



# FEDERATED STATES OF MICRONESIA

## SELECTED ISSUES

March 2024

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# FEDERATED STATES OF MICRONESIA

## SELECTED ISSUES

February 7, 2024

Approved By  
Asia and Pacific  
Department

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# PUBLIC INVESTMENT, ECONOMIC GROWTH, AND RESILIENCE: A MODEL BASED APPROACH<sup>1</sup>

*Enhancing public investment management (selection, planning, and implementation) could significantly improve the efficiency of public investment and support economic growth. This is particularly important as FSM starts a new boost to public investment financed by foreign grants. Using a dynamic DIGNAD model, we illustrate the effects of various policy options on achieving higher and more resilient growth and improving private sector participation. The reforms can also have fiscal benefits through the higher growth dividend. Additionally, the impact of different types of public investment on building resilience to climate shocks emphasizes the benefits of larger investment in climate-resilient infrastructure to minimize GDP loss and allow the economy to bounce back faster after a large natural disaster.*

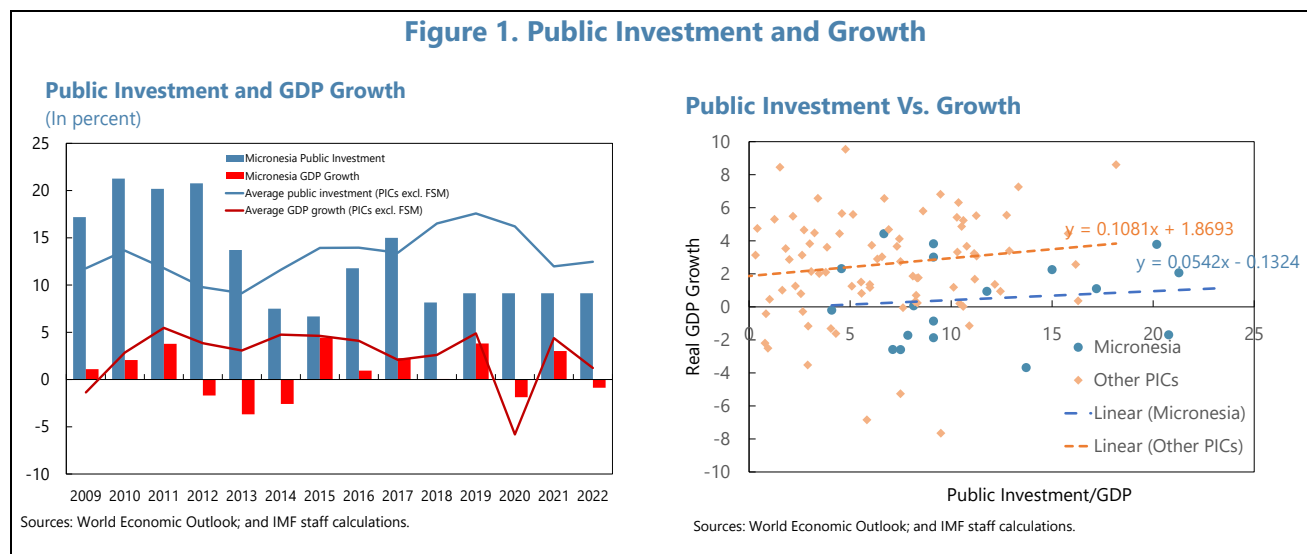
## A. Background

1. **High-quality public investment has the potential to drive sustainable economic growth.** By strategically and efficiently allocating resources to infrastructure development, such as transportation networks and digitalization, the FSM can improve connectivity, enhance communication, and streamline administrative processes. Quality infrastructure also attracts private sector investment, as businesses are more likely to invest in areas with reliable and efficient infrastructure (Barro 1990; Barro and Sala-i-Martin 1992; Futagami, Morita, and Shibata 1993; Glomm and Ravikumar 1994; Turnovsky 1997). Private sector investment, in turn, can contribute to job creation, increased productivity, and overall economic activity.
2. **However, it is essential to ensure that public investment projects are well managed and efficiently implemented.** Weaknesses in public investment management can undermine the potential longer-term benefits of infrastructure projects on the economy.<sup>2</sup> Better infrastructure governance is likely to strengthen the connection between public investment and growth. Gupta and others (2014) showed that an efficiency-adjusted public capital stock makes a positive and significant contribution to economic growth. IMF (2015) pointed out that countries with stronger infrastructure governance institutions tend to have lower average incremental public-capital-to-output ratios and therefore receive more growth impact for their investment. Countries with higher public investment efficiency receive greater output dividends from public investment.
3. **Economic growth in the FSM has remained subdued and highly volatile despite considerable efforts in infrastructure investment.** During the period of the recently expired COFA

<sup>1</sup> Prepared by Pranav Gupta.

<sup>2</sup> Warner (2014) finds that big infrastructure and public capital on average show only a weak positive association between investment spending and growth and only in the same year, as lagged impacts are not significant. Miyamoto, Baum, Gueorguiev, Honda, and Walker (2020) find very limited impact of investment on growth especially in low-income countries, with some positive impact among emerging economies—they show that the macroeconomic impact is stronger in countries with better infrastructure governance.

(FY2004-23), public investment averaged around 12 percent of GDP, while real growth was very volatile and averaged 0.3 percent in the period (Figure 1). Even after excluding the COVID-19 years, average growth in FSM was anemic at 0.3 percent, significantly below the average of 2.97 percent and 6.5 percent in other PICs and Asian low-income countries, respectively. Several factors, such as weak public investment management—limited capacity in implementing high-quality projects, inadequate planning—and lack of private sector participation contributed for the weak relationship between public investment and economic growth. Furthermore, vulnerability to frequent natural disasters, require more attention to investment in climate-resilient infrastructure.



**Table 1. Federated States of Micronesia: GDP Growth**

	2004-2019				2004-2023			
	Mean	Median	Standard deviation	Coefficient of Variation	Mean	Median	Standard deviation	Coefficient of Variation
Micronesia	0.32	0.50	2.67	8.33	0.31	0.41	2.52	8.16
PICs (excl. Micronesia)	2.97	2.54	7.16	2.41	2.35	1.90	7.02	2.99
Other APD LICs	6.51	6.80	4.07	0.63	5.67	6.44	6.11	1.08

Source: World Economic Outlook; and Staff calculations.

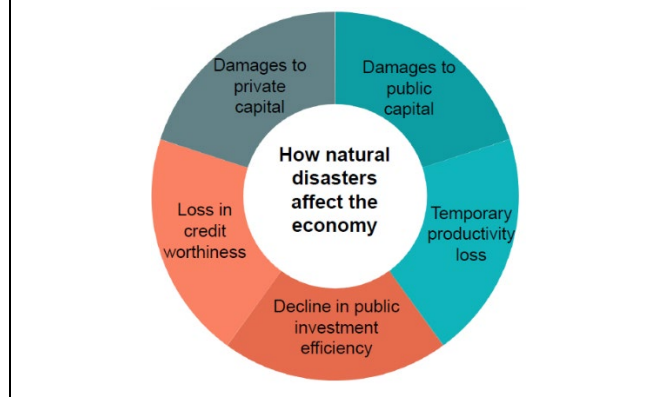
**4. Significant capacity constraints also arise from chronic shortage of skilled labor.** Private sector in FSM remains substantially underdeveloped resulting in lack of well-paying jobs and large outward emigration-FSM's population is estimated to have declined continuously since 2001. Moreover, the prolonged COVID related border restrictions have further intensified the labor issues.

## B. DIGNAD Model and Scenarios

**5. A structural model-based approach can be used to analyze the effects of various policy options on achieving higher and more resilient growth, as well as improving private sector participation.** The Debt, Investment, Growth, and Natural Disasters (DIGNAD) model is a dynamic small open economy model designed to simulate the impact of natural disasters and associated policy trade-offs, including debt accumulation, public/private investment, and growth.<sup>3</sup> It features two types of households, including poor households with no access to financial markets, and includes traded and non-traded sectors. Firm production requires inputs in form of labor, private capital, and public infrastructure. Public capital, subject to inefficiencies and absorptive capacity constraints, enters production functions in both the traded and non-traded sectors. The government has access to various types of debt and grants and have an endogenous policy function to adjust labor and consumption taxes to finance any fiscal gap.

**6. Another notable feature of the DIGNAD model is its ability to incorporate different forms of public capital.** The model includes two types of public capital: standard physical capital and climate-resilient adaptation capital. Standard capital is vulnerable to natural disasters, with a portion of it being destroyed whenever such an event occurs (Figure 1). On the other hand, adaptation capital is designed to be more resilient. The model highlights the advantages of investing in ex-ante adaptation infrastructure, particularly in countries prone to frequent natural disasters. While initial investments in adaptation infrastructure may lead to an increase in public debt, they ultimately enhance the economy's resilience by mitigating the adverse effects of natural disasters on output, minimizing damages to physical assets, and reducing post-disaster fiscal burdens associated with rebuilding and maintaining vital services. The baseline model is calibrated using historical data for the FSM and widely used parameters in the literature.

**Figure 2. Natural Disasters in the DIGNAR Model**



**7. To illustrate the macroeconomic implications of various policy options, three scenarios are considered:**

- (i) **Baseline:** This scenario is based on the team's current macroeconomic framework, which assumes a rebound in public investment starting in 2023-24, supported by available grants under the expired COFA. Furthermore, public investment is expected to gradually increase to 14.5 percent of GDP over the next two decades thanks to the renewal of the COFA. This scenario assumes no major reforms in terms of improving public investment management (PIM)—nor

<sup>3</sup> It was developed by Marto, Papageorgiou, and Klyuev (2018) as an extension of the DIG model (Buffie et al., 2012).

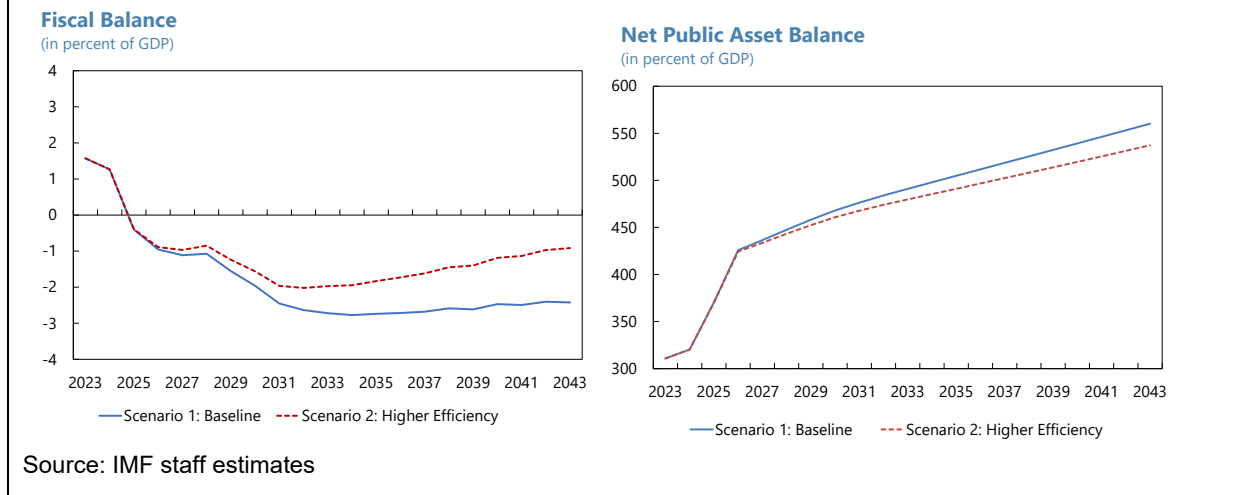
significant reforms to improve business environment and boost growth in the private sector. The effectiveness of public investment is assumed to remain relatively low at 0.2 percent.

- (ii) **Baseline investment with higher public investment efficiency:** This scenario assumes similar levels of public investment as in the baseline scenario but assumes significant reforms leading to an improvement in investment efficiency to the average for emerging markets (60 percent).
- (iii) **Historical public investment:** Public investment in the FSM has been characterized by high volatility, primarily driven by large-scale infrastructure projects. This volatility can lead to reduced capital accumulation, inefficient resource allocation, and increased uncertainty for businesses. This scenario is calibrated to assume high volatility in public investment, similar to the period of 2010-2019, persisting for the next 20 years.

## C. Results: Higher Private Sector-Led Growth and Stronger Public Finances

**8. The higher efficiency of public investment would boost private investment and economic growth.** As depicted in Figure 4, improving public investment efficiency (Scenario 2) would result in an increase in potential GDP growth to around 1.2 percent—almost double the level in past decades (excluding Covid years). The higher growth is driven by higher accumulation of public capital stock, such as transportation and digital infrastructure, for the same level of investment, leading to private sector crowding-in, higher private investment growth, and consumption growth. The private sector growth rate would be around 50 percent higher than in the baseline scenario, with significantly higher real wages reflecting improvements in per capita income. This is crucial as underdeveloped private sector and lack of well-paying jobs have resulted in significant emigration and impacted economic growth. Furthermore, structural reforms aimed at deepening the private sector can provide an additional boost to private sector-led growth, including easing regulations and barriers that have hindered FDI.

**9. The higher economic growth would also boost public finances and reduce dependence on grants (Figure 5).** Under the improved investment efficiency scenario, the higher economic growth leads to higher tax revenues and lower deficits (while maintaining the relatively high level of expenditures). Under this scenario the fiscal deficit would fall by 1.5 percent of GDP in FY2043. Net financial assets would increase at a faster pace in nominal (USD) terms but fall as a share of GDP—given the stronger economic growth. This would be consistent with public finances that are less reliant on grants (and the need to accumulate large financial assets to compensate for a future drop in foreign aid) and more reliant on stable tax revenues.

**Figure 3. Fiscal Balance and Balance of Trust Funds**

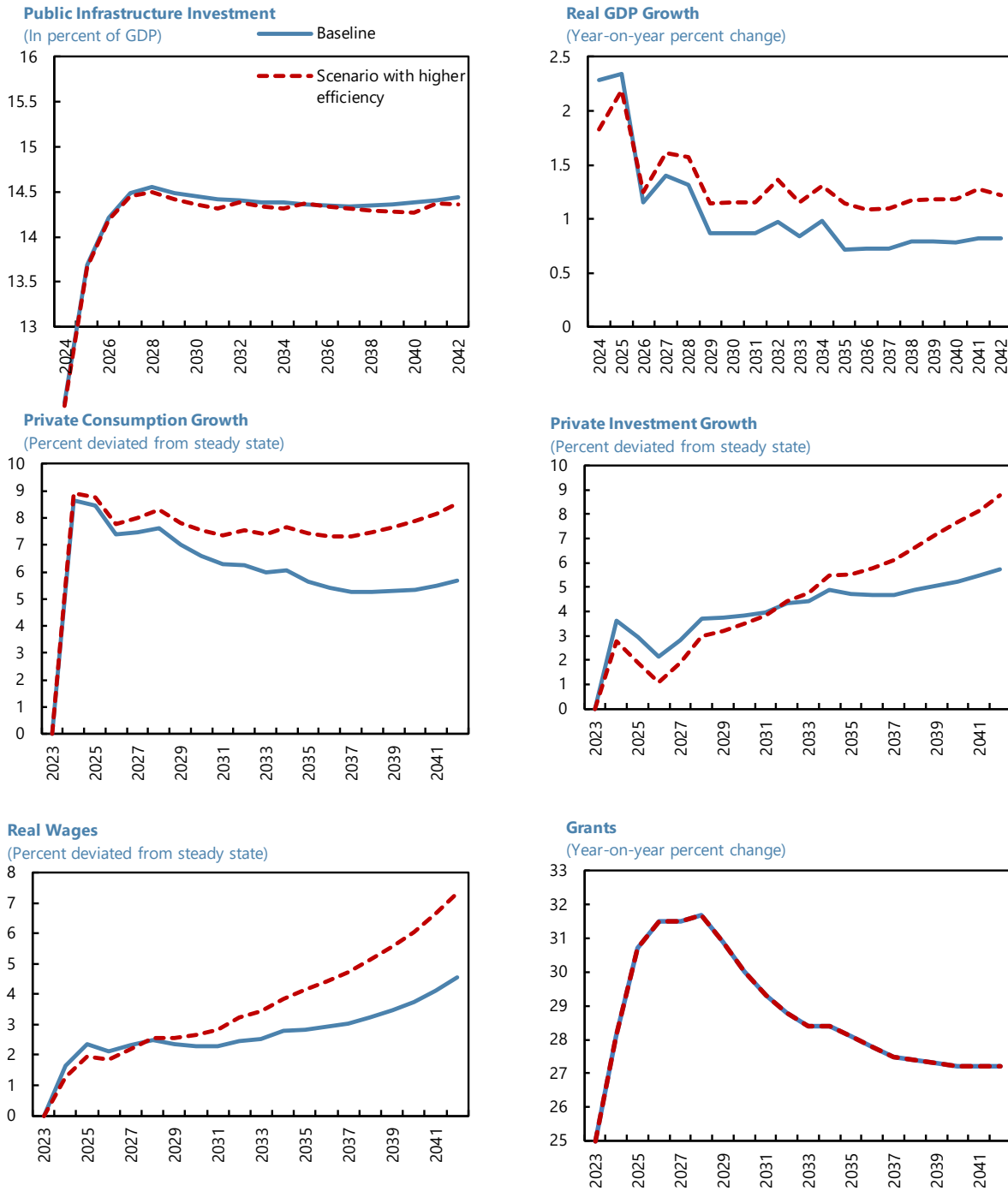
**10. The risk to growth remains tilted to the downside if public investment remains highly volatile.** Without reforms, particularly in project selection and planning, investment spending is likely to remain volatile, as observed in the past (Scenario 3). Under this scenario, high volatility in investment would spill over to growth and private sector activity, resulting in no significant improvement in the private sector. Average growth in private investment and private consumption would remain highly volatile and at around 1.8 and 2.7 percent points below the baseline, respectively, leading to lower average GDP growth rates and real wages.

**11. Additionally, placing greater attention on climate adaptation when planning public investment would strengthen FSM's economic resilience.** FSM remains highly vulnerable to climate change-induced natural disasters, with low climate readiness and adaptive capacity (see SIP on climate risks and adaptation). An alternative scenario illustrates the value of higher adaptive investment and its implications for growth if FSM were to be hit by a large natural disaster.<sup>4</sup> While higher adaptive investment would not result in higher potential GDP growth, simulation results indicate that it can significantly minimize GDP loss (by around 4 percentage points in year of disaster) and expedite the recovery when a disaster occurs. Furthermore, losses to the private sector activity are estimated to be contained resulting in much higher level of private investment and consumption over the long-term.

<sup>4</sup> Under this scenario, staff assumes that an additional 20 percent of the total public investment would be targeted towards adaptive investment in contrast to the baseline.



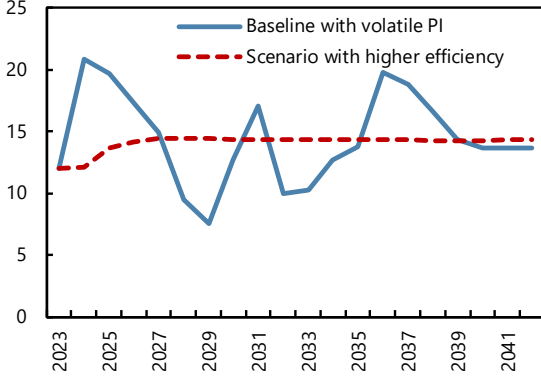
**Figure 4. Baseline Vs. Higher Efficiency**



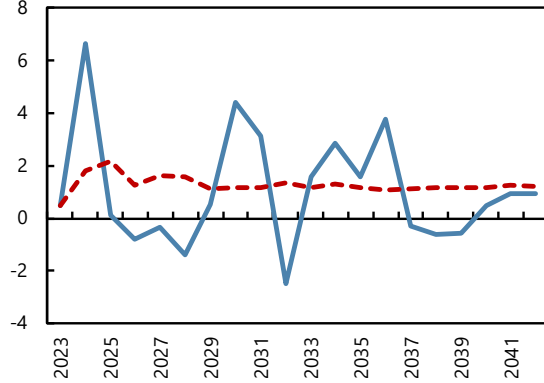
Source: IMF staff estimates.

**Figure 5. Impact of Highly Volatile Public Investment**

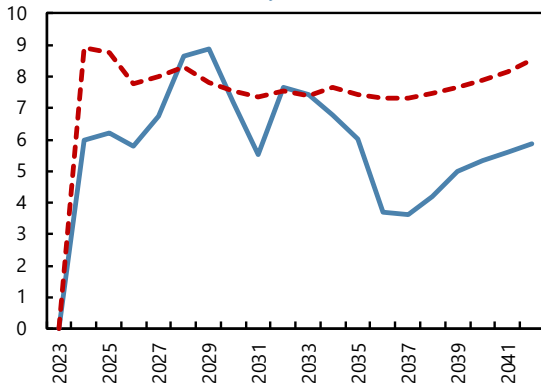
**Public Infrastructure Investment**  
(In percent of GDP)



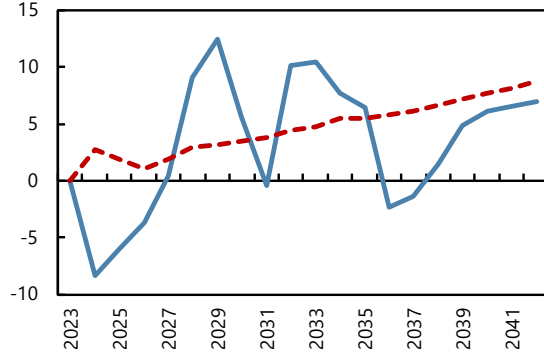
**Real GDP Growth**  
(Year-on-year percent change)



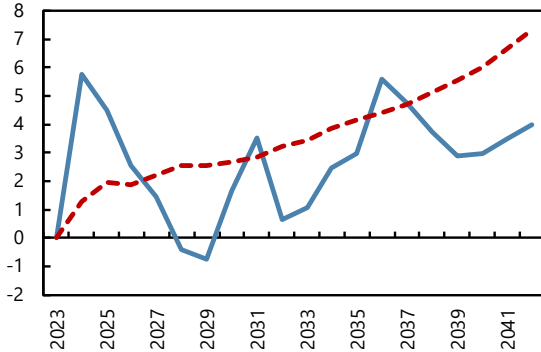
**Private Consumption Growth**  
(Percent deviated from steady state)



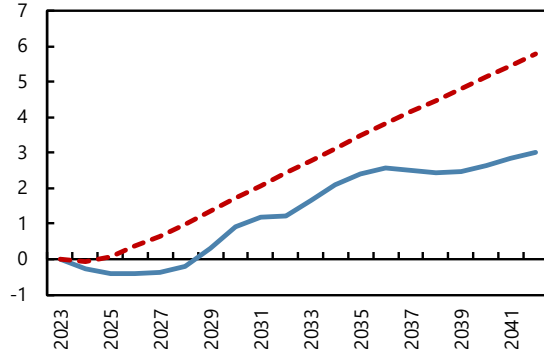
**Private Investment Growth**  
(Percent deviated from steady state)



**Real Wages**  
(Percent deviated from steady state)

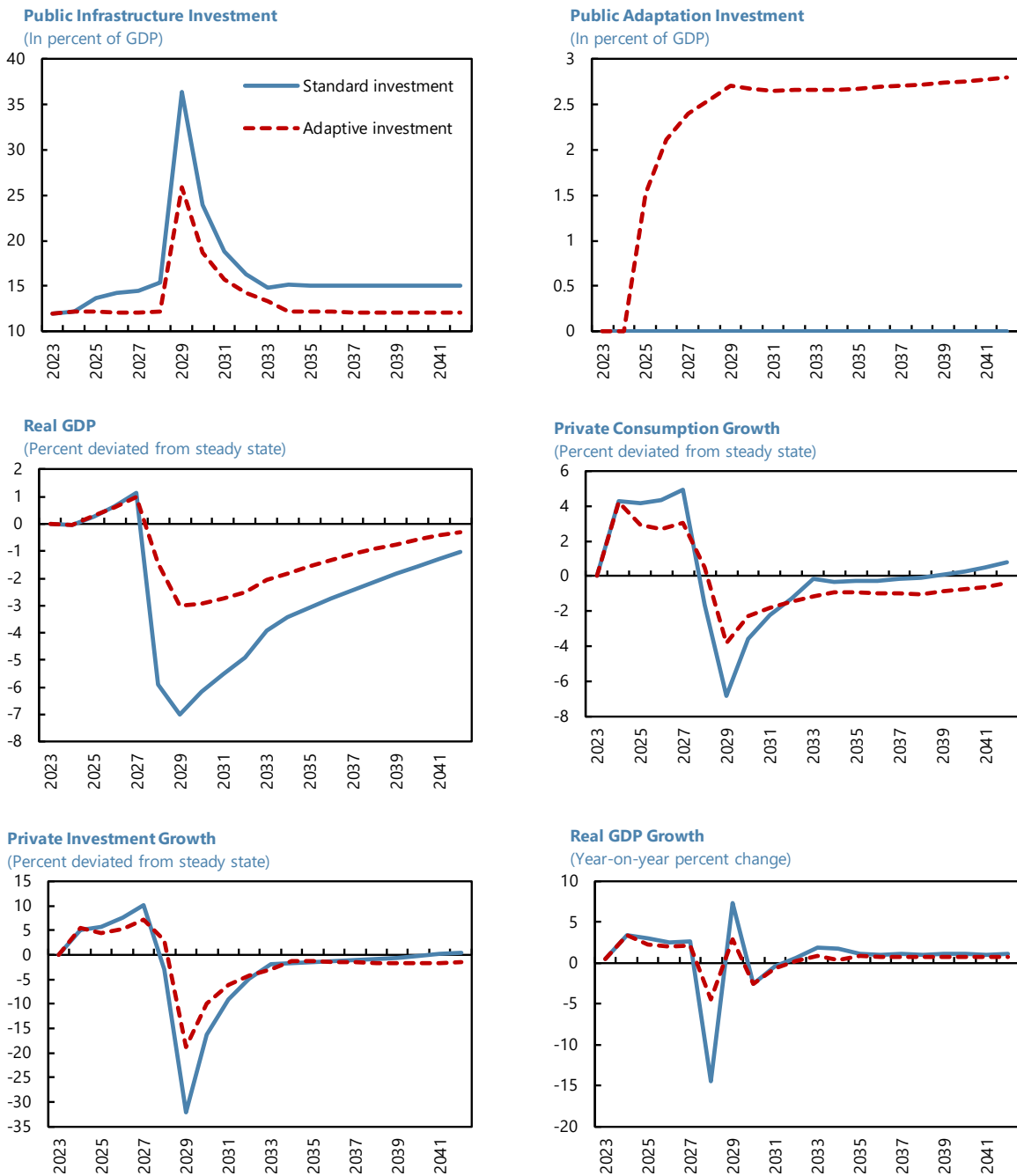


**Real GDP Growth**  
(Percent deviated from steady state)



Source: IMF staff estimates

**Figure 6. Standard vs. Adaptive Investment**



Source: IMF staff estimates.

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# CLIMATE RISKS AND ADAPTATION<sup>1</sup>

*FSM is highly vulnerable to climate change-induced natural disasters. While climate-related finance and investment in FSM have been growing in recent years, greater efforts are needed to build resilience against the impacts of climate change. Developing and implementing a comprehensive National Adaptation Plan, strengthening public financial management, improving coordination between agencies, and enhancing disaster risk reduction and preparedness will not only help cope with extreme climate-related events and natural disasters but also boost potential growth.*

## A. Introduction

**1. The frequency and intensity of climate related impact in the Pacific Island Countries (PICs) has been increasing in recent years placing them under precarious conditions.** The increasing frequency and intensity of extreme climate-related events is having serious consequences on small island nations due to its geographical location, making them most susceptible to the impacts of cyclones, king tides, heatwaves, and other natural hazards. Their likely impact includes the destruction of housing and infrastructures and damages to crops and livestock. The Intergovernmental Panel on Climate Change and Climate Crisis report states that the Pacific region is the most vulnerable to the impacts of climate change even though it contributes the least to global warming in terms of emission and initiatives such as the [“Climate Security in the Pacific project”](#) need to be extended to other countries in the region as part of a collective effort to address the multiple effects of climate change.

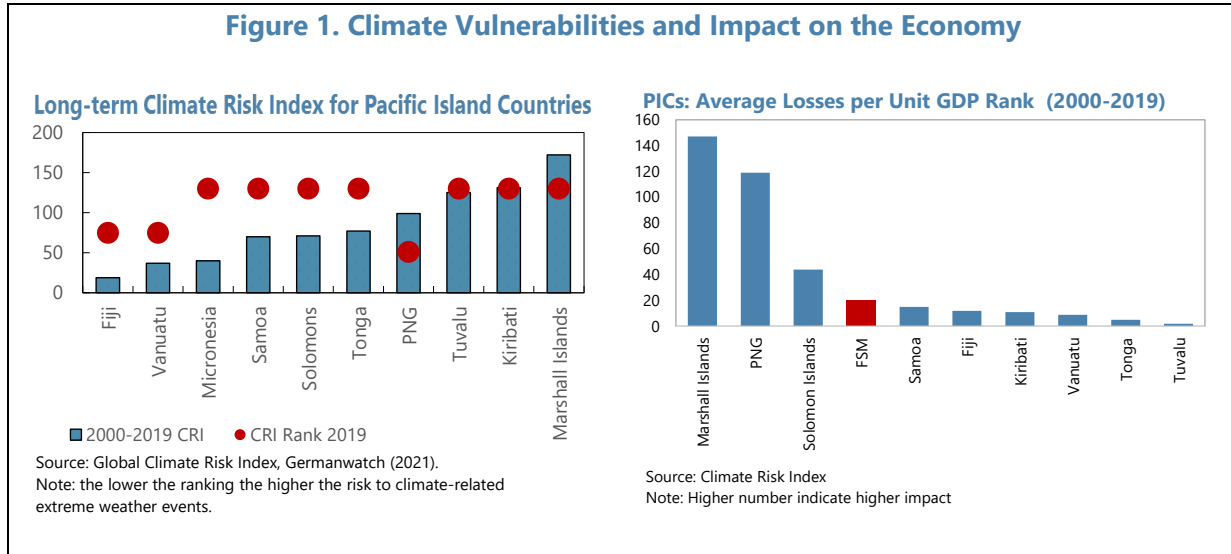
**2. FSM is highly vulnerable to climate change, making it crucial to plan and implement effectively adaptation investment and strengthen ability to manage natural disasters.** FSM is already facing rising costs as it moves to gradually adapt its infrastructure investment to consider climate-related risks. Concerted efforts will be needed to adopt a strategic approach to incorporate adaptation investments in its budget planning and respond to natural disasters. It will require continued support by development partners to build institutional and financial capacity.

## B. Climate Change Vulnerabilities In FSM

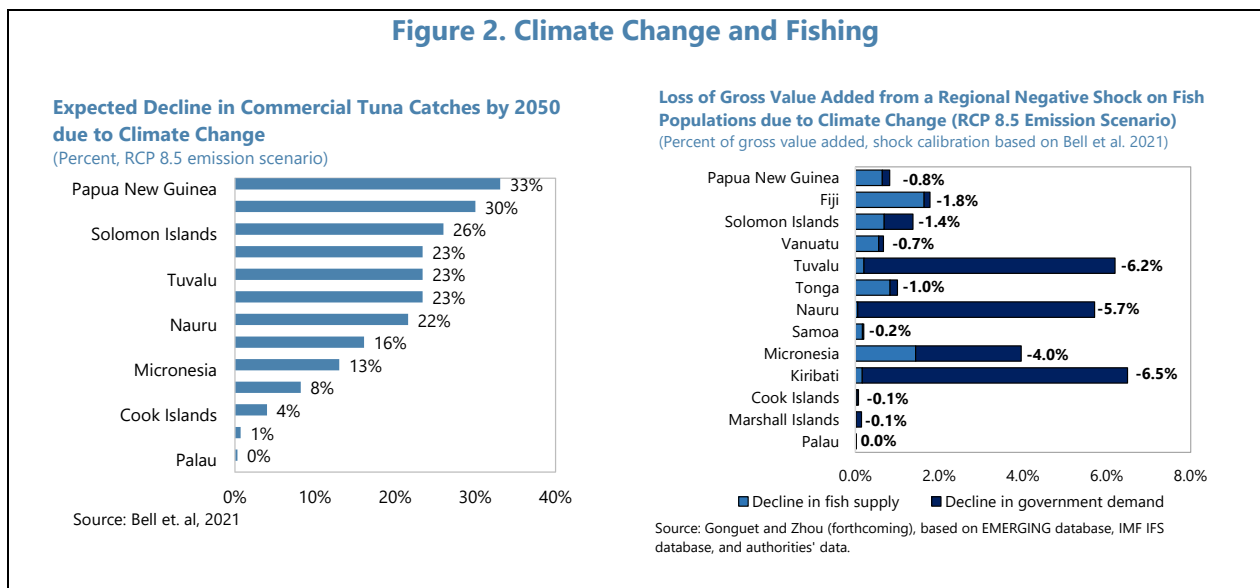
**3. FSM faces considerable exposure to climate change and natural disasters.** Extreme climatic events such as droughts, typhoons, flooding, landslides, storm-wave surges, ocean acidification, king tides, and rising sea temperatures pose high risk to the island economy. The Global Climate Risk Index (CRI) ranks FSM as one of the most at-risk countries among PICs and the fourth most at risk in losses per unit GDP (Figure 1). Furthermore, FSM has the highest percentage of its population affected by disasters (Pathway to Adoption and Resilience study in the Pacific SIDS, 2022). The Notre Dame Global Adaptation Initiative index—which considers food, water, health, infrastructure indicators—shows that the FSM's vulnerability to extreme climate events has increased during the last decade.

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<sup>1</sup> Prepared by Kavita Ram.

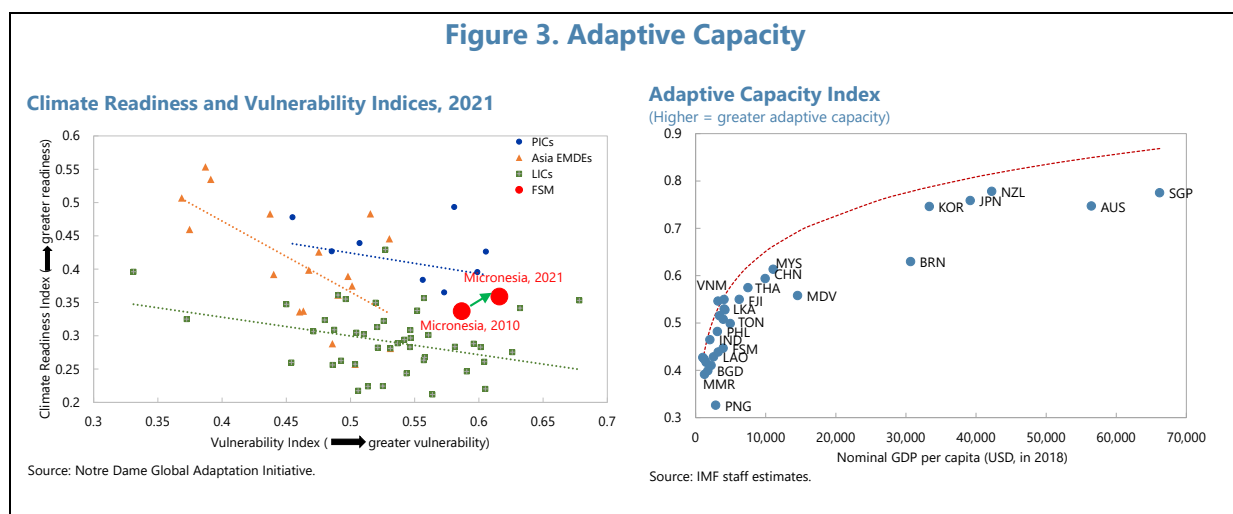


**4. Climate change, and related natural disasters, can have a large impact on the FSM economy and people’s livelihoods.** Being primarily dependent on agriculture and fishing, the economy can be severely affected by climate-related extreme events. For example, fisheries—which account (directly) for 11 percent of the GDP, most exports, and are an important source of government budget revenues (e.g., fishing licenses)—are likely to be adversely affected by climate change. Rising ocean temperatures and increase in acidification will significantly impact government revenue derived from fisheries. Climate change could lead to a 13 percent decline in tuna catches in FSM and a 4 percent fall in GDP (Figure 2). Rising temperatures and heatwaves also exacerbate health-related problems. A study on Human Health and Climate Change in the PICs found an increased risk of some illnesses when temperatures rise above 32-33°C. Sea level is rising at 28-36mm per decade exacerbating coastal erosion and placing coastal communities of atoll islands and islets at risk.



**5. Climate change threatens FSM’s food security.** Climate change is already threatening FSM’s food security mostly due to degraded arable land, crop losses, and saltwater intrusion. The decline in local food production over the last 50 years has aggravated food security, increasing reliance on imported and processed food.<sup>2</sup> To overcome this, there have been some initial efforts to make agriculture more climate resilient. A few pilot projects funded by the Green Climate Fund (GCF) to test crop varieties are being jointly implemented by the FSM National Government, the College of Micronesia-FSM, and the Micronesia Conservation Trust (MCT). The Australia’s Pacific Adaptation Strategy Assistance Program (PASAP) and the Secretariat of the Pacific Community (SPC) worked with local communities setting two field trials in the states with different ecological conditions to assess the resilience of different varieties of the nation’s main food crops (sweet potato and taro). There have also been efforts to replant coconut trees and other native plants such as sea-oaks, pandanus and mangroves along the coastline to protect arable land from erosion and to protect crops from salt spray and high tides. Seawalls have also been built to help protect land and freshwater resources from saltwater intrusion during high tides.

**6. Climate adaptation efforts are in its infancy and remain short of what is needed.** FSM’s increased exposure and vulnerabilities to natural disasters and climate change necessitate the strengthening of its adaptive capacity. While work is underway to integrate climate change policies into national policies such as the Infrastructure Development Plan (IDP) there is a need for further enhancement of adaptation policies and strategies to use higher grant financing more effectively. The climate readiness score based on economic, governance, and social readiness indicators has only slightly improved over the past decade and remains below most other PICs. The frontier analysis, based on the positive relationship between the adaptation index and income level, also suggests that FSM has low adaptive capacity to climate risks (Figure 3).<sup>3</sup>



<sup>2</sup> UNDRR (2022), Disaster Risk Reduction In FSM.

<sup>3</sup> IMF (2021) Fiscal Policies to Address Climate Change in Asia and the Pacific.

## C. Obstacles to Climate Adaptation

**7. There has been significant progress on climate mitigation.** A study estimated that FSM spent an average of 2.7 percent of 2018 GDP (2011-18) on climate mitigation efforts such as building renewable energy provisions, while average spending on climate adaptation remained at around 1.2 percent of GDP (IMF CCPA, 2019). To improve energy efficiency FSM has launched the Micronesia Public Sector Buildings Energy Efficiency (MPSBEE) project in 2021, a GCF funded project is being undertaken for food security and there are ongoing efforts to improve water security through ADB and EU aid funded projects.<sup>4</sup>

**8. Progress on adaptation has been slower due to several factors, including capacity constraints and the need for greater coordination between different levels of government.** The Department of Environment, Climate, and Emergency Management has been established to mainstream adaptation in development policies. But several factors have constrained greater progress on adaptation:

- **Weak implementation capacity.** Weakness in the public financial management (PFM) in general and the public investment management (PIM) in particular. Accessing climate finance, obtaining accreditation, and meeting complex project criteria for donor funds have been slow owing to weakness in the PFM and PIM systems. Lack of accountability and compliance with international standards and best practices have caused delays in fund disbursements. The execution of investment projects has also been hindered by low administrative capacity, arising from lack of staff and skills for project preparation and implementation, as well as delays in contracting and procurement.
- **Limited policy coordination.** Although FSM has made progress towards strengthening the policy framework for climate change adaptation with a National Climate Change Policy (NCCP) and Joint State Action Plan (JSAP) for each of the four states, it has not yet developed an overarching National Adaptation Plan (NAP). There is work in progress with the support of the Green Climate Fund (GCF) to develop the NAP, expected to start in 2024 and be completed in 3 years. There is also some disconnect between sectoral policies and plans due to the absence of an overarching NAP and Disaster Resilience Strategy (DRR). Adaptation planning is also hampered by the limited policy coordination between the national, state, and local levels, and a need to streamline adaptation planning across all states.
- **Lack of appropriate standards and regulations.** There is still no national building code to set standards. The changes and variations in temperature and topography caused by climate change require appropriate weather-resistant imports of materials for building and other infrastructure needs. The absence of a land zoning code, land use policy, and hazard risk mapping also hinders climate adaptation.

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<sup>4</sup> DECEM (2022), Updated NDC FSM



- **High cost of integration adaptation in investment projects.** The high cost of raw materials, transportation and shipment is already impacting project implementation. A climate change adaptation assessment can be more effective when initiated at an early stage of project development so that appropriate adaptation measures can be built into project planning, design, and operation to promote climate resilience.
- **Inadequate disaster preparedness and risk reduction measures.** The lack of access to adequate social protection amplifies existing vulnerabilities of local communities, impeding their ability to access essential goods and basic services in the aftermath of natural disasters. FSM does not have a disaster contingency funds to assist communities after the disaster.
- **Lack of funding has been a concern.** The IMF CCPA (2019) projects an estimated financing gap of US\$400 million for the FSM between its climate change investment goals (table 1) and the available grant financing. However, the renewal of the Compact could provide financing to help scaling up of climate adaptation investment, but more resources may be needed.

**Table 1. Federated States for Micronesia: Composition of the GCF Workplan**

Jurisdiction	Program	Estimated Cost (\$ millions)
<b>Nationwide</b>	1. FSM Food and Water Security Program	10
	2. FSM Renewable Energy Investment Program	125
	3. FSM National College Resilient Infrastructure Development Program	64
	4. Nation-wide Climate Change and Disaster Risk Management Coordination and Communications Program	43
	<b>Total:</b>	<b>242</b>
<b>Yap State</b>	1. Resilient Transport and Private Sector Development in the main and outer-islands of Yap Program	93
	2. Yap Renewable Energy Investment Program Phase 3	96
	3. Resilient Infrastructure for Health and Education Delivery Program	14
	<b>Total:</b>	<b>203</b>
<b>Chuuk State</b>	1. Chuuk State Resilient Critical Infrastructure Program	349
	<b>Total:</b>	<b>349</b>
<b>Pohnpei State</b>	1. Pohnpei State Resilient Critical Infrastructure Program	142
	2. Pohnpei State Resilient Social Protection Program	25
	3. Pohnpei State Resilient Tourism Development Program	3
	<b>Total:</b>	<b>170</b>
<b>Kosrae State</b>	1. Kosrae State Inland Road Completion Project	36
	2. Building Resilient Communities in Kosrae State Program	97
	<b>Total:</b>	<b>133</b>
<b>Overall total</b>		<b>1,097</b>

Source: 2019 IMF CCPA.

## D. Conclusion

**9. FSM is among the nations most exposed to the risks of climate change.** Climate change may lead to new and intensified natural hazards. Rising sea level has impacted smaller FSM islands and is expected to further damage infrastructure, food security and endanger communities scattered across the outer islands.

**10. To enhance climate adaptation, it will be critical to build up more capacity, ensure improved coordination, and use existing resources effectively.** This will include ongoing efforts

to develop and implement a comprehensive NAP in coordination with sectoral and national development plans, as well as incorporating climate adaptation in the government budget process. The adaptation efforts would also benefit from implementation of the 2023-26 PFM roadmap, improve administrative capacity, and accelerating the development and implementation of state-specific building codes, land use policies, and hazard mapping to enhance the implementation of capital projects. Collaboration with external partners would help ensure good practices and technical skills to expedite project implementation. Significant support for disaster preparedness, response, and recovery assistance is provided by the USAID, and the National Oceanic and Atmospheric Administration (NOAA), while the initial disaster assessment is done by the FSM government—which requires building more capacity. FSM could explore multilateral risk-sharing mechanisms through investment in insurance and social protection programs such as the UN Capital Development Fund-led Pacific Insurance and Climate Adaptation program and disaster risk insurance schemes provided by the Pacific Catastrophe Risk Insurance Company. This could help to strengthen its response mechanism, given the low insurance sector penetration.

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