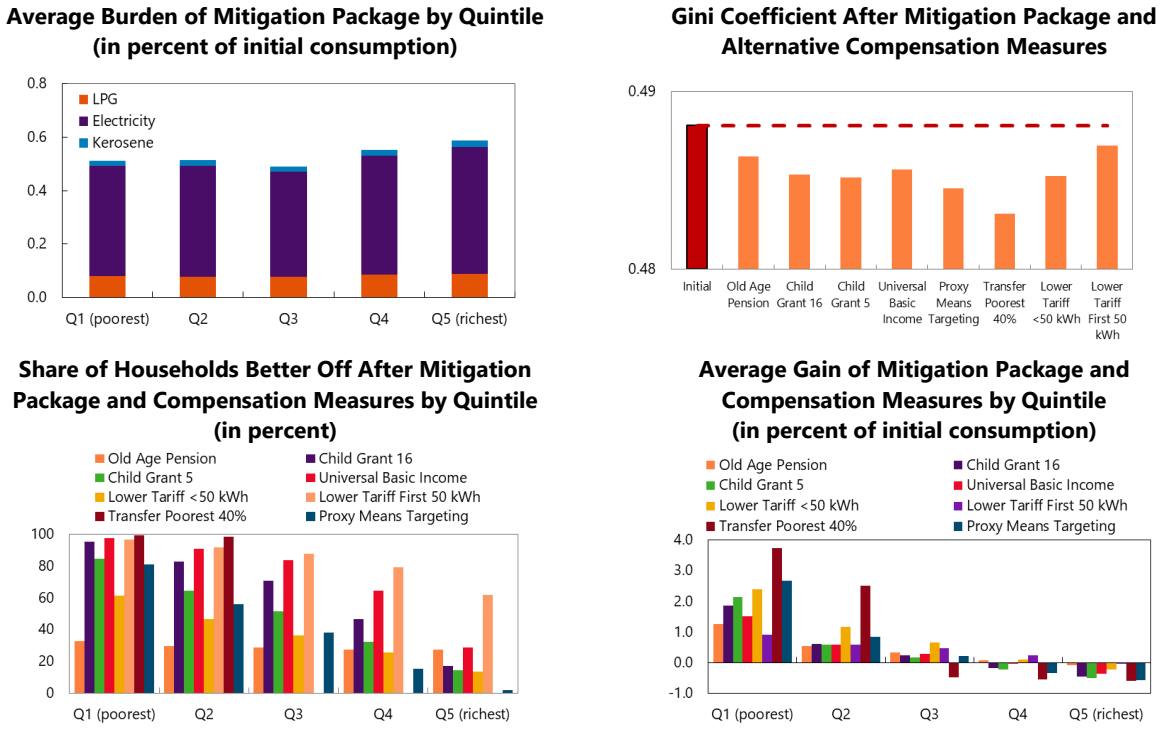
[13] The analysis in this section follows the methodology described in IMF (2019) and IMF (2021c). The introduction of VAT in electricity is assumed to have no indirect impact on the price of other goods because firms would be able to claim a VAT credit on the amount of their higher electricity bill. However, informal firms or firms in sectors that are exempt from VAT could pass on their higher electricity cost to consumers. Due to limited data, a precise estimation of those indirect effects is challenging. But, even in the most conservative scenario where all firms pass on their higher electricity cost to consumers, the additional negative impact for households would be limited to 0.4 percent of their initial consumption.

[14] For this proxy-means estimation, household characteristics such as region, type of house, cooking area, usual method of lighting and cooking, main source of drinking water, type of toilet, and household demographics are used to predict the level of household consumption per capita. A transfer is then offered to the 40 percent poorest households as identified by the proxy-means estimator. The framework yields an under-coverage rate of 31 percent (that is, poor households that should have received the benefit but did not because the proxy-means estimator failed to identify them as poor) and a leakage rate of 29 percent (that is, non-poor households that received the transfer). Both errors are within the usual range for this type of models, suggesting that introducing targeting in Samoa's social safety net would be feasible.

decline theoretically if perfect targeting was possible. Finally, offering a lower tariff for households with monthly consumption below 50 kWh (as has been done since November 2021) reduces inequality by much more than offering a lower tariff to all prepaid consumers on their first 50 kWh (as had been done until recently).

30. A number of these alternative compensation schemes can make the vast majority of the poorest households better off (Figure 7, Panel C), at a small cost for the richest households (Figure 7, Panel D). For instance, the cash transfer targeted using proxy-means testing would make 81 percent of the households in the poorest quintile better off, increasing their welfare by 2.7 percent on average, whereas households in the richest quintile would experience an average loss of 0.6 percent due to the higher energy prices. In addition, developing these safety net programs can prove useful to channel support to households in the aftermath of natural disasters, akin to how the old age pension was used to provide emergency support during the COVID-19 pandemic in Samoa, and build social resilience (Section IV and IV).[15]

Figure 7. Distributional Impact of Proposed Mitigation Package



Source: Staff calculations based on HIES (2018).
Notes: Quintiles defined by household expenditure per capita in panels A, C, and D. Gini coefficient of household expenditure per capita shown in panel B.
Mitigation package includes increasing the excise on kerosene and LPG and introducing VAT on electricity. Panels B, C, and D simulate alternative compensation measures using all the resources raised by the mitigation package.

[15] However, it is worth noting that the old age pension is not particularly progressive in Samoa (Figure 7, Panel B).

DISASTER RISK MANAGEMENT STRATEGY

The disaster risk management framework incorporates several important elements of a risk-layering strategy but some gaps remain. Integrating disaster risk assessments into the budget process would encourage adequate provisioning for fiscal risks. The social protection systems could be strengthened by introducing digital ID. While Samoa improved its financial resilience by having several global and regional risk transfer instruments, domestic insurance can be further developed.

F. Risk Assessment

Does the Government Provide a Comprehensive Assessment of Disaster-Related Fiscal Risks?

31. Disaster risks are not systematically compiled and published in the fiscal policy documents, though the average fiscal cost of natural disasters is estimated to be sizable. The Pacific Catastrophe and Risk Financing Initiative (PCRAFI)[16] estimates that the annual average fiscal cost of natural disasters in Samoa is about 1.5 percent of GDP or around US$10mn.[17] Furthermore, the National Action Plan (NAP) and National Disaster Management Plan (NDMP) analyze qualitatively which hazards are most relevant and consequential to Samoa. However, budget documents such as fiscal statements, budget addresses, and estimates do not quantify costs of disaster risks (See Section VII).[18]

G. Risk Retention

To What Extent Does the Government Self-insure Against Risks?

32. Samoa has had sufficient buffers to act as self-insurance against disaster risks in the past, including (i) from budgetary contingency, (ii) through budget reallocation, and (iii) in the form of FX reserves. Fiscal and foreign exchange buffers can help protect priority spending and maintain economic capacity in the immediate aftermath of disasters, until other medium-term financing becomes available (Table 4).

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[16] PCRAFI is a joint initiative between the Secretariat of the Pacific Community (SPC), the World Bank and the Asian Development Bank. The PCRAFI model for Samoa suggests there is a 50 percent chance of experiencing losses exceeding $130mn and a 10 percent chance of losses exceeding $350mn in the next 50 years (WB 2011; PCRAFI 2017).

[17] Average annual loss (AAL) measures the average expected loss annualized over a long-time frame. PCRAFI estimates AALs based on modeled losses from cyclones, earthquakes and tsunamis. For details, see GAR 2015, PCRAFI (2015; 2017; 2018). AALs take into account all the disasters that could occur in the future, including tail events, and thus overcome the limitations associated with estimates derived from historical disaster loss data (GAR 2015). Estimates of historical economic and human losses are available through EM-DAT and DesInventar.

[18] Training and preparation are currently underway, albeit at an early stage, to publish fiscal risk reports with assistance from Pacific Financial Technical Assistance Centre (PFTAC). See a list of PFTAC-Samoa activities here.

Table 4. Samoa: Fiscal and FX Buffers in Selected PICs

	Budget contingency lines	Budget re-allocations	Emergency reserve funds			FX reserves
	(as % of total appropriations)	(% of total budget allowed)		Established	($mn)	end-2020 ($mn, months)
Cook Islands	1.5%	24%	Emergency response trust fund	2011	0.409[a]	n.a.
Fiji	Discretionary	17%	Prime Minister's fund	2004	1.17[b]	$1011[d] (6.2 months)
Marshall Islands	$200k	10%	Disaster assistance emergency fund	2004	1.5[b]	$18.6[e] (1.2 months)
Samoa	3%	Discretionary	n.a.	2009, 2012	Needs based	$277 (8 months)
Solomon Islands	2.5%	Discretionary	Natural disaster council fund	1989	n.a.	$661 (14.3 months)
Tonga	5%	Discretionary	National emergency fund	2008	2.0[c]	$299 (11.5 months)
Vanuatu	1.5%	34%	n.a.	n.a.	n.a.	$614 (18 months)

a:Balance at establishment, b: As of 2013, c: annual appropriation, d: as of end-Nov, e: as of end-Sep

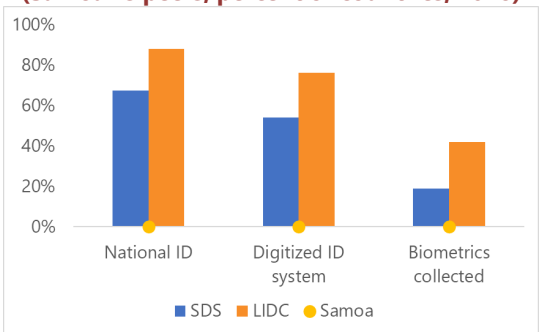
Source: PCRAFI (2015), Nishizawa et al (2019) and various IMF reports

- **Budgetary contingency.** The annual budget has an "unforeseen expense" line, set at 3 percent of current government expenditures (or less than 1 percent of GDP)[19], which can be used flexibly as a first line of self-insurance against risks, including but not limited to disasters.

- **Budget re-allocations (discretionary).** Intradepartmental transfers can be made, provided that the transfer does not increase the appropriation for that line item by 20 percent or more, and the total appropriation remains unchanged. If a state of emergency is declared, additional spending may be approved by the legislative assembly, including as supplementary budgets as illustrated after the 2019 measles and 2020-21 COVID-19 episodes (Samoa RCF IMF CR 20/138).

- **FX reserves.** As of end-2020, FX reserves reached US$277mn or about 8 months of imports. The IMF's latest AIV recommends around 3-5 months of imports coverage per the Assessing Reserve Adequacy metric, and 4-6 months coverage adjusted for natural disasters (IMF CR 21/56). This suggests that Samoa currently has 2-3 months of FX buffers (or around 8-12 percent of GDP), more than enough to respond to natural disasters.

Figure 8. Digital IDs
(Samoa vs peers, percent of countries, 2018)



Source: Calculations based on WB ID4D Dataset.
Note: Country groups are simple averages.

33. Samoa has, appropriately, no dedicated disaster emergency fund. This is in line with best PFM practices to avoid fragmented extra-budgetary funds. Samoa's resilience to meet short-term disaster relief has improved over time through build-up of reserves and other ex-ante contingent financing instruments, which can be supplemented by donor financing for reconstruction. Given its limited fiscal space,

[19] According to article 96 of the constitution, and section 29 of the PFM ACT 2001.

elevated debt level, and capacity constraints, the opportunity cost of establishing a dedicated fund is likely to outweigh its benefit.

34. Introduction of digital IDs can improve the efficiency of post-disaster social protection for vulnerable households. In Samoa, in-kind assistance had been provided to affected areas in post-disaster events.[20] Establishing the digital national ID system, as currently envisaged, would make post-disaster relief distribution faster and more effective in an inclusive manner (Figure 8). Traditional social protection programs[21] can also be utilized to increase resilience to natural disaster shocks.[22] This may involve vertical expansions (increased benefits to existing beneficiaries after disasters, e.g., Fiji's Poverty Benefit Scheme), horizontal expansions (adding beneficiaries, e.g., Ethiopia's Productive Safety Net Program) or both (e.g., Kenya's Hunger Safety Net Program).[23]

H. Risk Transfer

To What Extent Does Samoa Transfer Risk?

35. Samoa has strengthened its financial resilience by accessing several global and regional instruments:

Table 5. Samoa: PCRAFI PCRIC Insurance

	2019			2020		
	Peril Insured	Event insured	Coverage limit ($mn)	Peril Insured	Event insured	Coverage limit ($mn)
Cook Islands	TC	1 in 150y	3.0	TC	1 in 150y	3.0
Marshall Islands	TC	1 in 50y	10.2	-	-	-
Samoa	E & TC	1 in 100y	15.7	E & TC	1 in 50y	10.7
Tonga	E & TC	1 in 30y	7.4	E & TC	1 in 30y	7.2

E & TC: Earthquake & Tropical Cyclone

Source: PCRIC 2020 financial statements.

- Samoa has been a member of the regional catastrophe insurance platform, *the Pacific Catastrophe Risk Insurance Company (PCRIC)* since 2015. PCRIC offers its members quick-disbursing, parameter-based insurance cover against disaster hazards. Annual PCRIC insurance premia through 2023, of around US$0.5mn/year, are mostly financed through the WB-funded Pacific Resilience Program (PREP), with the Samoan Government contributing a

[20] As part of the response to Covid-19, the NPF provided an additional one-off payment to pensioners (vertical expansion). Similar measures can be extended in case of natural disasters but would require approval of the DAC.

[21] Currently, there is one formal social protection program in Samoa – the National Provident Fund (NPF)— and there is no unemployment or health insurance. Participation is mandatory in NPF, although the pension coverage of workers is only 20 percent and pension adequacy as a share of minimum wage is 40 percent.

[22] Post-disaster support through non-disaster programs can be up to five times larger than disaster-specific transfers (Hallegatte et al. 2020; Hallegatte et al. 2017).

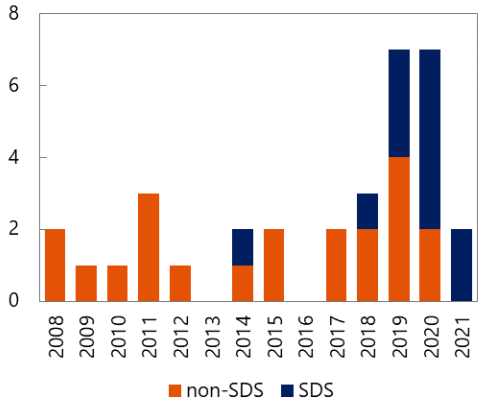
[23] See WB (2020) and WB (2020) for details on adaptive social protection programs.

small but over time increasing share of the premia (WB 2018 PREP). In 2020, insured hazards were earthquakes and tropical cyclones, with coverage up to US$ 10.7mn (Table 5).[24]

- Samoa has also strengthened *ex-ante contingent financing* with development partners such as the World Bank (WB) and the Asian Development Bank (ADB). These ex-ante instruments are typically disbursed soon after natural disasters. Currently, in addition to PCRIC insurance, total contingencies amount to about US$40mn or 5 percent of GDP.

- *WB Cat-DDO.* Samoa is one of the most active small developing states using the WB's catastrophe drawdown option (Cat-DDO) (Figure 9); a contingency credit line for immediate post-nature disaster relief. The per country limit for IDA clients, such as Samoa, is up to US$20mn. The 2018 DPO had a Cat-DDO component of US$8.7mn, which has been fully disbursed to date. The 2020 DPO also has a Cat-DDO component of US$10mn, but it has not yet been activated.

Figure 9. Approvals of WB Cat-DDOs
(number of countries/year)



Source: Calculations based on WB Projects & Operations database, and various WB reports.

- *WB Contingency Emergency Response Components (CERCs)* allow ongoing undisbursed project financing to be re-allocated to emergency response activities. CERCs are embedded in the Samoa 2015 and 2018 Pacific Resilience Programs (PREPs). Undisbursed amounts under both PREPs amount to around US$9.3mn to date. The CERC component has not been activated so far.

- *ADB Contingent Disaster Financing (CDF).* In 2017, the ADB committed US$6mn for Samoa under phase 1 of the Pacific Disaster Resilience Program as CDF for disaster response (ADB 2017). Samoa drew down $2.9mn from Phase 1 when the ADB expanded it to cover health emergencies in addition to climate change and natural disasters. The Programme was then replenished in 2020 for Phase 3 with a $10mn grant (ADB 2021).

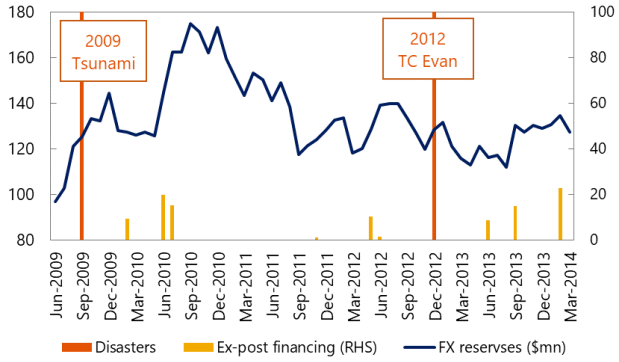
- *ADB Asia-Pacific Disaster Response Fund* (APDRF) was established in 2009 to provide quick-disbursing grants up to US$3mn/event to qualifying members (ADB 2009). Samoa received a US$1mn grant after the 2009 tsunami under the APDRF (ADB 2009).

36. Samoa also utilized several financing instruments from development partners for post-disaster recovery and reconstruction. These come in a large sum but often disbursed with a delay. They are mostly suited for the reconstruction phase (Figure 10). These include:

[24] For Samoa, PCRAFI coverage started under the 2015 PREP, hence neither the 2009 nor 2012 events were covered. The 2018 TC Gita that passed over Samoa as a category 1 storm did not trigger a payout (WB 2018).

- Samoa accessed US$9.3mn of *the IMF'S Rapid Access Component of the Exogenous Shocks Facility* after the 2009 tsunami, and a US$8.6mn *Rapid Credit Facility (RCF)* after the 2012 TC Evan (equivalent to 50 percent of quota). More recently, Samoa received US$22mn under the 2020 RCF in response to COVID-19. Samoa can have increased access to RCF/RFI resources under the large natural disaster window in case of severe disasters.

Figure 10. Ex-post Multilateral/Regional Instruments in Samoa
(disbursements, after the 2009 and 2012 events)



Source: Calculations based on WB projects database, IMF (2017), CDP (2019) and ADB (2014; 2014).

- *WB Crisis Response Window (CRW)* provides IDA countries with financing against severe natural disasters, public health emergencies, and economic crises. Samoa accessed US$20mn under the CRW pilot after the 2009 tsunami (WB 2010), US$20mn after the 2012 Tropical Cyclone (TC) Evan (CDP 2019), and US$1.4mn (out of a committed US$2.9mn in CRW and IDA resources) in 2020 under the Samoa Covid Response Project.[25] Disbursements can happen a year or more after disaster events, and often need a Post-Disaster Needs Assessment.

- Samoa received a total of US$25.8mn in concessional loans in two phases from the *ADB's Economic Recovery and Support Program (ERSP)* after the 2009 tsunami (ADB 2014). Samoa also received US$19.2mn in grants under the Renewable Energy Development and Power Sector Rehabilitation Project after the 2012 TC Evan (ADB 2014).

To What Extent Does the Government Insure Public Assets?

37. The government insures major public buildings but does not cover key public infrastructure assets such as roads and bridges. In case of large natural disasters, underinsurance of key public assets could pose potentially significant contingent liabilities. The PFM Act 2001 establishes an insurance fund to finance premiums to insure government buildings against fire, earthquake, or other catastrophe hazards, on an indemnity value basis but it excludes the coverage of other public infrastructure assets, such as bridges or roads (PCRAFI 2015).[26]

38. Samoa would benefit from developing a comprehensive centralized registry of public fixed assets. A comprehensive registry would serve multiple purposes: (i) map out which

[25] In addition, ex-post WB financing after the 2009 tsunami included US$10mn to date under a Post-Tsunami Reconstruction Project. After the 2012 TC Evan, Samoa received US$16.2mn (from a committed US$20mn) under the Enhanced Road Access Project and US$5mn to date under an Agriculture and Fisheries Cyclone Response Project.

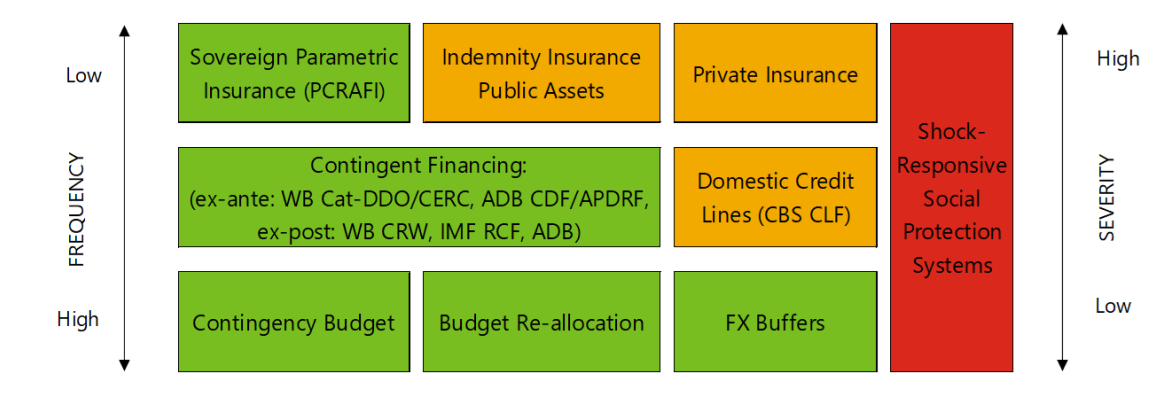
[26] There are ongoing discussions, in collaboration with the WB, to allow further use of the balance of the insurance fund, currently estimated at SAT 11mn (or 0.5 percent of GDP). This includes the potential to expand its mandate to also insure key public infrastructure assets, and use available funds for immediate relief/rescue work.

assets are climate-resilient, and which need retrofitting, (ii) estimate maintenance and repair costs, (iii) facilitate post-disaster damage assessments, and (iv) allow consolidating insurance coverage into larger policies with potentially reduced premiums from international insurers (see Section VII).

How to Improve Risk Layering in Samoa?

39. While Samoa has good disaster risk management in place, social protection systems and private insurance could be developed further. Figure 11 summarizes how Samoa applies the World Bank's risk layering framework (WB 2014)[27] using different financing instruments for different layers of disaster risk according to the frequency and severity. Red areas are assessed to be relatively 'weak' in Samoa, yellow are 'partially available/utilized', and green are 'well utilized'.

Figure 11. Disaster Risk Financing in Samoa



Source: Staff assessment based on WB Risk Layering Framework (WB 2014).

40. Samoa's disaster risk management could be further strengthened by coordinating the various instruments in place through a National Disaster Risk Financing and Insurance (DRFI) Strategy. While Samoa has a proactive approach to DRFI, these are mostly developed in isolation (PCRAFI 2015). An overarching DRFI strategy, to be approved by the Cabinet, is expected to provide centralized guidance on disaster risk assessments, existing and planned financing instruments, as well as outline the disaster response processes and responsibilities of different agencies.

I. Financial Sector Preparedness

How Does the Financial Sector Respond to Disaster Shocks?

41. The Samoan banking system seems to be robust to natural disaster shocks in the stress tests. Large disaster shocks could lead to financial instability given high loan concentration in disaster-sensitive sectors such as construction and tourism (CBS Annual Report

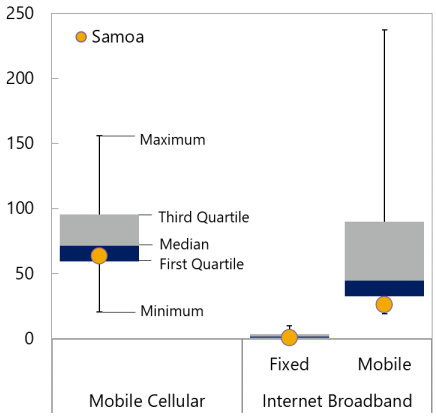
[27] The World Bank's risk-layering framework (WB 2014) suggests that countries should have a financing mix that relies on both risk retention and risk transfer instruments depending on the frequency and severity of disasters. In practice, this often means that small, frequent be covered through budget contingencies. Medium-sized disasters can be financed by ex-ante contingent and sovereign insurance instruments. Largest disasters can be partially covered by insurance, but will mainly depend on ex-post support from the international community.

2019-20). Stress tests suggest that banks are resilient to these shocks, although local banks are relatively more vulnerable (FSAP 2015). A deposit insurance scheme would help protect small depositors and strengthen the CBS financial safety net.

42. The Central Bank of Samoa (CBS) has stepped in to support public financial institutions by on-lending after the previous disasters. The CBS has used its short-term Credit Line Facility following the 2009 (SAT 5mn), 2012 (SAT 44mn), and 2018 (SAT 10mn) disaster events. Backed up by government guarantees, these amounts were lent to PFIs, such as the Development Bank of Samoa and the Samoa Housing Corporation, who then on-lent them to their clients at concessional terms (PCRAFI 2015; IMF CR 21/56).[28] Previous IMF analysis recommended unwinding this scheme to avoid a conflict between the CBS' supervisory capacity and its creditor position, and to better channel such support through the normal budget process (FSAP 2015; IMF CR 21/56).

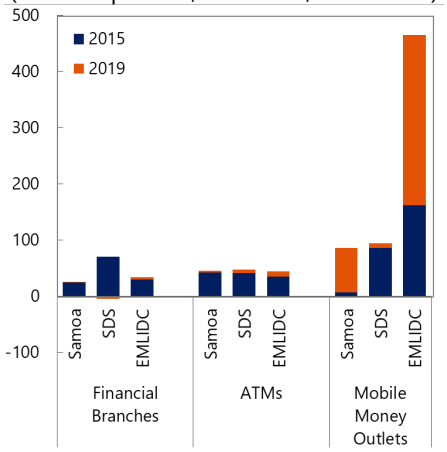
43. Digital financial services could expedite transfer of short-term post-disaster relief in a more efficient and scalable way. The cost of mobile payments can often be lower than other methods, including because of larger number of access points and wider reach in rural areas. In Samoa, while internet and mobile penetration are relatively lower than in peers (Figure 12), mobile money outlets are becoming more available compared to traditional outlets (Figure 13). While most inflows of international remittances are still transferred using traditional methods (PFIP 2016), digital/mobile financial services can put money in the hands of crisis-affected populations quickly and efficiently.[29]

Figure 12. Mobile and Internet Subscriptions
(per 100 inhabitants, Samoa vs SDC, 2019)



Source: Calculations based on ITU WTID.
Note: Subscriptions per 100 inhabitants. The box plot represents Small Developing Countries SDC.

Figure 13. Availability of Traditional vs Digital Financial Services
(Number per 100,000 adults, 2015-2019)



Source: Calculations based on IMF FAS database.
Note: EMLIDC

[28] The CBS extended five separate Credit Lending Facilities since 200 for a total of SAT 135mn, for natural disaster and other inclusive growth purposes, with the outstanding balance declining to SAT 87mn in FY2020 (CBS Annual Report 2019-20).
[29] Remittances represent, on average, 20 percent of GDP in Samoa. About 60-70 percent of remittances to Samoa originate from New Zealand and Australia (PFIP 2016; annual remittances WB database).

44. The private sector is insufficiently covered by insurance. Samoa has a small insurance sector that consists of six insurance companies, one of which is an SOE. Cyclone, earthquakes, and tsunami insurances are limited but available to the private sector. Cyclone insurance is available as an optional extension of property policies, but only with a valid engineer's certification of compliance with the cyclone standard set out in the 2017 National Building Code. Based on estimates of insured-to-total losses in prior major cyclone events,[30] about 10 percent of residential premises have cyclone insurance, potentially reflecting high insurance premium and lack of awareness. Earthquake and tsunami insurances are also optional. Disaster risk insurance is not available for farmers due to the inherent high risk even to smaller events and the inability to use community-owned land as collateral. Insufficient insurance can create fiscal risks in the form of contingent liabilities to the government (IMF CR 21/56).

ADAPTATION PLANS

Adaptation plans are developed and implemented at sectoral and community levels in Samoa. The community-based approach to adaptation ensures an inclusive decision-making process. However, adaptation planning remains fragmented at the sectoral level and planning is often driven by external financing without a common planning strategy. Samoa would benefit from conducting climate risk assessment more consistently in adaptation planning and using a common methodology for cost-benefit analysis for project planning. In addition, incentivizing adaptation by the private sector through measures such as better enforcement of regulations and financial inclusion would also be helpful.

J. Adaptation Policies and Planning

What Policies has the Country Implemented to Adapt to Climate Change?

45. Adaptation plans in Samoa have been made at the sector level as well as at the community level. The CIM plans reflect a programmatic approach to climate adaptation, which feeds into the relevant ministry sector plans. Though this helps foster partnership between community and relevant ministries, each sector often plans its own adaptation measures without reference to a broader context. Furthermore, their sectoral planning is subject to funding from development partners available for a specific purpose. The timeframe of projects is generally specified in accordance with the timeframe of the sector plans or follows donor timelines.

46. The decentralized approach in adaptation planning makes it difficult to prioritize adaptation plans at the national level. Mainstreaming of adaptation into sectoral plans is in line with good international practice[31]. At the same time, because adaptation planning is fully incorporated into sectoral plans, it is difficult for the government to have a coherent national-level storyline for its adaptation plans and financing needs. Consequently, donors and investors will likely drive climate-related projects that are mainly aligned with their own strategic direction but not necessarily with the country's priorities at the national level.

[30] Cyclone Ofa in 1990 (US$120mn losses and total insurance claims of US$6mn), cyclone Val in 1991 (US$287mn losses), Cyclone Evan in 2012 (US$103mn losses and insurance claims of US$12.4mn) (PCRAFI 2015).
[31] AC_25 Years of Adaptation Under the UNFCCC_2019.pdf

K. Implementation of Adaptation Plans

47. The MOF has an important role in coordinating adaptation plans across sectors and ensuring consistency. The CRICD of the MOF oversees the alignment among the adaptation objectives at different government levels and facilitates the development of sector plans integrating climate risk management and sectoral development. They also develop and implement financing strategies to fund adaptation projects and incorporate them into the budget plans. Technical and coordinating support for short-term disaster response is provided by the National Disaster Management Unit.

48. The CIM plans reflect an inclusive approach to adaptation planning, addressing concerns of the most vulnerable. The CIM plans have served as the main pillar for adaptation planning as the communities and villages are on the frontline of climate impacts and are well-placed to assess adaptation needs on the ground. Inputs from the villages then feed into sectoral plans in the decision-making process. Some sectors, such as the Ministry of Commerce, Industry, and Labor, have a mature social dialogue system in place, ensuring that adaptation measures address the needs and concerns of the vulnerable groups and micro and small entrepreneurs.

49. Adaptation projects could be better prioritized by consistent cost-benefit analysis. The preparation of project appraisals is hampered by a lack of capacity and availability of comparable data on climate change impacts, socioeconomic conditions, and impacts of previous development projects (Table 6). Consequently, investment decisions are driven by a range of factors, including expected overall costs and risks, and development co-benefits, but also by the interests of various stakeholders including the development partners. There is no consistent methodology for the cost-benefit analysis of adaptation projects. A notable exception is the road transport sector that develops climate scenarios and risk assessments and feeds them into the adaptation planning. To support the efficient allocation of public resources in line with government priorities, a common approach to project assessment would be helpful (see Section VII).

L. Evolution of Adaptation Plans

Have Adaptation Policies been Adequate?

50. Efficient adaptation decision-making is hampered by a paucity of data availability. Data constraint is a common issue in small developing countries. Adaptation to climate risks is essentially a learning process based on continuous knowledge updating. This process is supported by data in all stages of adaptation including assessing climate risks, planning adaptation, implementing adaptation measures, and monitoring and reviewing such measures. Samoa has a data gap in the following three areas: (i) systemic climate risks assessment, (ii) consistent cost and benefit analysis, and (iii) slow-moving climate stresses in the baseline projections. Therefore, collection of observational data as well as projected data are crucial for effective adaptation planning. Samoa gets technical assistance from external development partners to collect climate data. For instance, the World Bank provided technical support for the

vulnerability assessment in the road transport sector. This type of support does not seem to have scaled up across the sectors but would be extremely helpful.

51. Support for private sector adaptation efforts could usefully be strengthened. The private sector could usefully play an important role in climate adaptation especially for agriculture and fisheries, tourism, and the power sectors in Samoa. In these sectors participation of the private sector has been extensive. However, the private sector faces several challenges when it comes to the guidance and resources for adaptation. First, while private sectors receive general guidelines and operational standards, not all of these incorporate adaptation strategies. Second, the private sector is typically faced with financial constraints. Because Samoa's financial market is not well developed and smallholders or micro-scale businesses have limited access to finance, the private sector is constrained for conducting adaptation activities. Removing financial constraints as well as providing guidelines for adaptation across all sectors would support adaptation efforts by the private sector.

Table 6. Samoa: Adaptation Policy Gap Assessment

Risk profile	*Adaptation goals*	*Adaptation policies*	*Policy Gaps*
What climatological risks does the country expect as results of climate change?	***What are the key climate risks to address in adaptation plans? What are the goals and objectives of adaptation as elaborated in national plans?***	***What actions do the national plans specify to reduce risks of climate change?***	***What are the gaps between the risk profile and the adaptation goals, and between the adaptation goals and the policies?***
• Slow-moving climate stresses including heat, rainfall variability, and sea level rise that are going to be relevant to the sectors of agriculture, fisheries, health, power, and water. • Disaster risk hazard including increased intensity of tropical cyclone, extreme rainfall, and flooding, landslide driven by extreme rainfalls, droughts, and heatwaves • Physical assets and population are highly exposed to the climate hazards. 70% of infrastructure and population are in the coastal area. • Agriculture is susceptible to extreme climate events, drought, and increased pests and disease incurrence, due to the minimally modernized	The sector's mainstreamed adaptation plans are specifically targeting climate disaster risks: • More intense tropical cyclone • More frequent flooding • More frequent drought Sectors are making plans to manage the relevant climate risks, by: • establishing an effective governance framework and support systems • enhancing sustainable climate finance • mainstreaming climate change adaptation into national planning, • implementation and monitoring processes	• **Institutional arrangement:** The overall coordination work is organized by the MOF's division of Climate Resilience Investment and Coordination, with technical support from MNRE. Sectors are making their own plans for adaptation and disaster risk management, considering sector-specific goals and objectives. • **Knowledge acquisition and sharing mechanism:** Each sector emphasizes the importance of climate risk assessment for planning purposes. For transport infrastructure, agriculture and fisheries, health, education, and water and sanitation, knowledge building and sharing are highlighted as key strategies of the resilience building, including establishment of well-maintained databases, through	• Long-term climate risk assessment is lacking to project the impact of slow-moving climate stresses on macroeconomic baseline, especially for agriculture, fisheries, and tourism, which can be impacted by the gradual increase of temperature and the slowly changing rainfall patterns. • Adaptation planning takes a backward-looking approach only, risking neglecting important hazards that were not historically critical. For instance, the heatwave hazard is not taken into account as a disaster risk, given that Samoa is considered by policy makers generally adapted to heat conditions

Table 6. Samoa: Adaptation Policy Gap Assessment (concluded)

farming practices and the crop types. • A quarter of the Samoa GDP is from tourism, which heavily relies on its marine and terrestrial resources vulnerable to climate risks. • Samoa has less than 50% of population with access to basic drinking water and managed sanitation. This exacerbates the vulnerability of the public health to flooding and drought. • Hydropower accounts for over 50% in Samoa's renewable power supply. With an ambitious goal of reaching 100% renewable by 2025 and exacerbated hazard of dry spells, the power sector is sensitive to the climate risks.	• improving data and information management • strengthening effective coordination and representation at different levels • promoting and implementing effective awareness, education and advocacy activities on climate change issues	documentation of the project M&E, knowledge capacity building for private sectors and individuals. • **Funding mechanism**: Most of the adaptation measures are project-based, funded by international development partners. SOEs that provide service access (such as EPC) are responsible for financing their adaptation activities.	• The decision-making process lacks support from systematic climate risk assessment due to technical constraints. • Adaptation decision-making is not guided by a systematic cost-benefit analysis. • Disaster resilience building and post-disaster rehabilitation face budget constraints. • Most of the small-holder farmers and micro businesses do not have access to the financial market to implement adaptation actions. • There is lack of incentives or guidance to facilitate adaptation of private sectors and individuals

What Public Programs Should be Strengthened Other than Investment?

52. Samoa has adopted a range of non-fiscal measures for adaptation (Table 7). Many line ministries and implementing agencies, including MAF, MNRE, SAT, EPC, and MWTI, have adopted non-fiscal adaptation measures. These include measures to address storm and flooding as well as drought risks, risk and resource mapping for planning, regulations such as building codes and standards for construction and maintenance, and education/outreach programs to facilitate action at the individual level.

53. Samoa should apply new regulations rigorously. Samoa has been making progress in strengthening the regulatory framework to support climate adaptation. The Ministry of Works, Transport and Infrastructure (MWTI) recently finalized the building codes that incorporate climate and disaster risk considerations and these are being implemented for new building construction. Samoa is also progressing on risk zoning to guide adaptation investment planning. The PUMA has conceptualized the management of building development as part of the flood risk mitigation plan, aiming to discourage the development in flood zones. The implementation of these initiatives should happen in congruence with the work of risk zoning.

54. More ex-ante resilience building would allow the agricultural sector to better cope with drought risks. Droughts are currently monitored by the MNRE's Meteorology Division, and a disaster risk management mechanism is in place once a drought warning is triggered. However, drought response has been reactive rather than proactive. There is no planning and preparation for the next drought. Two areas for improvements are: (1) prepare for future droughts by utilizing risk mapping and hydrological monitoring, which are currently used by the EPC for optimal water allocation, and (2) prepare operational guidelines for smallholder farmers to plan for longer dry spells, e.g., community small-scale water reservation, soil management to reduce evaporation, crop alternation.

Table 7. Samoa: Non-Fiscal Public Programs for Adaptation

Climate hazard	**Suggested Non-fiscal measures**		**Adopted Non-fiscal measures in Samoa**	**Gaps**
	What are nonfiscal public programs to address each hazard 1/		*Which measures are adopted in Samoa and by which entities?*	
Storm and flooding	Planning	Risk zoning	Undergoing (MWTI)	Since the risk zoning is taking place and not yet finalized, PUMA would not be able to effectively put restriction on building development in risk zones. Operational standards have not yet fully incorporated the
	Regulatory	Building code	Adopted (MWTI, MESC)	
		Standard for construction and maintenance	Adopted (MWTI, EPC)	
		Development restriction	Conceptualized (PUMA)	
	Educational/outreach	Community-based early warning and	Adopted (DMO)	

Table 7. Samoa: Non-Fiscal Public Programs for Adaptation (concluded)

		disaster response protocol		consideration of climate risks.
		Operation standard incorporating climate risk-proofing	Undergoing (EPC, SAT, MAF)	
		Drainage design manual	Adopted (MNRE)	
Drought	Planning	Water resource mapping and water level monitoring	Adopted (EPC)	MAF should take measures to map water resources and monitor the risks liaising with the MNRE's MET Division. Operational standards have not yet fully incorporated the consideration of climate risks.
	Regulatory	Conservation measures (e.g. price differentiation, groundwater protection and preservation, building water benchmarking ordinance, etc.)	Partially adopted (MNRE)	
	Educational /outreach	Community-based early warning and disaster response protocol	Adopted (MAF, MNRE)	
		Operation standard incorporating climate risk-proofing	Undergoing (MAF)	
Extreme heat	Planning	Terrestrial and marine "hot spots" mapping	Not adopted	Extreme heat has not been paid much attention to across the sectors. The non-fiscal measures should focus on the planning and enhancing awareness building for the private sectors, as well as vulnerable population in the communities.
		Identifying cooling centers and vulnerable population in the communities	Not adopted	
	Educational /outreach	Operation guideline in fisheries and tourism	Not adopted	
		Community-based early warning and disaster response protocol	Not adopted	

1/ Extracted from key policy lists from EPA's Smart Growth Fixes for Climate Adaptation and Resilience, FAO's Impacts of Climate Change on Fisheries and Aquaculture, FAO's Practical Guideline for Early Warning.

MACRO-FISCAL IMPLICATIONS OF CLIMATE POLICY

Expected negative impacts from climate change and repeated natural disasters put Samoa at high risk of debt distress over the long term. With support from international donors, Samoa is already making significant advances in building resilience. Additional ex-ante adaptation investment financed by grants would improve the long-term economic outlook and reduce debt vulnerabilities. Financing additional adaptation investment prior to natural disasters could also bring benefits to international donors as post-disaster reconstruction funding needs would be smaller with adaptation investment yielding net savings.

M. Cost of Climate Mitigation and Adaptation Investment

What are the Fiscal Implications of Mitigation and Adaptation Plans?

55. The total estimated cost to meet climate adaptation and mitigation goals, together with spending needs for social resilience, amounts to about US$650 million over 2022-2026, equivalent to about 17 percent of GDP per year (Table 8). Of these, the annualized cost of adaptation projects alone is around 11 percent of 2021 GDP, based on currently identified projects and sectoral plans, with the bulk of funding secured (see below).[32] Samoa will also need to spend about 3 percent of GDP per year above current levels to reach the SDGs in health and education.[33] Moreover, the investments needed to achieve Samoa's mitigation goals[34] as outlined in its second NDC are estimated to be around 3 percent of 2021 GDP annually for the next five years, followed by around 1 percent of 2021 GDP annually between 2027 and 2030. Financing

Table 8. Samoa: Spending Needs for Adaptation, Social Resilience and Mitigation

	Total estimated costs over 2022-2026 (millions of USD)	Annualized (percent of GDP)
Identified Adaptation Projects	**426**	**11.0**
Transportation	231	6.0
Flood mitigation	79	2.0
Water and Sanitation	61	1.6
Environment	24	0.6
Agriculture and Fisheries	22	0.6
Early Warning Systems	10	0.3
Social spending needs	**122**	**3.2**
Health	41	1.1
Education	81	2.1
Mitigation goals (NDC)	**107**	**2.8**
Land transport	62	1.6
Maritime transport	31	0.8
Electricity	8	0.2
AFOLU	4	0.1
Waste, Tourism and Marine	3	0.1
Total	**657**	**17.0**

Source: World Bank, ADB, GCF, GEF, authorities, and IMF staff estimates

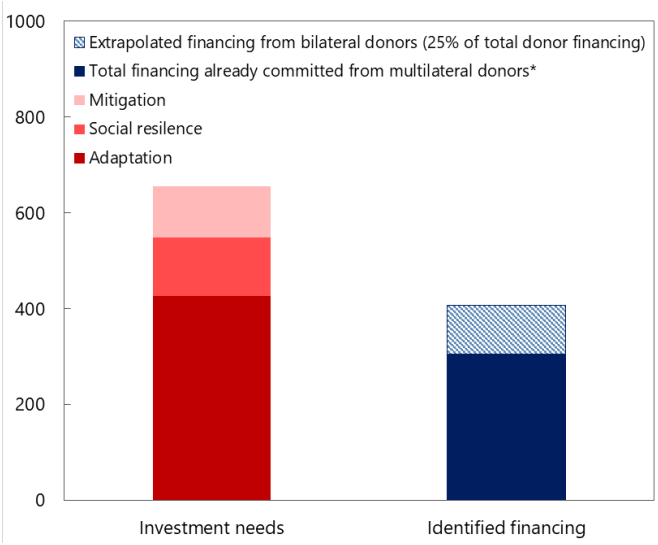
[32] The average remaining lifespan of identified projects from Section V is estimated at 5 years, based on project descriptions and historical execution delays.
[33] These estimates are based on the SDG costing tool developed by Gaspar et al. (2019) and extended in an application to Small Developing States with climate vulnerabilities by Tiedemann et al. (2021).
[34] Samoa's second NDC includes three quantitative targets in the AFOLU and marine sectors that are expected to contribute to both adaptation and mitigation. The costs for these are incorporated in Table 8.

sources for implementing mitigation goals in the NDC are yet to be identified but could partly come from private sector investment.

Does the Country Have Adequate Financing to Meet the Needs of its Climate Change Strategy?

56. Funding needs for Samoa's climate policy are significant and are unlikely to be met without additional donor support (Figure 14). Of the US$657 million in identified spending needs in Table 8, US$306 million have committed funding from multilateral donors, mostly in the area of adaptation, and another US$100 million could be expected from bilateral donors, based on recent trends (see Section VI.C). This still leaves a funding gap worth US$250 million or roughly 6 percent of GDP per year if spread over the next five years. Samoa's vulnerability to external shocks leaves limited fiscal space for borrowing of this magnitude, which means additional grant financing will be necessary.

Figure 14. Spending Needs vs. Identified Financing, 2022-2026
(in millions of USD)



Source: World Bank, ADB, GCF, GEF, authorities, and IMF staff estimates
*includes only commitments from World Bank, ADB, GCF and GEF and assumes current commitments are disbursed over the next five years

57. The sharp increase in climate-related public investment needs could be spread over a longer time horizon given limited capacity. Carrying out all identified climate-related projects over the next five years would imply a significant increase in government spending. If projects with identified donor financing are assumed to be fully factored into the government's medium-term expenditure plans and roughly half of outstanding spending needs are in capital investment, Samoa would need to increase annual public investment spending by 3 percent of GDP. Public investment in Samoa for 2022-26 is currently projected at about 7-8 percent of GDP annually, compared to a historical average of around 6 percent of GDP since 2010. The additional scale up within the next 5 years could thus prove ambitious given its limited capacity and may necessitate a careful prioritization of projects as well as a longer time horizon.

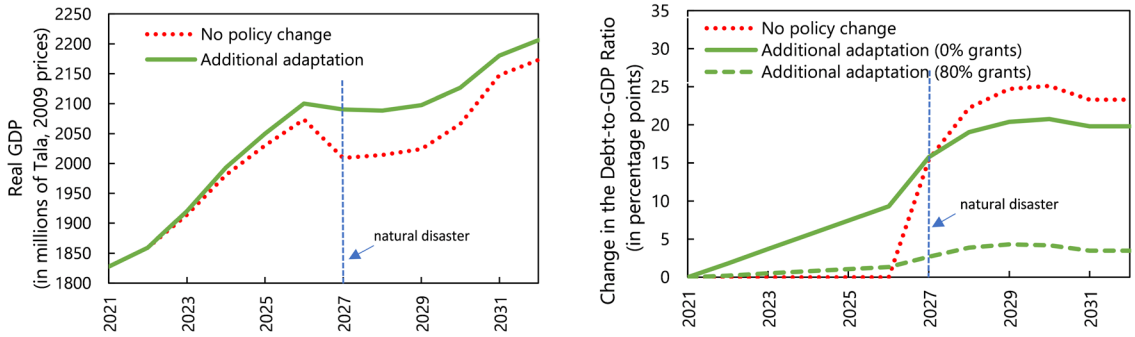
N. Consistency of Climate Change Policies and Financing Plans with Fiscal and External Debt Sustainability

How Would the Climate Plans Affect Growth and Debt? Are Climate Change Plans Consistent with Fiscal and External Debt Sustainability?

58. Samoa is rated as being at a high risk of overall and external debt distress due to the expected negative impact of climate change and natural disasters. Samoa's high exposure to climate change and natural disasters is expected to lower growth and increase financing needs for repeated post-disaster reconstruction. As a result, the present value (PV) of Samoa's public debt-to-GDP ratio is projected to breach the 70 percent threshold from 2034 onward under the DSA baseline in the latest Article IV (2021) (Figure 14) and even earlier if a natural disaster strikes in the near term. Samoa's fiscal space is therefore constrained.

59. Investing in adaptation ex-ante could mitigate the negative impact of natural disasters, leading to higher long-term growth and lower overall financing needs (Figure 15). Simulations using the IMF DIGNAD model (see Annex I) suggest that investing an additional 2 percent of GDP in adaptation capital[35] for the next five years would save Samoa about 4.5 percent of 2021 GDP in output losses if a typical natural disaster is assumed to occur in 2027. Adaptation investment would also reduce the negative fiscal impact. Even if financed entirely through (concessional) borrowing, lower post-disaster reconstruction costs would contain the overall increase in the debt-to-GDP ratio to about 20 percent (green solid line) relative to about 23 percent in a disaster scenario where no additional adaptation investments are undertaken (red dotted line).[36]

Figure 15. Simulation of Impact of Ex-ante Adaptation Investment on GDP and Debt



Source: IMF staff calculations

[35] Adaptation capital is broadly defined as physical infrastructure that is capable of withstanding natural disasters, and partially shielding standard non-resilient infrastructure from their impact (e.g., climate-proofed roads, sea walls). The simulation assumes 2 percent of GDP in additional annual investment to approximate the subset of additional capital investment needs without identified financing derived in section VI.A that would fall under adaptation spending.

[36] In addition to diminishing disaster-related losses, additional adaptation investment raises the potential GDP via the higher stock of productive capital.

60. Grant financing for climate resilience building is necessary to avoid further debt build-up. Securing a financing mix of 80 percent grants versus 20 percent concessional loans (in line with recent experience) for investments in adaptation capital and post-disaster reconstruction would contain the projected increase in the public debt-to-GDP ratio to 3.5 percent in the long run following the natural disaster (green dashed line in Figure 15).[37]

61. Financing additional ex-ante adaptation investment is likely to result in net savings for international donors, especially when natural disasters become more intense (Table 9). Comparing the simulated costs of ex-ante adaptation investment versus post-disaster reconstruction needs suggests that financing ex-ante adaptation investment would result in a lower cost to donors. In the above scenario, if donors financed the additional adaptation investments, expected discounted net savings would amount to about 9 percent relative to the cost of financing post-disaster reconstruction under no policy change. These savings would increase in the event of more intense natural disasters.[38]

Table 9. Samoa: Discounted Net Savings of International Donors*

(percent of reconstruction costs)

Hazard Magnitude	Net Savings
Average historical (AH) impact	9.3%
AH+10%	14.1%
AH+20%	18.1%
AH+30%	21.6%

*Net savings are calculated as the difference between fiscal savings in the reconstruction phase and cost of extra investment spending. Both are discounted at 5 percent rate and measured in percent of reconstruction costs under no policy change.

Source: IMF staff calculations

62. Long-term debt sustainability is estimated to improve with additional ex-ante adaptation investment (Figure 16). We calibrated the benefits from additional adaptation investment on growth and financing needs and present an illustrative scenario in the DSA framework, which under the baseline assumes that recurrent natural disasters and climate change generate a deterioration in growth and the fiscal balance over the long term. In line with the DIGNAD model results, additional adaptation investment was assumed to mitigate 40 percent of these negative effects,[39] subject to some additional spending on maintenance of

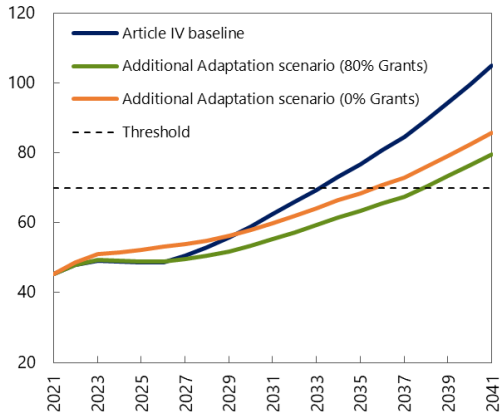
[37] Since both sources of financing are concessional, putting more weight on grants in the financing mix has no repercussions for the projection of real GDP.

[38] Similarly, the growth dividends from ex-ante adaptation investment are higher on impact of a stronger natural disaster.

[39] The results of the DIGNAD model application in this report are broadly in line with previous applications, see Marto, Papageorgiou and Klyuev (2017), Cantelmo et al. (2019), Melina and Santoro (2021), and "Solomon Islands: Selected Issues," March 2018, IMF Country Report No. 18/73. To avoid overstating the potential benefits from adaptation investments in the face of high uncertainty, particularly surrounding the long run, the 40 percent parameter used is relatively conservative.

the adaptation capital stock.[40] In the scenario where the additional upfront investment is financed with 80 percent grants and 20 percent concessional loans, the present value of public debt breaches the debt sustainability threshold only in 2038 as opposed to 2034 and stays substantially below the baseline. Financing additional investment with concessional loans (i.e., no grants) also improves debt dynamics over the long term but leads to a significantly higher debt-

Figure 16. Present Value of Public Debt-to-GDP Ratio
(percent of GDP)



Source: IMF staff estimates

to-GDP ratio during the first eight years of the projection period. In both scenarios, the public debt-to-GDP ratio still does not stabilize as residual climate-related effects continue to lower economic growth and raise financing needs.

O. Sources of Financing

Does the Country Have Adequate Access to Climate Financing?

63. Samoa relies on international donor support to help finance its development objectives, with the majority provided in the form of grants (Figure 17, Panel A). However, among PICs, Samoa ranks towards the bottom in terms of total donor support received. Between 2014 and 2018, Samoa received on average around 16 percent of GDP in development finance each year (Figure 17, Panel B).[41] Of this, about 8 percent of GDP went to sectors broadly related to climate resilience and just under 1 percent of GDP went to activities expressly tagged as having either climate change mitigation or adaptation as their goals.

[40] Additional maintenance costs were assumed to equal the depreciation rate of 3 percent times the adaptation capital stock, financed by borrowing.

[41] Development finance as reported by Aid Atlas includes Official Development Aid grants and loans, other official flows, as well as private flows such as philanthropic grants or concessional loans from charitable foundations. It does not include remittances but does include in-kind contributions such as technical co-operation.

64. Samoa has been successful in accessing several global and regional concessional climate financing sources on par with its peers (Figure 17, Panel C). Focusing on recently *committed* climate finance, Samoa ranks roughly in the middle of the PICs. Samoa has pursued climate financing most recently through the Global Environment Facility (GEF), Green Climate Fund (GCF), World Bank, and Asian Development Bank as well as the Climate Investment Funds, Adaptation Funds, and other multilateral climate funds in the past. Like other small island states, Samoa does not have direct access accreditation for climate funds and relies on internationally accredited entities, in particular the UNDP, for the execution of its GCF- and GEF-financed projects. Samoa is seeking direct accreditation with the GCF for the Development Bank of Samoa. However, this process is likely to take time.[42] Bilateral donors have also been involved in financing climate-related projects with most support coming from Australia, Japan, and New Zealand.

65. Access to climate finance is often hindered by complex and demanding requirements for climate funds combined with a domestic capacity constraint common to small states. Complying with complex access requirements of multilateral climate funds, including repeated accreditation, is time-consuming and many of the smaller funds have temporal access limits which can be easily exhausted. Even if climate finance has been secured, slow disbursement rates undermine its realization (see Figure 17, panel D). Thus, the government needs to be strategic in matching its climate project pipeline to those financing sources that provide a positive balance of administrative costs and total funding access. Combining smaller projects together into one large project with different sub-components may be one way to reduce the per-dollar administrative cost of accessing climate funds. Where smaller projects cannot easily be combined or where particularly urgent needs exist, bilateral donor financing can be prioritized, which tends to be easier to access and get disbursed faster.

66. Private capital can be mobilized to finance mitigation investments within limits. Expanding renewable energy generation capacity in the electricity sector could result in significantly lower tariffs, making the electricity sector a good fit for private sector funding (Section III).[43] Samoan authorities expect to similarly recoup some of the other needed investments to reduce GHG emissions in the transport sector through user fees. On the other hand, guarantees from the government may be required for large projects, which could add to contingent liabilities. If so, careful assessments on the risk exposure would be called for to manage risks associated with such guarantees.

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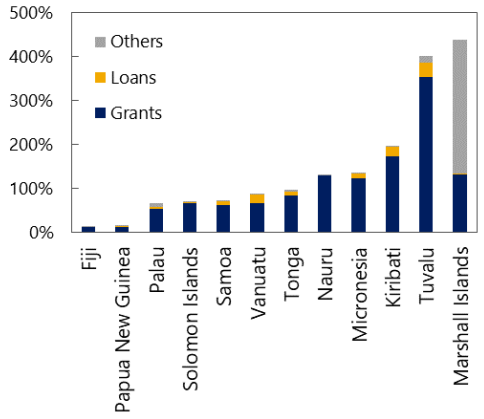
[42] As of May 2021, only two countries within the PICs had secured direct access to the GCF: The Fiji Development Bank in 2017 for projects up to US$10 million and the Cook Islands Ministry of Finance in 2018 for projects up to US$50 million. So far, only one direct access project has been approved by the GCF but no disbursements have been made (IMF 2021b).

[43] Accordingly, the cost of expanding renewable energy sources in electricity production is not included in Samoa's NDC implementation roadmap and therefore not in the estimate of investments needed to reach Samoa's mitigation goals presented in Table 8. The NDC does include additional investments needed to ensure grid stability and improve energy efficiency.

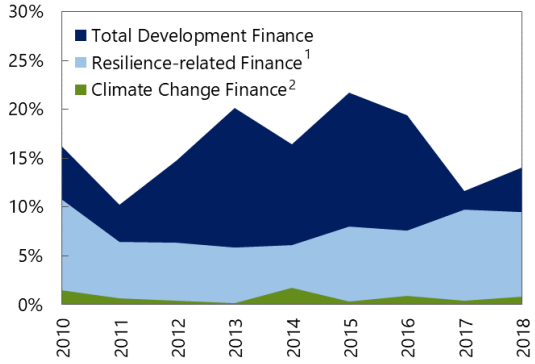
Figure 17. Climate Finance in Samoa

Disbursed Total Development Financing in PICs by Financing Type, 2014-18
(in percent of GDP)



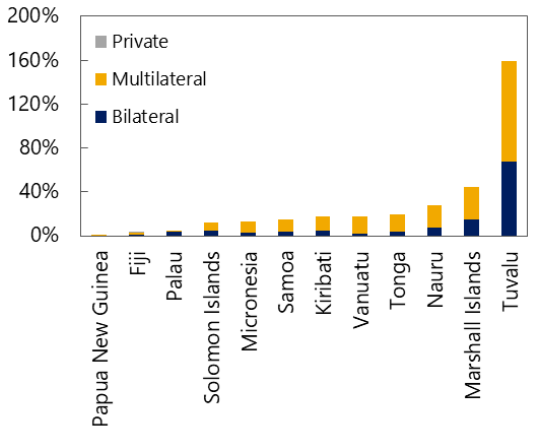
Source: Aid Atlas

Disbursed Development Financing in Samoa, 2010-18
(in percent of GDP)



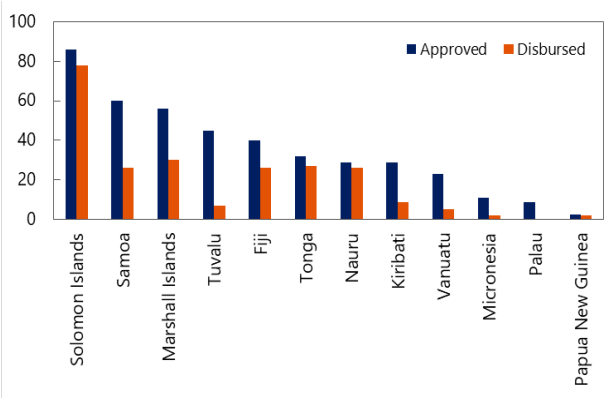
Source: Aid Atlas

Committed Climate Financing in PICs by Donor Type, 2014-18
(in percent of GDP)



Source: Aid Atlas

GCF Funding Approved and Disbursed by PIC (as of May 2021)
(in USD million)



Source: IMF (2021b)

1/ Resilience-related Finance includes donor finance on Agriculture, Forestry and Fishing, Disaster Prevention and Preparedness, General Environment Protection, Education, Health, Transport and Storage, and Water Supply and Sanitation sectors
2/ Climate Change Finance includes donor finance with the explicit goal of either climate change mitigation or adaptation

PUBLIC INVESTMENT AND FINANCIAL MANAGEMENT

Some key aspects of public investment management are in place, including coordination across the public sector and risk management, but project appraisal, selection, and review lack climate-specific elements. Public financial management has limited focus on climate issues and the budget does not identify climate-relevant spending.

P. Adequacy of Public Investment Management

Are Adequate Public Investment Management Systems in Place to Ensure Climate-Related Investments will be Well-Spent?

67. The assessments in this section are based on the IMF Climate PIMA conceptual framework.[45] The assessment results are summarized in Table 10.

Table 10. Samoa: Climate PIMA Heat Map

C1. Climate-aware planning: Is public investment planned from a climate change perspective?	
Are national and sectoral public investment strategies and plans consistent with the government's climate objectives, targets, and expected impacts?	
Do central government and/or sub-national government regulations require that land use and building codes address climate-related concerns affecting decisions on public investment?	
Is there centralized guidance and support for government agencies and infrastructure developers on planning public investment in the context of climate change?	
C2. Coordination between entities: Is there effective coordination of decision making on climate change-related public investment across the public sector?	
Is decision making on public investment coordinated across central government from a climate-change perspective?	
Is the planning and implementation of capital spending of sub-national governments coordinated with the central government from a climate-change perspective?	N/A
Does the regulatory and oversight framework for public corporations ensure that their climate-related investments are consistent with national climate policies and guidelines?	
C3. Project appraisal and selection: Do project appraisal and selection include climate-related analysis and criteria?	
Does the appraisal of major infrastructure projects require climate-related analysis to be conducted according to a standard methodology with central support?	
Does the PPP framework include climate-related elements?	
Are climate-related elements included among the criteria used by the government for the selection of infrastructure projects?	
C4. Portfolio management and oversight: Is climate-related investment spending subject to active management and oversight?	
Are climate-related public investment plans, sources of financing, outputs and outcomes identified in the budget and related documents, monitored and reported?	
Are ex post reviews conducted of the impacts of public investment projects on mitigating climate change and on adaptation to climate change?	

[45] "Strengthening the climate resilience of public investment", IMF 2021.

Table 10. Samoa: Climate PIMA Heat Map (concluded)

Do the government's asset management policies and practices, including the maintenance of assets, address climate-related considerations?	
C5. Risk management: Are fiscal risks relating to climate change and infrastructure incorporated in budgets and fiscal risk analysis and managed according to a plan?	
Does the government publish a national disaster risk management strategy that incorporates the projected impact of climate change on public infrastructure assets and networks?	
Has the government put in place specific ex ante financing mechanisms, such as contingency funds or insurance schemes, to manage the exposure of the stock of public infrastructure to climate-related risks?	
Does the government conduct and publish a fiscal risk analysis that incorporates climate-related risks to public infrastructure assets?	

Source: IMF mission assessment.
Note: Green, yellow, and red cells indicate that the good practices defined in the C-PIMA are fully met, partly met or not met, respectively.

C1. Climate-Aware Planning

68. National and sectoral public investment plans are consistent with the country's climate objectives. The SDS provides a five-year national plan, with contributions from sectoral plans with respect to strategic priorities and outcomes. (Section II). The new SDS is being finalized and is expected to be published in end-2021. Sector plans are being updated in the context of the new SDS.[46] Climate adaptation and mitigation are well integrated into the SDS and climate-relevant sector plans (e.g., agriculture, energy, and transport) and are consistent with the SCCP and the NDC. Samoa 2040 also prioritizes climate-resilient infrastructure investment in the same climate-relevant sectors. The adaptation and mitigation targets set in the 2nd NDC are conditional on external financial support.

69. The National Building Code and Urban Development Policy contains a comprehensive coverage of climate and disaster risks. As discussed in Section V, building codes and land-use regulations are well-developed in Samoa, which support its climate-aware public investment planning. The Samoa City Development Strategy and the National Urban Policy place climate and disaster resilience at the core of the country's spatial planning and urban development.

70. Main stakeholders such as line ministries and state-owned enterprises would benefit greatly from technical guidance and support to integrate climate change into public investment planning. Incorporating climate considerations into public investment planning requires technical knowledge, data, and guidance, which often need to be tailored to specific sectors/sub-sectors depending on their exposure to climate and transition risks. While sector advisory committees exist across all sectors, their roles do not include providing guidance and support particularly on the climate change aspects of public investment planning. The responsibilities of central teams, such as the MOF's CRICD and/or MNRE's sectoral divisions, could be expanded to play this important role across the public sector.

[46] Sector plan preparation is guided by the Sector Planning Manual and the Monitoring Evaluation Reporting Framework Manual, and the plans are submitted to the Cabinet Development Committee (CDC) for approval.

C2. Coordination Across Public Sector

71. Decision making on climate-related public investment is well coordinated across the central government and all projects regardless of financing sources. All budget-funded projects, including climate-related public investment, go through CDC approval and are guided by the SDS, sector plans, and corporate plans of the ministries. The Project Planning and Programming Manual is the basis for ensuring a common approach across ministries and agencies to climate-sensitive project planning and programming. The manual also specifies the roles and responsibilities of stakeholders and provides guidelines on the integration of project planning into the budget cycle. Externally financed projects are also approved by the CDC and discussed at the Aid Coordination Committee. While Samoa does not have sub-national governments, many climate-related projects are at the community level and require active consultation and participation from the communities, which is also done through the CIM planning process.

72. The regulatory and oversight framework for Public Corporations (PCs) ensures that their climate-related investments are consistent with national climate policies and guidelines. Table 11 shows key financial data for the PCs that undertake climate-relevant public infrastructure investment. EPC and LTA manage about two-thirds of infrastructure assets. PC investments are closely coordinated with government policies and PCs play a major role in climate-related investments. PC investments above SAT 1 million go through the government appraisal and CDC approval process, whereas smaller investments are decided by PC boards.

Table 11. Samoa: PCs Involved in Climate-Relevant Infrastructure
(million SAT)

	Assets	Liabilities	Equity
Electric Power Corporation	516	231	285
Land Transport Authority[47]	22	14	8
Samoa Airport Authority	184	128	56
Samoa Housing Corporation	54	20	34
Samoa Land Corporation	113	71	42
Samoa Ports Authority	278	135	143
Samoa Water Authority	192	126	66
Samoa Sports Facilities Authority	75	49	26
Total	**1434**	**774**	**660**

Source: Samoa Public Accounts 2019.

C3. Project Appraisal & Selection

73. Standardized climate-impact assessments are recommended in the near term to ensure consistent climate analysis There is currently no standard methodology for climate analysis in project appraisal. The Project Preparation Guidelines (MOF, 2009) provide a well-defined, comprehensive process for project appraisals, but do not require climate-specific

[47] LTA accounts do not show the value of road assets. A recent valuation study indicated that the value of these assets could be 1.5 billion SAT.

analysis according to a standard methodology. All major projects require an approval by the CDC and the MOF reviews the project proposals prior to CDC consideration. The guidelines do include general requirements for EIA. These indicate that all relevant environmental impacts should be assessed and quantified to the extent possible, and that mitigating measures should be identified. Many projects are supported by development partners, who also focus on the impact of climate-related risks on the projects according to their own guidelines and methodologies for climate impact assessments. For comparable assessment of the climate impact across projects, project preparation and EIA guidelines could be updated by incorporating a unified approach to climate impact assessment, including for cost/benefit analysis of climate adaptation projects (see Section V). The MNRE could develop and issue specific methodological guidance on how to undertake the assessment.

74. The PPP framework does not include specific climate-related elements but does provide guidance on risk sharing in the events of natural disasters. There are no explicit climate references in the PPP Handbook.[48] However, the Handbook includes guidelines for PPP contracts, which describe how unexpected events should be reflected. No PPPs have been contracted to date, but there are some PPAs for solar power. More specific guidance on how to allocate climate risks and how to define climate-related performance criteria in PPP contracts would help ensure consistent treatment of these issues.

75. Though climate-related factors are considered for the selection of infrastructure projects, there is no formalized project selection mechanism. This undermines the transparency of the project selection process. Prior to CDC consideration, the MOF verifies that project proposals contribute to achieving SDS objectives. The SDS includes several objectives related to climate adaptation and mitigation and climate and disaster resilience is a separate outcome objective. However, in the absence of a formal, structured project selection framework, it is difficult to see exactly how project selection is guided by SDS objectives, including various climate objectives. A project selection mechanism would typically specify the criteria proposals should be assessed against and the weight to be given to each criterion.

76. Transparency of project selection can be improved in the short term. The SDS objectives, including those related to climate change, can be formulated and structured to be explicit selection criteria, including relative weights. A formal project selection mechanism based on these criteria could be established and published.

C4. Budgeting & Portfolio Management

77. Information on climate-related public investment projects is fragmented and it is hard to see if projects meet climate objectives. There is no consolidated overview of climate-relevant public investment projects in budget documents nor systematic reporting on the implementation of these projects. In 2015, the government issued a Public Sector Investment Program (PSIP) for the 2015/16 – 2017/18 budget cycles. The PSIP provided detailed information

[48] PPP Handbook, MPE 2017.

about ongoing and planned public investment and was an important contribution to public investment transparency. There has been no comprehensive update of the PSIP. However, the Fiscal Strategy documents for 2020/21 and 2021/22 provided summary overviews of public investment. There is no mechanism for budget coding of (or 'tagging') climate-related budget expenditures, though some major climate-related investment projects can be identified by project names. These are found in budget documents or in separate SOE corporate plans. Table 12 provides an overview of major public investment projects in the 2021/22 budget period. Most of the major projects have an explicit climate angle.

Table 12. Samoa: Major Climate Related Investment Projects 2021/22

PROJECTS	SECTOR	TOTAL COST (thousand WST)
Enhanced Road Access Project	Transport	6,395
Samoa Climate Resilient Transport Project	Transport	33,256
Central Cross Island Road Project	Transport	11,512
Central Cross Island Road Upgrading Project	Transport	2,865
Enhancing Safety, Security, and Sustainability of Apia Port Project	Transport	10,233
Enhancing Safety Security and Sustainability of Apia Ports (ESSSAP) project	Transport	12,791
Samoa Port Development Project (ADB)	Transport	3,837
Samoa Connectivity Project	Telecom	9,439
Samoa Connectivity Project	Telecom	1,617
Improving the Performance and Reliability of RE Power System in Samoa	Energy	1,341
Enhancing Climate Resilience of Coastal Resources & Communities (PPCR)	Environment	2,067
Economy wide integration of CC Adaptation & Disaster Risk Mgmt.	Environment	7,000
Pacific Resilience Program (PREP Samoa)	Environment	8,161
The Project for Provision of Emergency Rescue Equipment to SFESA	Environment	354

Source: MOF

Box 2. Nepal: Climate Tagging System

Nepal has developed a climate budget coding system to track the country's climate-relevant budgets and expenditures. The climate budget coding is also used to support the prioritization of climate relevant public investment programs and projects as part of the budget formulation process and the development of the Medium-Term Expenditure Framework.

Sector ministries, in close coordination with the Ministry of Finance, tag proposed budgets through the Line Ministry Budget Information System. It is then reviewed and validated by the National Planning Committee. The tagged expenditures are presented as an annex to the budget document (Redbook) and in an annual citizens' climate budget. The climate change budget code has been implemented in the national budget since the fiscal year 2012/13.

Climate Change Related Programs – Nepal's climate coding identified eleven categories of programs to be climate related**:**

1. Sustainable management of natural resources and greenery promotion
2. Land use planning and climate resilient infrastructures
3. Prevention and control of climate induced health hazards
4. Prevention and control of climate change induced hazards to endangered species and biodiversity
5. Management of landfill site and sewage treatment for GHG emission reduction
6. Sustainable use of water resources for energy, fishery, irrigation, and safe drinking water
7. Plans/ programs supporting food safety and security
8. Promotion of renewable and alternative energy, technology development for emission reduction and low carbon energy use
9. Preparedness for climate induced disaster risk reduction
10. Information generation, education, communication, research and development and creation of database
11. Preparation of policy, legislation, and plan of action related to climate change

Climate Change Budget Code – Each activity is assessed to determine the proportion of the activity that is climate related.

1. Highly relevant — Expected expenditure is more than 60% of the total budget
2. Relevant — Expected expenditure is 20% to 60% of the total budget
3. Neutral — Expected expenditure is less than 20% of the total budget

Source: Nepal Climate Change Budget Code 2012.

78. Improving transparency of climate-related investment spending would be key to assessing whether investments are sufficient to meet climate objectives. A first step would be to provide a comprehensive overview of all major projects in budget documents, similar to what was done in the 2015/16 PSIP. In the longer term, the authorities could consider establishing a budget tagging mechanism for all climate-related spending as in other countries (See Box 2).

79. There is no ex-post review or audit of projects specifically for their climate adaptation and/or mitigation outcomes. Ex-post review or audit of climate-related projects is essential to understand the extent to which the projects are effectively implemented and achieve their intended climate outcomes. The Samoa Audit Office (SAO) is mandated to provide public sector audit services and to promote improvement in public sector administration. The SAO focuses on financial performance of public entities and projects, but it recognizes that areas such as climate change, environment, and disaster risks are important emerging areas. The SAO is in the process of conducting financial audits of three climate-related projects funded by the World Bank. Albeit not directly climate-related, the SAO has also undertaken environmental audits (e.g., solid waste and rubbish collection) in the past, whose audit reports were published as part of Reports to Parliament. The existing Environmental Audit Manual is being updated to international Supreme Audit Institution standards. In principle, the Samoa Monitoring Evaluation Reporting Framework can be applied at the project level to map project outcomes to sector plan outcomes. The Samoa Monitoring Evaluation Reporting Framework and the SAO provide good entry points for ex-post review and monitoring of climate outcomes of projects.

80. The Asset Management Framework and maintenance practices do not explicitly address climate-related risks. There are asset registers at line ministries and SOEs, some of which are linked to a database managed by the MOF. The MOF has a register of minor assets (below SAT100,000), while other assets are captured in the asset registers of line ministries and PCs. Asset registers do not include information related to climate damages or vulnerability. However, some PC asset registers are equipped with Geographic Information System (GIS) features that can be used to map risks and vulnerability of assets. The Asset Management Framework is being updated and will include risk assessment (albeit not related to climate change specifically), while some sectors are working to improve asset management. Maintenance funding is through the regular budget process. The asset register could improve and ensure maintenance of existing assets is done in a more systematic way.

C5. Risk Management

81. Samoa has a disaster risk management strategy in place. As discussed in section IV, Samoa has mainstreamed disaster risk management in sector plans since the Disaster and Emergency Management Act in 2007. The National Emergency Operation Center has been established and staffed with the DMO team and those seconded from other technical agencies and sector ministries. The MOF's Disaster Finance team is working in collaboration with the DMO through the National Emergency Operation Center. One of the flagship initiatives is the Multi-hazard Early Warning System that has been put in place and in operation. The government has also put in place several ex-ante financing mechanisms to manage the exposure of public infrastructure to climate-related risks.

82. Samoa does not conduct a fiscal risk analysis related to climate change and natural disasters. To manage negative shocks from climate-related hazard events, Samoa needs to quantify contingent liabilities related to those events, plan mitigation measures, and develop a governance framework. The government is considering seeking external technical support to

develop climate-related fiscal risk analysis. There are good international practices from other countries in integrating climate change and natural disaster into fiscal risk analysis and modelling. One leading example of incorporating a quantitative assessment of climate change in fiscal risk analysis over the long-term is the UK Fiscal Risk Report 2021.[49] Further insights can be drawn, for instance, from fiscal risk analysis and statements of the Philippines and the United States.[50]

Q. Adequacy of Other Public Financial Management Practices

Are Climate Change Considerations Effectively Incorporated Across All Stages of the Budget Cycle?

This section is based on the IMF's FAD Green PFM framework and is informed by the results of the recent Climate PEFA for Samoa.[51]

Strategic Planning and Fiscal Framework

83. Climate considerations are well reflected in the Government's strategic plans, in sector strategies and in corporate plans of ministries and PCs. Medium-term fiscal frameworks and budgets are also closely aligned to meeting climate objectives. As discussed above, many climate-relevant projects are funded by development partners and the financing is clearly directed towards specific climate-related objectives.

Budget Preparation

84. There is limited focus on climate issues in the budget preparation process, except for the major externally funded projects. The budget circular does not highlight climate concerns and there is no general requirement for climate impact assessment of budget measures, but the major projects are subject to environmental impact assessment regulations. There is no specific tagging of climate expenditure and the budget program structure does not identify climate-relevant spending in the budget documents. There have been no climate-focused spending reviews.

Budget Execution and Accounting

85. Climate considerations are not explicitly reflected in budget execution and accounting. While there are well-designed and robust mechanisms for budget execution controls and accounting, these do not have any specific provisions for climate-related spending. In the absence of a systematic framework for climate tagging or a budget program structure that

[49] See https://obr.uk/frr/fiscal-risks-report-july-2021/.
[50] For the case of United States and the Philippines, see the respective links: https://obamawhitehouse.archives.gov/sites/default/files/omb/reports/omb_climate_change_fiscal_risk_report.pdf ; and https://www.treasury.gov.ph/wp-content/uploads/2017/10/FRS_2015-2016.pdf.
[51] See 'Climate-Sensitive Management of Public Finances—Green PFM', IMF 2021 and 'Samoa - PEFA Assessment of Climate Responsive Public Financial Management', IMF 2021.

reflects key climate objectives, any analysis of climate-related spending will be ad-hoc in nature. The public accounts do not provide any information on climate spending.

Control and Audit

86. Climate considerations are not explicitly and systematically reflected in internal controls, nor internal and external audit. So far, the SAO has not carried out any performance audits of climate projects or programs but they are planning such audits in the future.

Annex I. The DIGNAD Model[1]

87. The Debt, Investment, Growth, and Natural Disasters (DIGNAD) model is a dynamic two-sector small open economy model designed to simulate the impact of natural disasters and associated policy trade-offs. It was developed by Marto, Papageorgiou, and Klyuev (2018) as an extension of the DIG model.[2] The key assumption in DIGNAD is that there are two types of public capital, one is standard physical capital and the other is adaptation capital. Standard capital is vulnerable to natural disasters, and part of it is destroyed each time a natural disaster hits the economy. Adaptation capital is more resilient to such events. Both types are used as an input to production by perfectly competitive firms, jointly with private capital and labor. The government has access to a wide range of financing sources, including external concessional loans and grants from international donors. The model captures the main mechanisms and policy issues of interest for debt sustainability analysis, particularly those associated with the linkages between public adaptation investment, economic growth, and debt.

88. Role of Natural Disasters. In the model, natural disasters are expected to affect the economy through the following five channels: (i) damages to public capital; (ii) damages to private capital; (iii) a temporary productivity loss; (iv) a decline in public investment efficiency during reconstruction; and (v) a loss in credit worthiness. For Samoa, a synthetic natural disaster shock that is assumed to hit the economy is calibrated to an average impact of tropical cyclone Evan and 2009 earthquake/tsunami, resulting in 16.5 percent of GDP in losses and 13.6 percent of GDP in damages. In all scenarios, the reconstruction of public infrastructure is assumed to take four years after which the stock of standard capital returns to the pre-disaster level.

89. Building Resilience to Natural Disasters. DIGNAD demonstrates the benefits of investing in ex-ante adaptation in countries exposed to frequent natural disasters. Relative to standard infrastructure, adaptation capital or infrastructure could be complementary—e.g., seawalls, breakwater retrofitting or climate proofing—or substitute—e.g., climate resilient infrastructure. The two types of infrastructure (standard and adaptation) are aggregated into the total stock of public capital that is used by firms to produce output:

$$y_t = A_t\left(k_t^g\right)^{\psi} k_t^{\alpha} l_t^{1-\alpha}$$

where y_t is the total output of the private sector; k_t is the stock of private capital; l_t represents the labor employed; k_t^g is the total stock of public capital; and A_t is total factor productivity. ψ and α jointly determine the rate of return on each factor of production. Since adaptation

[1] The development of the DIGNAD model is part of a research project on macroeconomic policy in low-income countries (IATI Identifier: GB-1-202960) supported by the U.K.'s Foreign, Commonwealth and Development Office (FCDO) and the partners in the IMF's COVID-19 Crisis Capacity Development Initiative (CCCDI)—Belgium, Canada, China, Germany, Japan, Korea, Spain, Singapore, and Switzerland.

[2] The Debt-Investment-Growth (DIG) model was introduced in Buffie and others (2012)

infrastructure is characterized by greater resilience, it suffers smaller damages in the aftermath of disaster shocks. Thus, more adaptation capital implies relatively lower economic losses if a natural disaster hits the economy. Moreover, because of climate-proofing, which allows more intensive use during adverse weather conditions not amounting to a natural disaster, adaptation capital also carries a marginally larger rate of return.

90. Financing Adaptation and Post-Disaster Reconstruction. The model considers several government-financing options and types of government expenditure. International donors may provide grants and/or concessional loans to financially support the country in scaling up ex-ante adaptation investments during pre-disaster times, as well as financing investment during post-disaster reconstruction. The budget constraint of the government plays a central role in determining the path of public debt in the model. Suppressing non-concessional types of debt, it is given by:

$$\underbrace{s_t \Delta d_t}_{Borrowing} = \underbrace{s_t r_{d,t-1} d_{t-1}}_{\substack{Interest \\ payments}} + \nu \underbrace{i_t^a + i_t^s + g_t}_{\substack{government \\ spending}} - \underbrace{\mathcal{A}_t}_{Grants} - \underbrace{\tau}_{\substack{Tax \\ revenue}}$$

where, s_t is the real exchange rate; Δd_t is the change in external concessional debt; $r_{d,t}$ is the real interest rate on concessional debt; i_t^a and i_t^s are public adaptation and standard investment expenditure; g_t represents public transfers to the population. Government revenues comprise grants supplied by donors, $\mathcal{A}_t$, and taxes collected from the population, τ. Finally, $\nu > 0$ governs the relative cost premium of building adaptation infrastructure compared to standard infrastructure.

91. Calibrating DIGNAD for Samoa. The DIGNAD model is calibrated at an annual frequency using recent data capturing salient features of Samoa's economy. Table 13 reports the key parameter values necessary to pin down the initial steady state. Where possible, parameters are calibrated in line with data provided by the Samoan authorities and IMF country team. The initial rate of return on standard infrastructure investment is set at 25 percent, approximately in the middle of the range of estimates identified by the World Bank.[3] The initial rate of return on adaptation investment is set at 30 percent, only marginally higher than the return on standard capital, to avoid overestimation of the growth dividends from adaptation investment. Also, adaptation investment is assumed to be 25 percent more costly for the government than standard capital.[4] The steady-state efficiency of both types of public investment is set at 60

[3] "Cost-Benefit Analysis in World Bank Projects" (2010) by Independent Evaluation Group identifies the 17–31 percent range.

[4] Following Cantelmo, Melina and Papageorgiu (2019).

percent in line with the average for small developing states.[5] Additional parameters are from Marto, Papageorgiou and Klyuev (2018).

Table 1. Samoa: Calibrated Parameters and Initial Values for the Steady State

(in percent)

DEFINITION	VALUE
Initial return on standard infrastructure investment	25.0
Initial return on adaptation infrastructure investment	30.0
Public investment to GDP ratio	10.1
Grants to GDP ratio	8.8
Consumption tax (VAT) rate	15
Public debt to GDP ratio	45.3
Remittances to GDP ratio	27.1
Imports to GDP ratio	37.6
Real interest rate on domestic debt	11.4
Real interest rate on concessional debt	0
Depreciation rate of public infrastructure	3

Source: Samoa's authorities and IMF staff calculations.

[5] An efficiency of 60% is in line with Marto, Papageorgiou, and Klyuev (2018) and Melina and Santoro (2021), mirroring IMF Public Investment Management Assessments for small developing countries.

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