Pacific Economic Monitor

December 2017 www.adb.org/pacmonitor

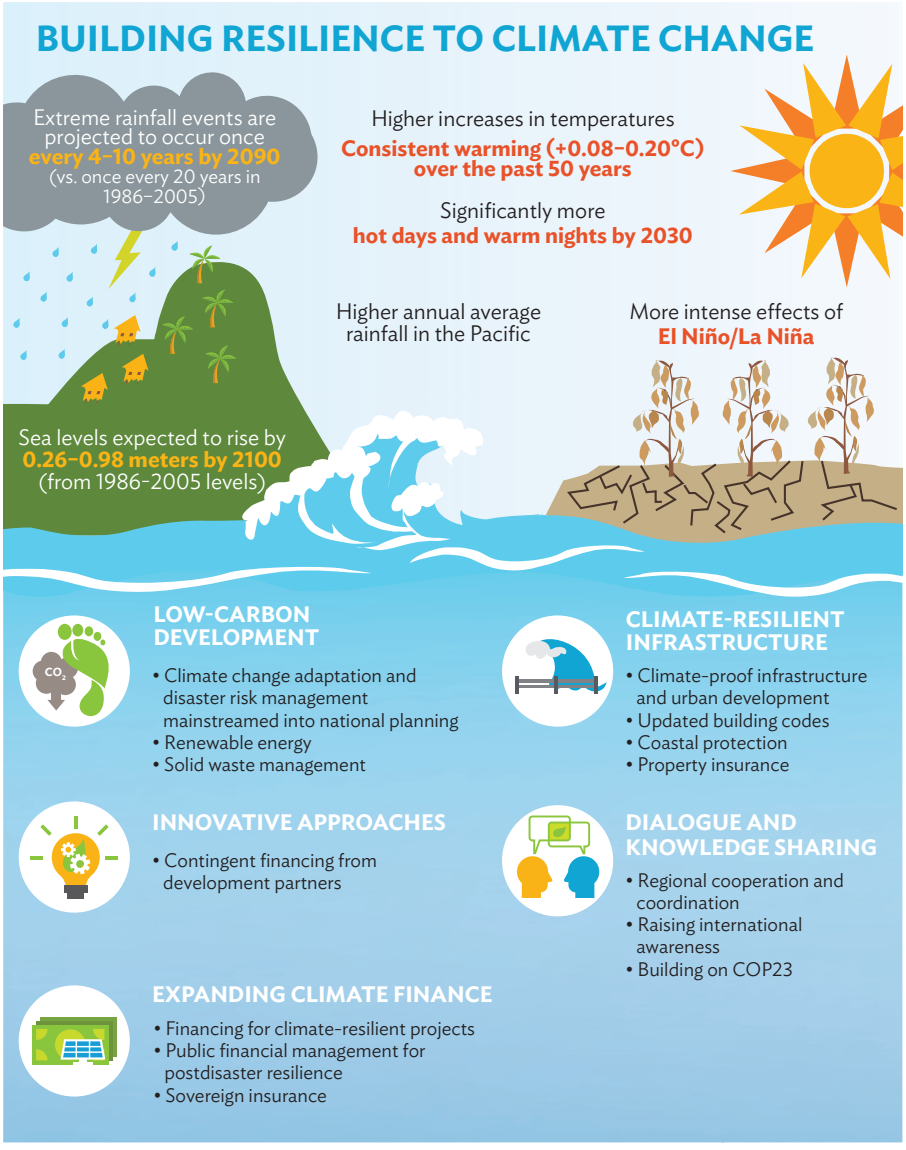
The *Monitor* provides an update of developments in Pacific economies and explores topical policy issues.

Contents

Highlights

- **Recent global economic gains dampened by looming risks.** With better-than-expected momentum in the first half of 2017, higher world economic growth is now projected for the full year and in 2018. However, medium-term risks such as tighter monetary policy, inward-looking policies, and persistently low inflation in advanced economies persist.
- **Climate change adaptation and disaster risk management.** Despite its relatively low contribution to the causes of climate change, the Pacific is particularly vulnerable to its effects and is stepping up efforts to adapt to more extreme weather conditions and mitigate disaster risk. These include integrating climate change and disaster risk concerns into national planning and policies, climate-proofing infrastructure, and building financial resilience.
- **Expanding climate finance.** Financial resilience is a key component to climate change response. A range of options, most recently disaster-contingent lines of credit and sovereign or regional insurance schemes, can be tapped to help Pacific economies recover from climate change impacts.

This issue of the Pacific Economic Monitor is dedicated to the memory of Malie Lototele, senior economics officer in ADB's Pacific Subregional Office, who sadly passed away on 9 November 2017. Malie was a longtime member of the Pacific Economic Monitor team and his contributions will be greatly missed. The team sends our deepest condolences to his family and friends. ***Tofa***, Malie.



Sources:

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

Pacific Community. 2016. *Framework for Resilient Development in the Pacific, 2017–2030.*

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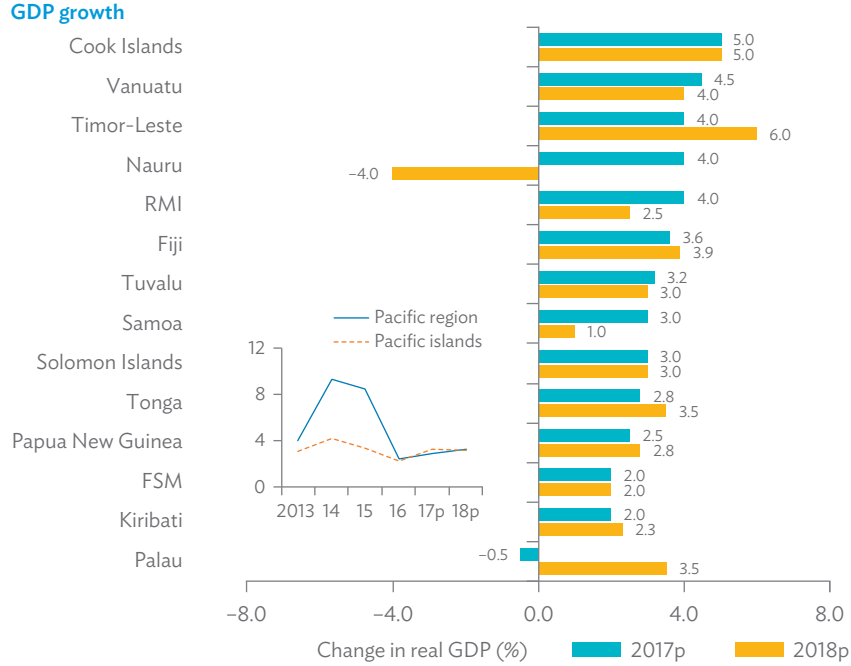
Notes:
In this publication, "$" refers to US dollars.
ADB recognizes "Timor" as Timor-Leste.
Corrigenda to ADB publications may be found at http://www.adb.org/publications/corrigenda

Abbreviations

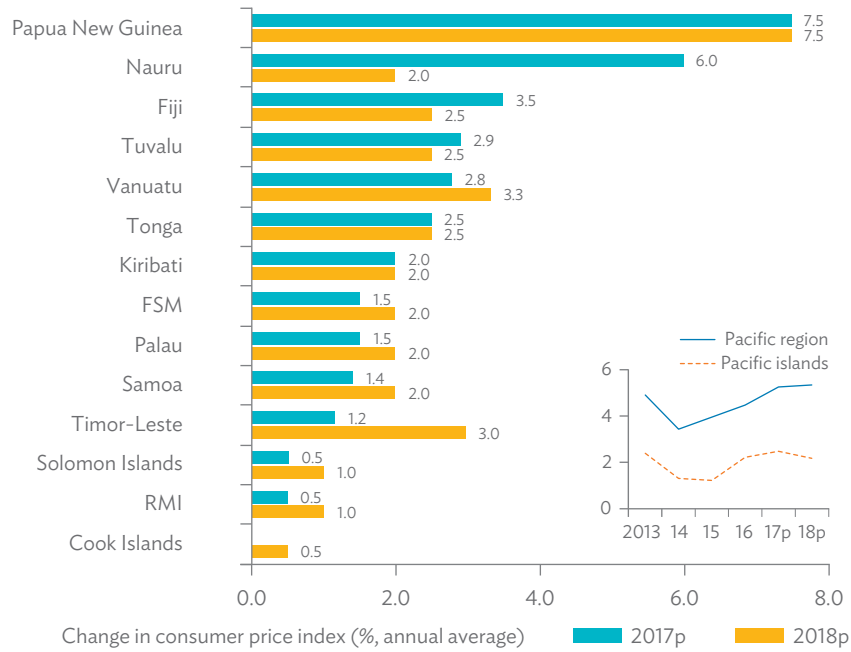
DMC	developing member country
DRR	disaster risk reduction
ENSO	El Niño–Southern Oscillation
FSM	Federated States of Micronesia
IMF	International Monetary Fund
PNG	Papua New Guinea
PRC	People's Republic of China
RMI	Republic of the Marshall Islands
SOE	state-owned enterprise
VDS	vessel day scheme
y-o-y	year-on-year

Asian Development Bank projections

GDP growth



Inflation



FSM = Federated States of Micronesia, GDP = gross domestic product, p = projection, RMI = Republic of the Marshall Islands.
Notes: Projections are as of December 2017 and refer to fiscal years. Regional averages of GDP growth and inflation are computed using weights derived from levels of gross national income in current US dollars following the World Bank Atlas method. Averages for Pacific islands exclude Papua New Guinea and Timor-Leste. Timor-Leste's GDP is exclusive of the offshore petroleum industry.
Source: ADB estimates.

Notes

This *Monitor* uses year-on-year (y-o-y) percentage changes to reduce the impact of seasonality, and 3-month moving averages (m.a.) to reduce the impact of volatility in monthly data.

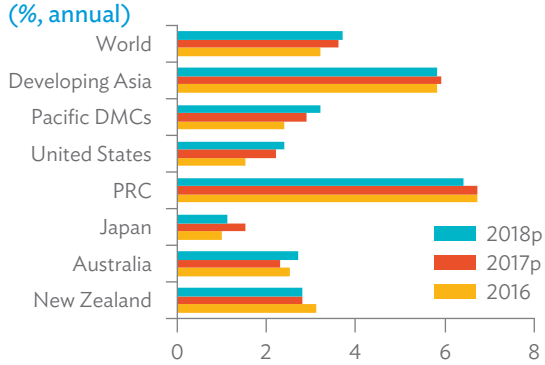
Fiscal years end on 30 June for the Cook Islands, Nauru, Samoa, and Tonga; 31 July for Fiji (starting 2017); 30 September in the Republic of the Marshall Islands, the Federated States of Micronesia, and Palau; and 31 December elsewhere.

International and regional developments

Medium-term risks cloud better-than-expected short-term gains

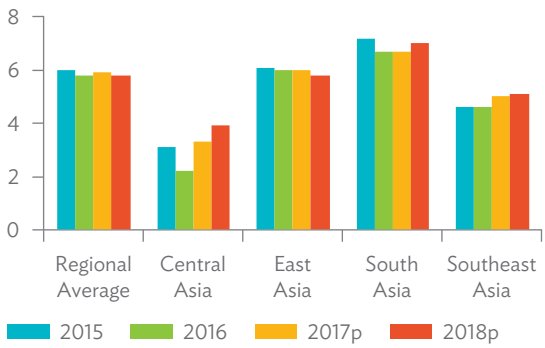
- Stronger growth in many advanced economies as well as in developing economies led to better-than-expected momentum in the first half of 2017. World output is now projected to rise to 3.6% in 2017 and 3.7% in 2018, both higher by 0.1 percentage points relative to July figures. Yet recovery remains weak in many countries and medium-term risks to growth, such as tighter monetary policy, inward-looking policies, and persistently low inflation in advanced economies, among others, continue to cast a shadow over the global economy.
- The outlook for Developing Asia is more optimistic, with growth stabilizing instead of moderating. A rebound in global trade and strong domestic investment is benefiting regional growth, with stronger-than-expected expansions in the People's Republic of China (PRC) and Japan. The region is now expected to grow by 5.9% in 2017, higher than the previous projection of 5.7%, and maintain its momentum by growing at 5.8% in 2018, up by 0.1 percentage points from the July figure.
- The short-term forecast for the Pacific subregion remains the same, primarily due to the retained growth outlook for Papua New Guinea, the subregion's largest economy. Prospects for the smaller Pacific economies are mixed. Growth estimates have been adjusted downward for most of the North Pacific and small island economies, but upgraded for the South Pacific. The subregional growth outlook for 2017 remains at 2.9% although the 2018 projection is adjusted slightly downward to 3.2%.
- The United States (US) economy exceeded expectations as it posted an annual growth rate of 3.0% for the third quarter of 2017. The impact of recent major hurricanes that caused massive damage in two states clouded prospects, yet sustained consumer and business spending fueled economic growth to exceed the initial forecast of 2.5%. A further decline in unemployment to 4.1% in October 2017 supported a 2.4% expansion of consumer spending in the third quarter, although spending growth decelerated reflecting disaster impacts. Economic activity is expected to gain more momentum as the country pursues reconstruction activities during the fourth quarter.
- The PRC economy continued to grow, buoyed by expansionary fiscal policy and favorable external demand. The economy defied expectations of a marked slowdown as sustained infrastructure spending and stronger corporate earnings supported third-quarter growth of 6.8% in 2017. With latest figures indicating better performance, growth forecasts are adjusted upward to 6.7% for 2017 and 6.4% in 2018, both higher by 0.2 percentage points from July figures. However, the expansion of domestic debt remains a concern for the economy. Although reforms are being implemented to address the massive buildup of credit, their success will heavily depend on the careful balancing of state and market forces.
- The Japanese economy continued to surpass expectations, registering a seasonally adjusted annualized rate of growth of 4.0% in the second quarter of 2017. The latest figure is the fastest in over 2 years and extends the longest uninterrupted period of growth in 11 years. Although fiscal stimulus, on top of the rise in infrastructure spending for the 2020 Tokyo Olympics, supported the expansion, a huge part of it was driven by robust domestic consumption and a sustained rise in business investment. Despite a decline in Japanese exports for the first time in 4 quarters and a chronic labor shortage, short-term prospects remain bright and growth forecasts for Japan have been upgraded by 0.5 percentage points to 1.5% in 2017 and by 0.2 percentage points to 1.1% in 2018.
- Australia's economy picked up steam in the second quarter of 2017, pushing growth to 1.8% (y-o-y) amid strong consumer and government spending.

GDP Growth (%, annual)



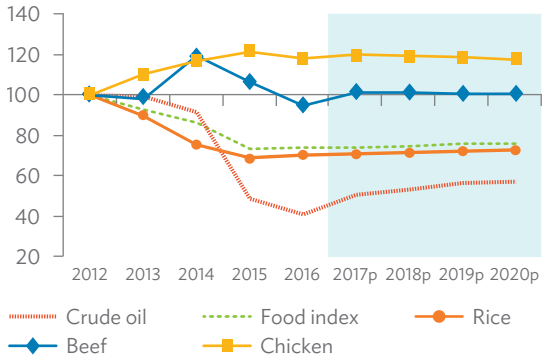
DMC = developing member country, GDP = gross domestic product, p = projection, PRC = People's Republic of China.
Notes: Developing Asia and Pacific DMCs as defined by ADB. Figures are based on ADB estimates except for world GDP growth.
Sources: ADB. 2017. *Asian Development Outlook 2017 Update.* Manila; International Monetary Fund. 2017. *World Economic Outlook October 2017: Seeking Sustainable Growth: Short-Term Recovery, Long-Term Challenges.* Washington.

GDP Growth in Developing Asia (%, annual)



GDP = gross domestic product, p = projection.
Source: ADB. 2017. *Asian Development Outlook 2017 Update.* Manila.

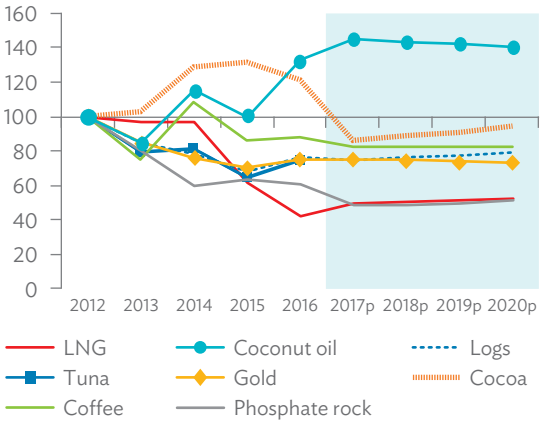
Prices of Import Commodities (2012 = 100, annual)



p = projection.
Source: ADB calculations using data from World Bank Commodity Price Data (Pink Sheets).

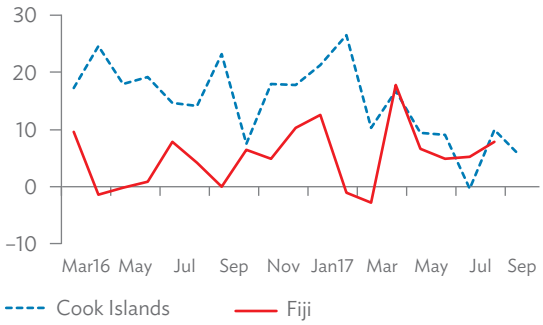
International and regional developments

Prices of Export Commodities (2012 = 100, annual)



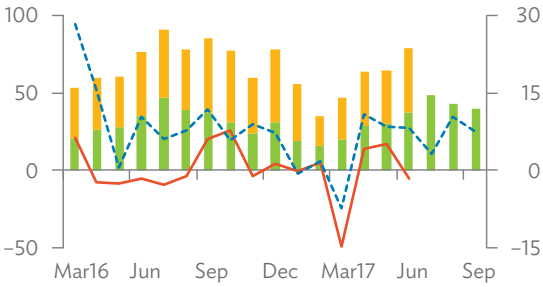
LNG = liquified natural gas, p = projection.
Source: ADB calculations using data from World Bank Commodity Price Data (Pink Sheets) and FAO GIEWS FPMA Tool.

Visitor Arrivals in the Cook Islands and Fiji (y-o-y % change, monthly)



Sources: Cook Islands Ministry of Finance and Economic Management and Fiji Bureau of Statistics.

Tourist Departures to Pacific Destinations (monthly)



lhs = left-hand scale, rhs = right-hand scale, y-o-y = year-on-year.
Sources: Australian Bureau of Statistics and Statistics New Zealand.

Lead authors: Noel Del Castillo and Rommel Rabanal.

Public investment alone, which includes expenditure on roads, railways, and a new hospital, added 0.8 percentage points to growth while private consumption contributed 0.4 percentage points. However, economic growth is expected to decelerate to 2.3% growth in 2017 from 2.5% last year because of continued weakness in the labor and real estate markets, but is projected to accelerate to 2.7% in 2018.

- Growth in consumption and manufacturing fueled New Zealand's faster expansion in the second quarter of 2017. Manufacturing increased by 1.8% on food and beverage processing, but construction and primary industry production both fell. Consumer confidence sustained a positive outlook, and strong domestic demand, accommodative monetary and fiscal policy, and high flow of net migration are expected to support forecast growth of 2.8% in 2017 and 2018.

Commodity price trends still offer mixed prospects for Pacific exports

- Price trends for both industrial and agricultural commodities are unchanged, with agriculture prices remaining stable and energy prices rising in the third quarter of 2017. Adequate supply of agricultural commodities has kept global food prices weak. The agricultural price index remained stable with a decline in maize and rice prices being offset by a moderate increase in soybean and coffee prices. The agricultural price index is expected to pick up slightly in 2018. Potential risks to the forecast are limited because global weather disruptions are not expected to occur during the current season while farmer subsidies were isolated and did not affect global prices.
- Key Pacific exports continue to face mixed price prospects. Liquefied natural gas (LNG) prices rose by 24.7% in the third quarter of 2017 (y-o-y). The PRC government's policy of switching from coal to gas to reduce emissions is raising demand while planned maintenance and delayed start-up at LNG facilities in Australia has tightened supply. Revised short- to medium-term projections indicate an upward adjustment in LNG prices. Meanwhile, forecasts for phosphate prices have been slightly lowered as markets remain oversupplied, with new capacity in Morocco and Saudi Arabia forthcoming. The price of coffee is still expected to be stable in the next few years while the price of cocoa is projected to decline this year but then to recover and steadily increase thereafter. However, weaker jewelry demand and expectations of higher US interest rates may lead to a decline in the price of gold over the next few years.

Tourism to the Pacific firming up

- Visitor arrivals in the Cook Islands and Fiji—the two largest South Pacific tourist destinations—have recorded strong growth so far in 2017. In Fiji, arrivals increased by 6.5% to over 545,000 in the first 8 months of the year (y-o-y). Although tourist numbers from the main market of Australia rose only modestly, total arrivals have been buoyed by double-digit growth in tourism from New Zealand and North America. Tourism in the Cook Islands has performed even better. Total visitor arrivals rose by 10.2% (y-o-y), reaching almost 119,00 over the first 3 quarters of 2017. Arrivals from North America likewise recorded rapid growth, supplementing the sustained robust performance of the Australia and New Zealand markets.
- Available data also show encouraging signs for most of the smaller South Pacific destinations. Samoa and Vanuatu each saw solid growth from their respective main markets. Tourist departures from New Zealand to Samoa increased by 7.8% over the first 3 quarters of 2017, further building on gains from last year. Similarly, departures from Australia to Vanuatu rose by 17.4% over the first half of 2017. The resumption of regular Qantas flights to Port Vila in June is expected to further this trend through the second half of the year. Departures from both Australia and New Zealand to Tonga, however, appear to be retreating from the highs achieved in recent years.

The Pacific is among those parts of the world most vulnerable to weather-related disasters. To illustrate, 5 of the top 15 countries with the highest risk, and 10 of the top 30 facing the largest potential economic losses from disasters, are in the subregion. With climate change bringing additional risks from global sea level rise—and potentially heightening vulnerability to more intense, frequent, and prolonged extreme weather events—Pacific economies are stepping up adaptation efforts to brace for future adverse impacts.

These include climate-proofing vital infrastructure assets, strengthening disaster risk management, and expanding social safety nets to build resilience to disasters. Further, a number of Pacific economies are promoting green urban development to move toward more sustainable green cities. Careful monitoring and planning will also be required to manage important income flows, including fishing license fees and tourism-related revenues, amid climate-related volatilities and to maintain adequate fiscal buffers for disaster response.

Fiji and its vulnerability to climate change: Threats and steps forward

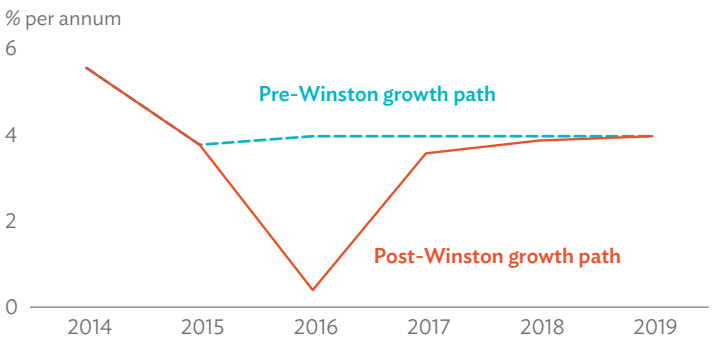
Lead author: Shiu Raj Singh.

Fiji represents the highly vulnerable Pacific island economies whose contribution to climate change, in terms of emissions of greenhouse gases, is negligible, but who are among the most vulnerable to natural hazards, which are being exacerbated by climate change. Climate change is expected to bring about an increase in the frequency and intensity of extreme events such as flooding, droughts, and cyclones as well as pose threats to marine and terrestrial ecosystems.

VULNERABILITY TO CLIMATE CHANGE

Fiji's vulnerability to natural hazards and climate change was evident in February 2016 when Cyclone Winston struck the country, killing 44 people and damaging or destroying over 30,000 houses, 495 schools, and 88 medical facilities. This was the most intense cyclone ever to make landfall in the southern hemisphere and the government estimated the damage to be the equivalent of about one-third of Fiji's gross domestic product (GDP). Post-Winston growth was 0.4% of GDP in 2016, compared with a pre-Winston forecast of 4.0% (Figure 1).

Figure 1: Impact of Cyclone Winston on Fiji's GDP growth



GDP = gross domestic product.
Sources: Fiji Bureau of Statistics and ADB estimates.

Recognizing the relevance of climate change for small island economies, the Fijian representative was selected to preside over the 23rd annual meeting of the Conference of the Parties (COP23) to the United Nations Framework Convention on Climate Change (UNFCCC), which took place in Bonn, Germany from 13 to 14 November 2017. A climate vulnerability assessment launched at COP23 estimates that by 2050, Fiji's annual losses due to extreme weather events could reach the equivalent of 6.5% of GDP because of the impact of climate change. According to the World Bank and the Global Facility for Disaster Reduction and Recovery, an estimated F$9.3 billion ($4.5 billion) over 10 years—almost equivalent to the country's GDP in 2017—is needed to ensure the resiliency and adaptability of the country to climate change.

The assessment provides new analysis of Fiji's vulnerability to climate change, outlining the potential impact on its economy, livelihood and poverty levels, health and food security, and key industries including agriculture and tourism, as well as the impact of sea level rise on coastal areas and low-lying islands. Key projections from the assessment include the following:

- an increase in the number of Fijians being pushed into poverty and hardship from 25,700 people per year in 2017 to an estimated 32,400 people per year by 2050;
- a significant increase in the cost of climate-change-related disasters, with projections of asset losses from floods and cyclones costing up to 30% more (in real terms) by 2050 than current averages; and
- sea level rise and increased intensity of coastal storms, with most models projecting an increase in global sea levels of 17–38 centimeters relative to current levels by 2065. About 30% of Fiji's population currently lives in risk-prone areas.

The report recommends measures to mitigate risks and adapt, which include building resilient towns and cities, improving infrastructure services, supporting climate-smart agriculture and fisheries, conserving ecosystems, and building socioeconomic resilience.

RECENT MEASURES TO MITIGATE IMPACT OF CLIMATE CHANGE

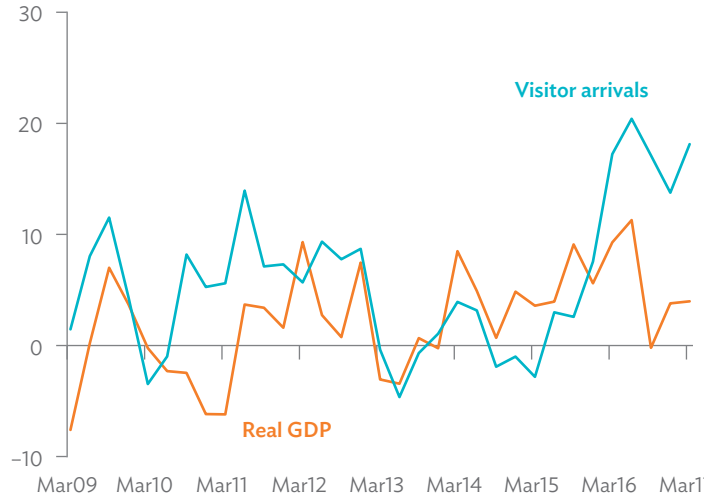
The government, following technical advice from the Fiji Institute of Engineers, amended the national building code to raise the minimum requirement to Category 4 resilience from the previous Category 2. This applies to any new construction, particularly reconstructed assets, to minimize future damage and instill the concept of "building back better." Measures to climate-proof public infrastructure investments include intricate drainage systems to prevent flooding and surface-tear and traction loss of roads, and underground trenching of a telecommunication cable ring around Viti Levu, the biggest and most populated island.

The government is also moving to flood-proof infrastructure, starting with Nadi, location of the country's main airport. To improve watershed management, the government has recently announced that it will establish a dedicated ministry of waterways. Fiji is also relocating communities at risk to inundation due to sea level rise. The government has relocated a coastal community, Vunidogoloa, and there are plans to relocate 42 more communities in the near future.

ADB recognizes Fiji's vulnerability and supported Fiji in the immediate aftermath of Cyclone Winston in 2016 with a $2 million grant for relief efforts, followed by a $50 million loan to assist with the reconstruction efforts. ADB has also provided $1 million to help Fiji prepare for its COP23 presidency.

ADB is working with the World Bank Group to assist Fiji to develop an income protection and disaster insurance scheme that can cover vulnerable households in Fiji. This will not only provide an important safety net to households in Fiji, but will also contribute to fiscal resilience by reducing the demands on the national government in the aftermath of national disasters.

Figure 2: Cook Islands: Trends in Major Indicators
(y-o-y % change, quarterly)



GDP = gross domestic product, y-o-y = year-on-year.
Source: Cook Islands Ministry of Finance and Economic Management.

Climate change adaptation efforts in the South Pacific

Lead authors: Shiu Raj Singh and Laisiasa Tora.

Many Pacific economies are vulnerable to the impacts of climate change. Their geographical location and topographical characteristics leave their populations particularly exposed to rising sea levels, and economic growth can be seriously affected by damage and loss brought about by more frequent and intense disaster events. Pacific governments are formulating plans and, with the help of development partners, exploring approaches to finance the interventions necessary to address disaster- and climate-change-related risk.

COOK ISLANDS

The Cook Islands is exposed to a broad range of natural hazards, including tropical cyclones (accompanied by high winds and storm surges), tsunamis, floods, and droughts. The particularly high cyclone risk was highlighted in 2005, when five cyclones hit over a period of 2 months. In 1997, Rarotonga was extensively damaged by Cyclone Martin, which destroyed about 90% of houses and killed 19 people on Manihiki atoll. Cyclone Pat, the most recent major cyclone, hit in 2010, damaging 78% of houses in Aitutaki, devastating crops, and disrupting tourism (Figure 2).

In its efforts to mitigate the impact of such disasters, the Government of the Cook Islands maintains a disaster risk fund. In addition, it has recently integrated disaster resilience into infrastructure planning, undertaken advance preparation of the private sector for postdisaster recovery activities, prepared local disaster plans, and improved public-sector coordination on disaster risk management.

The disaster response trust fund provides initial funding for rehabilitation and reconstruction following a disaster. In addition, the government has access to catastrophic risk insurance through its participation in the Pacific Catastrophe Risk Assessment and Finance Initiative, and the Cook Islands can also seek financial support from ADB through a $10 million policy-based loan that can be utilized if a state of emergency is declared in the country. If a disaster strikes, this loan will provide rapid access to a pool of resources, enabling the government to initiate recovery and reconstruction efforts with minimal delay, thereby helping to mitigate a disaster's immediate socioeconomic impact. The program supports implementation of the government's National Sustainable Development Plan through policy strengthening and institutional arrangements for disaster risk management, building resilient infrastructure, and expanding disaster risk financing.

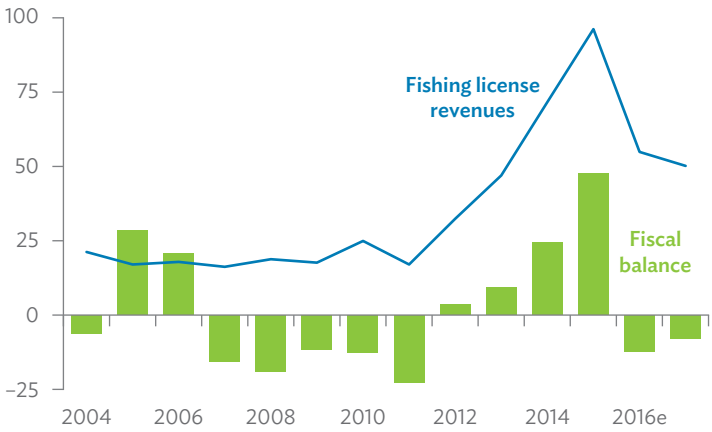
KIRIBATI

Kiribati is one of the smallest, remotest, and most geographically dispersed countries in the world. It comprises 33 atolls and islands, which have a total land area of less than 800 square kilometers (km^2) and are spread across 3.5 million km^2 of ocean—an area larger than India. About 50,000 people live on South Tarawa, which has a total land area of only 16 km^2, while the islet of Betio is as densely populated as Manila or Jakarta. Kiribati's low-lying atolls rise an average of only 1.8 meters above sea level, and as such, are exposed to the adverse impacts of climate change. According to a recent survey of experts, if the sea level continues to rise at its current rate, Kiribati will disappear by 2100.

This extreme remoteness, geographic dispersion, and vulnerability to the effects of climate change pose significant challenges to fiscal sustainability and service delivery. In recent years, record-high fishing license revenues have boosted growth, increased the current account surplus, and enabled the government to add to Kiribati's sovereign wealth fund, the Revenue Equalization Reserve Fund. However, unfavorable weather conditions caused these revenues to decline by more than 40% to A$116 million (equivalent to 55%

of GDP) in 2016 (Figure 3). It reversed the country's fiscal surplus, which had been the equivalent of 47.7% of GDP in 2015, into a fiscal deficit of 12.4% of GDP in 2016. Although the International Monetary Fund (IMF) anticipates growth to pick up in 2017, fiscal deficits are still projected in the near term as fishing license revenues continue to decline. In addition, the cost of rehabilitation after an extreme weather event is estimated to be large relative to the size of the economy, even if the probability of a weather disturbance occurring in Kiribati is low. Public expenditure for post-Cyclone Pam reconstruction in 2015, for example, was equivalent to around 4.0% of GDP. IMF analysis suggests that growth is likely to be 0.1% lower than the historical average of 1.8% over the long run due to climate change. The long-term threat of climate change, together with weak growth prospects, also places Kiribati at high risk of debt distress. Building fiscal buffers to enhance resilience, and continued support from development partners, are essential to mitigate this risk.

Figure 3: Kiribati: Fiscal Impact of Fishing License Revenues
(% of GDP)



e = estimate, GDP = gross domestic product.
Sources: Kiribati National Statistics Office; Kiribati national fishing license revenue reports (various years); Kiribati national budget documents (various years).

The government's approach to addressing priority environmental issues, particularly the impacts of climate change, and climate change adaption is contained in two key policy documents: (i) the Kiribati Integrated Environment Policy, which will also facilitate "on the ground" implementation of the environmental key policy area of the Kiribati Development Plan 2016–2019; and (ii) the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management 2014–2023, which seeks to integrate climate change and disaster risk sensitivities and impacts across sectors, identify measures to reduce vulnerabilities, and coordinate priorities for action. To help fund the mitigation of climate change impacts, the government could consider (i) allocating for climate change adaption costs in each year's national budget; (ii) monitoring spending on climate change adaptation to help ensure adequate provision of resources; and (iii) promoting an operations and maintenance culture in the public service by ensuring adequate funding and full utilization of annual allocations, among others, to improve the resilience of public assets.

SAMOA

Samoa experiences a wide range of natural hazards, including tropical cyclones, floods, earthquakes, tsunamis, and droughts. In 2009, Samoa was struck by a tsunami that killed 143 people and injured 310. Over 12,000 people were affected by waves that wiped out large stretches of the south and southeast coasts of the main island of Upolu. The country's vulnerability to cyclones was demonstrated in 2012, when Cyclone Evan destroyed over 600 homes, killed 14 people, and displaced more than 7,500. The IMF estimated the resulting economic damages and production losses at over $210 million, equivalent to about 30% of the country's GDP. Volcanic eruptions also remain a possibility, with the second-largest island of Savai'i hosting a volcano that has been dormant for over 100 years.

Mindful of the serious socioeconomic impact of recent disasters, the Government of Samoa has taken important steps to improve the country's disaster resilience, with climate change and disaster risk management objectives generally well-defined within government policies and plans. The government has undertaken a vulnerability assessment of its road network and developed an integrated asset management strategy to ensure that assets are built to withstand extreme climate events. The intention is also to enhance local capacity to construct more climate-resilient roads. Two road projects are currently under way to restore and enhance the resilience of key road assets damaged by extreme weather events.

At the subnational level, community integrated management plans are being prepared for all 41 districts. These provide a framework to support coastal communities' efforts to become more resilient to climate change and variability. The approved plans will serve as a practical, community-based response and, when combined, result in a "whole of country" adaptation response for coastal management. Implementation of the plans will involve site-specific interventions and active community engagement. At the national level, the government intends to integrate climate change adaptation, disaster risk management, and reduction of climate vulnerability into its national development plans and policies.

An integrated flood management project was approved by the Green Climate Fund in December 2016 to enhance resilience in the catchment area of the Vaisigano River, which flows through the capital Apia. This area is home to Samoa's highest concentration of public infrastructure, including schools, hospitals, and government buildings; as well as private homes and businesses. The project aims to reduce exposure to extreme weather events of vulnerable communities and infrastructure in the Vaisigano River catchment area. Specifically, it will aid the government to pursue an integrated approach to reducing vulnerability to flood-related risks, flood-proof key infrastructure in the Vaisigano River catchment, and upgrade downstream areas to increase river capacity and allow for the more rapid outflow of floodwaters.

Samoa is also participating in the Pacific Disaster Resilience Program. The program provides participating countries with a source of financing for response, early recovery, and reconstruction activities for disaster events caused by all types of natural hazards.

TONGA

Based on its exposure and susceptibility to natural hazards, and coping and adaptive capacities, Tonga is ranked by the *2016 World Risk Report* as second-highest among countries most at risk of disasters. (Of these, Vanuatu ranks the highest, and three other ADB developing member countries are included in the top 15.)

Tonga is already experiencing the effects of climate change, as increasing variability in rainfall patterns is causing more severe flooding and droughts, rising ocean temperatures have led to coral bleaching and destroyed natural coastal barriers, and sea level rise is contributing to coastal erosion. These changes have increased the country's exposure to disasters caused by climatic events, such as tropical cyclones and storm surges, which have inflicted significant economic losses (Table 1). Tonga is also highly vulnerable to earthquakes and tsunamis because of its location and geology.

Table 1: Major Cyclones in Tonga, 2002–2014

		Estimated losses	
Year	Name	$ million	% of GDP
2002	Waka	60.0	33.6
2010	Rene	22.0	6.0
2014	Ian	55.3	12.5

Sources: Government of Tonga. 2002. *Natural Disaster Management Report*. Nuku'alofa; Government of Tonga. 2010. *Initial Damage Assessment Report*. Nuku'alofa; Government of Tonga. 2010. *Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management, 2010–2015*. Nuku'alofa; and ADB estimates.

Recognizing the severe threat posed by climate change, the government has taken important steps to improve disaster resilience. Tonga's climate change policy promotes direct responses to climate change and disaster risk reduction between 2016 and 2020, with a view toward building a resilient Tonga by 2035. This, and the associated revised joint national action plan, provide context and a guiding framework. The policy has the following overarching objectives:

(i) mainstreaming a resilient Tonga into government legislation, policies, and planning at all levels;
(ii) developing a coordinated multisector approach to research for building a resilient Tonga;
(iii) developing the capability for resilience-building responses throughout the government, private sector, and civil society;
(iv) implementing actions that will achieve a resilient Tonga by 2035 at national, island, and community levels;
(v) securing and mobilizing the required finances and resources to build a resilient Tonga by 2035; and
(vi) developing and maintaining strong regional and international partnerships.

Tonga is also implementing a strategic climate resilience program with ADB support. This aims to develop local capacity for climate resilience, including legal and regulatory reforms; improve data monitoring and facilitate early warning; and support ecosystem resilience and climate-resilient infrastructure.

The program also established a climate change trust fund to sustainably support community-based climate-responsive investments. The fund was launched in February 2017 and 213 applications had been reviewed as of the end of September 2017. Of these, 33 projects—comprising rainwater harvesting, retaining wall reinforcement, and evacuation center climate-proofing, among others—have been selected.

TUVALU

Tuvalu comprises eight low-lying atolls with a total land area of 26 km^2. More than half the population of 10,800 (2013) resides on the main island of Funafuti, which has an area of only 2.8 km^2. The economy is narrowly based, with high dependence on imports and external sources of income, and is extremely vulnerable to the effects of climate change, including rising temperatures and sea levels and more intense cyclones. In 2015, Cyclone Pam affected around 40% of the population and caused significant losses and damages estimated by the World Bank at $10.3 million (equivalent to 26.9% of Tuvalu's GDP). The costs of reconstruction and long-term resilience are likely to be five times that amount. Given the country's vulnerability, mitigating the impact of and adapting to climate change has been identified as a key priority for successive governments.

Although the macroeconomic outlook is stable—the economy is expected to grow into the medium term on the back of several large infrastructure projects and high public expenditure—there are several downside risks, including the effects of climate change and decline in fishing license revenues. By the end of August 2017, actual receipts from fishing license fees had reached 84% of the 2017 budgeted amount of A$24.9 million, and were equivalent to 51.8% of GDP. At this rate, receipts are projected to exceed the budget projection by as much as 18%. However, it must be noted that tuna is a migratory species, and the fish population in Tuvalu's exclusive economic zone could decline sharply in response to changes in weather conditions.

To help mitigate these risks, the Government of Tuvalu adopted Te Kakeega III (National Strategy for Sustainable Development 2016–2020) in November 2015, which aligns with the UN Sustainable Development Agenda and focuses on 12 strategic areas including climate change. In June 2016, the Green Climate Fund approved a $38.8 million coastal protection project. The project, which would benefit around 29% of the population, will help Tuvalu reduce the impact of increasingly intensive wave action on key infrastructure due to climate-change-induced sea-level rise and intensifying extreme events. Finally, like Samoa and Tonga, Tuvalu is a participant in the Pacific Disaster Resilience Program, providing both contingent financing and capacity building for disaster risk management.

Dealing with climate-induced volatility: The case of Palau's tourism

Lead author: Prince Cruz.

Palau, a small island nation in the North Pacific with a population of about 20,000, is described in its tourist literature as a pristine paradise. Tourism is extremely important to the economy; between 2011 and 2016, the number of visitors to the islands averaged 130,000 annually—one of the highest ratios of tourists per capita in the world.

TRENDS IN VISITOR ARRIVALS AND TOURISM REVENUES

In recent years, tourism has accounted for around 45% to 50% of GDP. Tourism-related industries (such as hotels and restaurants, wholesale and retail trade, transportation, and entertainment) employ around a third of Palau's workforce (the government employs another third). Tourism, however, can be volatile. In fiscal years (FY) 2000 to 2016, visitor arrivals grew in 8 years and contracted in 8. Expansions were as high as 40.2% in 2004 and 34.3% in 2015, while contractions were as sharp as 11.9% in 2009 and, more recently, 13.1% in 2016 (Figure 4). The contraction in arrivals in 2016 was partly due to El Niño, highlighting the volatility induced by climate-related events.

The rapid increase in arrivals in 2014 and 2015 was mainly due to the rise of chartered flights from the People's Republic of China (PRC) (operating from Hong Kong, China; and Macau, China). In FY2015, around 45% of visitors were from the PRC, up from just 4% in 2013 and less than 1% in 2008. However, in recent years the focus of the government's tourism campaign has been more on high-end tourism and since April 2015 the number of charter flights from the PRC has been restricted to 32 per month. At the end of 2015, one of the main charter flight operators in Hong Kong, China undertook aircraft maintenance, leading to further decline in arrivals.

In preparation for the onset of El Niño in the summer of 2016, a state of emergency was declared in March. The intense heat and lack of rain led to a drop in the water level in the famed Jellyfish Lake, one of Palau's major tourist attractions. The number of jellyfish dropped from millions to an estimated 300,000, leading to closure of the lake (Raines 2016). Drought conditions also led to water rationing as Palau's main source of freshwater dried up.

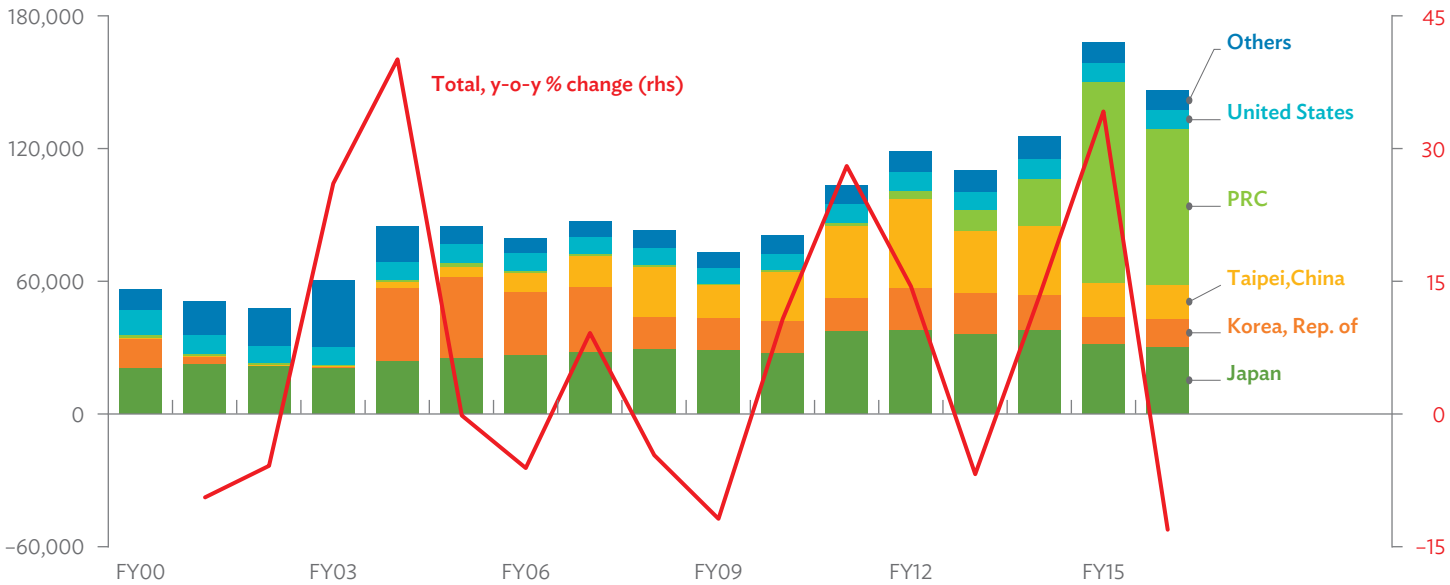
A similar drop in the jellyfish population due to drought was seen in 1999. It took around 18 months before the jellyfish population recovered. With climate change and other factors affecting the environment, it is unclear when the jellyfish would be abundant enough for the lakes to be reopened. Available data for 2017 reveal a 9.1% drop in visitor arrivals from a year earlier.

Despite the fall in arrivals in FY2016, total revenues still rose by 10.2%, with tax revenues increasing by 7.1% and nontax revenues rising by 18.1% (grants also rose 13.3%). Compared with visitor arrivals, Palau's nongrant revenues are relatively less volatile (Figure 5). Even GDP growth is more stable compared with the change in visitor arrivals.

PROMOTING ENVIRONMENTALLY RESPONSIBLE TOURISM

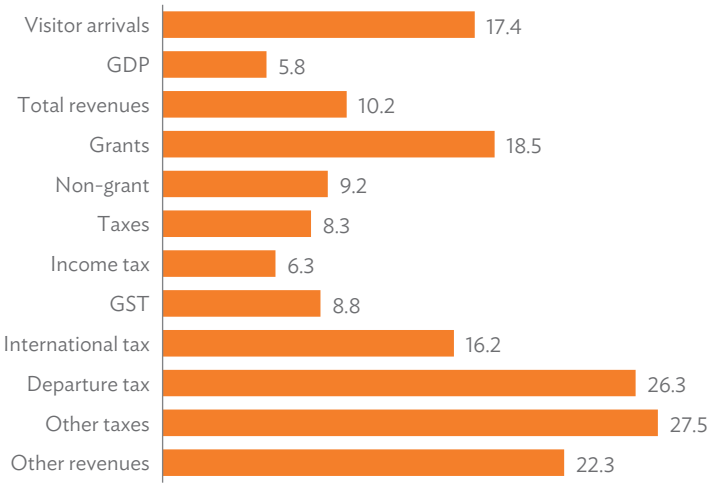
Through the years, Palau has implemented revenue-enhancing reforms to finance environmental and other cause-oriented programs. In November 2009, the government introduced a "green fee" to be used for financing local community conservation efforts. In October 2012, the green fee was raised in order to provide funds for improvement of water and sewerage systems and coastal conservation efforts.

Figure 4: Palau Visitor Arrivals (by origin)



PRC = People's Republic of China, rhs = right-hand scale, y-o-y = year-on-year.
Source: Pacific Islands Training Initiative. 2017. *Republic of Palau Economic Review Fiscal Year 2016*. Graduate School USA.

Figure 5: Volatility of Palau's GDP, Visitor Arrivals, and Revenues (FY2000–FY2016)



FY = fiscal year, GDP = gross domestic product, GST = goods and services tax.
Note: Volatility based on standard deviation of annual rate of change.
Other revenues include royalties from fishing vessel day scheme and sales of goods and services.
Source: Author's calculation using data from Pacific Islands Training Initiative. 2017. *Republic of Palau Economic Review Fiscal Year 2016.* Graduate School USA.

In 2014, the government passed a law converting 80% of its exclusive economic zone into a marine sanctuary where fishing and other commercial activities are prohibited. To finance the protection of the marine sanctuary and compensate affected fisher folks, the government announced the introduction of a $50 visa fee for noncitizens and replacement of the green fee ($30) and departure tax ($20) with a $100 environmental impact fee effective April 2017. The decline in visitor arrivals in 2016 prompted the government to delay the implementation of the environmental impact fee to April 2018. The proposed fee has been renamed the Pristine Paradise Environmental Fee. With the postponement, the allocation of the fee was also changed: $10 to the Fisheries Protection Trust Fund, $12.50 to be divided among the states, $25 for airport operation and maintenance, $30 for the green fee, and $22.50 for the National Treasury.

The creation of the marine sanctuary, to be fully implemented by 2021, means that the government is foregoing part of royalties from the fishing vessel day scheme. At $6.2 million in FY2015, the royalties declined to $5.5 million in FY2016 and are expected to fall further to around $4 million from 2021 onward.

Although Palau is in a better position fiscally and environmentally to deal with climate-induced volatility than other countries in the Pacific, there is much more to be done. Heavy reliance on grants, especially for capital expenditure, must be addressed. While revenues from tourism showed resilience, rising sea levels and stronger weather disturbances may make these revenues more variable in the future. A shift to a value-added tax system is seen to be more suited to a tourist-based economy, as it equally divides the tax base between tourists and residents (PITI 2017). Development of small- and medium-sized enterprises related to tourism may open the path for diversifying the economy and thereby enable local communities to benefit more from tourism.

Managing climate-related cycles in fishing license revenues in the North Pacific

Lead authors: Rommel Rabanal and Cara Tinio.

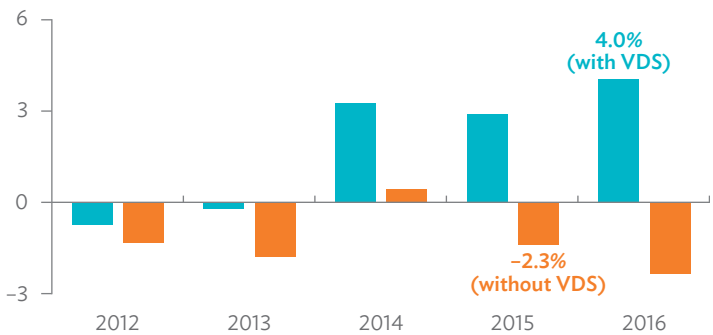
Since its full implementation in 2012, the Parties to the Nauru Agreement's vessel day scheme (VDS) for collecting license fees from foreign fishing fleets has been a game-changer for many small Pacific island economies. Higher fishing license revenues have boosted fiscal positions in these economies, which otherwise have very limited domestic resource bases. Although the outlook for fishing license revenues under the VDS is optimistic, actual revenues will be subject to weather-related fish migration patterns. Prioritizing the accumulation of fiscal buffers not only promotes public expenditure-smoothing across climate-related variations in resource availability, but also helps achieve longer-term fiscal sustainability.

FISHING LICENSE REVENUES: TRENDS AND OUTLOOK

In the Federated States of Micronesia (FSM), fishing license revenues have tripled from a pre-VDS average of $15.9 million per year (equivalent to about 6% of GDP) to $47.5 million annually (about 15% of GDP) in the period from FY2012 to FY2016 (fiscal years ended 30 September for both the FSM and the Republic of the Marshall Islands).

Fishing license revenues collected by the Government of the Marshall Island (RMI) followed a similar trend, increasing from less than $2 million a year (equivalent to about 1% of GDP) prior to implementation of the VDS to an average of more than $13 million (7% of GDP) over the period 2012 to 2016, with a record $26.3 million collected in FY2016. Together with higher collections of other revenues, the RMI's fishing license revenues have helped offset the general decline in grants, particularly those related to its Compact of Free Association with the United States. As a result, the RMI improved its budget performance, especially in recent years; had fishing license revenues remained at pre-VDS levels, fiscal outcomes would have been more volatile, with larger budget deficits (Figure 6).

Figure 6: Republic of the Marshall Islands: Fiscal Balances
(% of GDP)



GDP = gross domestic product, VDS = vessel day scheme.
Sources: Republic of the Marshall Islands Fiscal Year 2016 Statistical Appendices and ADB estimates.

The implementation of the VDS, coupled with continued demand for access to Pacific waters, is seen to keep fishing license revenues elevated in the medium term. During this period, fishing license revenues are forecast to plateau at about $62.5 million (just under the FY2016 level) per year in the FSM. The outlook for the RMI is somewhat less clear, with the government expecting volatility at least in the near term.

However, annual collections will be subject to transitory factors. Foremost among these are the seasonal variations brought about by the El Niño–Southern Oscillation (ENSO) climate pattern in the tropical Pacific Ocean. Fluctuations in winds and sea surface temperatures between the warming El Niño phase and the cooling phase of La Niña affect migratory patterns of the various Pacific tuna species that are the primary targets of distant water fishing fleets. During El Niño periods, warmer temperatures in the eastern Pacific attract tuna stocks toward countries such as Kiribati. Conversely, La Niña periods are associated with increased tuna activity in the west Pacific, which benefits the FSM and, to a lesser extent, the RMI.

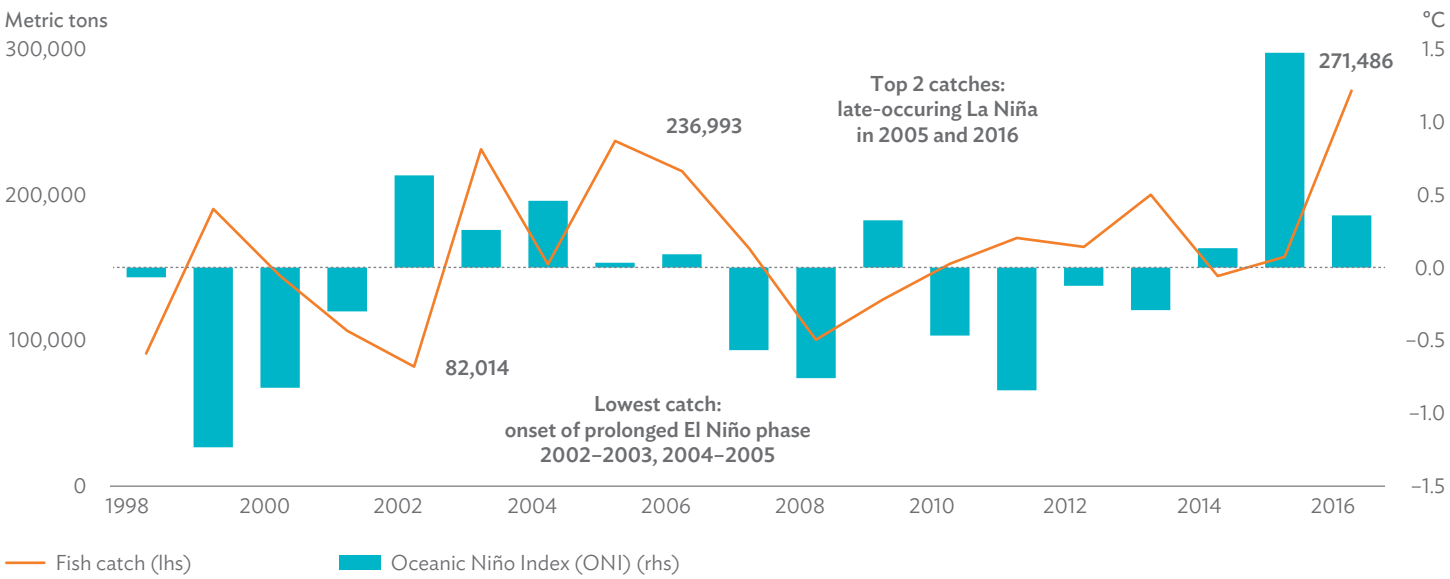
Data on fish catch in the FSM's exclusive economic zone illustrate the effect of the ENSO climate pattern (Figure 7). The 2 years with the lowest catches, 1998 and 2002, were years in which the El Niño effect was at its strongest. In particular, 2002 saw the beginning of a period of 41 consecutive months—17 of which were considered as warm El Niño months—without a cooling La Niña phase. By contrast, the top 2 catch years on record appear to have been buoyed by cooler La Niña waters during the latter months of 2005 and 2016. Historically, year-by-year fish catch has been subject to considerable variation, with historical highs of over 230,000 metric tons and lows below 100,000 metric tons.

SMOOTHING THE WAY FORWARD

Given that future fisheries activity—and, by extension, potential collections of fishing license fees—will be subject to similar ENSO-driven variations, it will be ideal to distribute resource availability more evenly across years. For example, higher revenues earned during peak La Niña seasons can be stored in trust funds in preparation for future periods of severe El Niño. This, in turn, will help smooth annual government expenditure, which is particularly important in the context of the Pacific, where the public sector accounts for a relatively large proportion of economic activity. On average, this share is equivalent to 41.7% of GDP in the RMI, and 35.0% in the FSM.

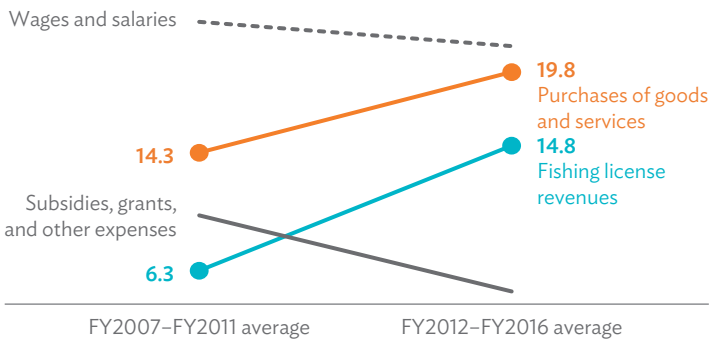
In contrast to the RMI's improving fiscal outcomes during the VDS era, there has been a gradual erosion in the budget surpluses realized by the FSM in recent years. From a peak equivalent to 11.4% of GDP in FY2014, the surplus declined to 10.4% and 7.3% in the next 2 years, even while fishing license revenues reached record highs of over $60 million in each year. This appears to be at least partly attributable to a marked increase in recurrent spending on government purchases of goods and services that has coincided with the structural rise in fishing license revenues (Figure 8). The bulk of recent years' increased expenditure is on professional and contractual services, which suggests ballooning government personnel costs on consultants and contractors despite the regular wage bill appearing to remain under control.

Figure 7: Fluctuations in Total Fish Catch in the Federated States of Micronesia and the El Niño–La Niña cycle



°C = degrees centigrade, lhs = left-hand scale, rhs = right-hand scale.
Note: The Oceanic Niño Index is based on average sea surface temperature in an area of the east-central equatorial Pacific, with anomalies beyond a threshold of +/– 0.5°C (on a 3-month running average basis) classified as warm/cold periods. Warmer (higher) temperatures associated with El Niño, cooler (lower) temperatures with La Niña.
Sources: Federated States of Micronesia Fiscal Year 2016 Statistical Appendices and United States National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center.

Figure 8: Federated States of Micronesia: Fishing license revenues and components of recurrent government expenditure (% of GDP)



FY = fiscal year, GDP = gross domestic product.
Sources: Federated States of Micronesia Fiscal Year 2016 Statistical Appendices and ADB estimates.

A similar examination of the RMI's public spending patterns indicate that the increased revenue collections also supported nominally higher recurrent spending, which increased from an average of $81 million in FY2007–FY2011 to an average of $95 million in FY2012–FY2016. Spending on the public wage bill, as well as goods and services (of which professional and contractual services also claimed a significant share), showed marked increases in FY2012 onward.

At the same time, the increase in fiscal resources afforded the Government of the Marshall Islands an opportunity to set aside funds in response to looming development challenges. It made deposits in its Compact Trust Fund toward ensuring long-term fiscal self-sufficiency, and transferred funds into the social security system to shore up depleted reserves. However, these allocations were sporadic, and the amounts small compared with subsidies to state-owned enterprises (SOEs) that were much higher and more regularly disbursed over the past 5 years.

Although structurally higher revenues could allow for some productive increases in public expenditure, long-term fiscal sustainability should remain the chief priority. This is a particularly pressing concern for the FSM and the RMI, whose compacts of free association with the US—and the related annual financial assistance—are scheduled to expire in 2023.

Tighter expenditure control will be critical to avoid unsustainable increases in nonessential government spending. Interventions such as SOE reforms would improve efficiency and thereby free up resources for other, more productive uses. These include investments in sustainability and climate-proofing of major infrastructure, and accumulating fiscal buffers to be drawn upon in times of need.

Prioritizing contributions into trust funds promotes public expenditure-smoothing across climate-related variations in resource availability, and helps achieve longer-term fiscal sustainability. Further, raising deposits will also gradually build up the trust fund's assets and future income, which should help ensure that an economy is adequately prepared for any future lean periods.

Financing urban development in Nauru

Lead author: Cara Tinio.

Although development literature often classifies Nauru as 100% urbanized, the central plateau known as "Topside"—which accounts for up to 80% of the country's 21 km^2 of land area—has been rendered uninhabitable due to decades of phosphate mining. Human settlement is limited to the remainder, which consists of a narrow coastal strip with limited water and sanitation infrastructure.

LIVING IN CLOSE QUARTERS

In particular, Nauru lacks an island-wide water distribution system and, like many other low-lying small island economies in the Pacific, has few sources of fresh water. Groundwater is scarce and generally not drinkable; it must be augmented with harvested rainwater, which is naturally subject to weather fluctuations, as well as costly deliveries from a desalination plant that mostly services the Regional Processing Centre. The Nauru Utilities Corporation, responsible for water production and distribution, has reverse osmosis facilities with a capacity of 2,300 kiloliters, but limitations on seawater intake keep output at about 56% of full capacity.

Sanitation in general is poorly coordinated, with a disconnect between the entities responsible for regulation and implementation. Solid waste collection and disposal services recently stopped in many parts of the island due to unclear delineation of responsibilities among the parties involved. Further, sewage treatment facilities are inadequate. Apart from not functioning correctly, their capacities are far below what is required for the entire population. The lack of a holistic approach to sanitation means that poorly treated raw sewage and wastewater are negatively impacting Nauru's groundwater systems, hampering what progress has been made in the water sector.

Moreover, land use planning is ad hoc, complicated by customary land ownership structures and lack of conflict resolution mechanisms. The recently established Ministry of Land Management lacks the capacity and a clear mandate to take the lead on urban development in the country, and the state-owned Nauru Rehabilitation Corporation, responsible for land rehabilitation and development, is incurring financial losses.

FUTURE-PROOFING URBAN DEVELOPMENT

Nauru's already-stretched resources are coming under further strain from continued population growth and increased economic activity. The population of roughly 11,000 has grown by an estimated annual average of 2.3% over the past decade, and increased by a further 10% when asylum seekers from the Regional Processing Centre were integrated into the local community.

Recognizing this, the Government of Nauru approved the Water and Sanitation Master Plan 2015–2035, which prescribes the public investments needed to meet water and sanitation requirements

into the future; and the National Solid Waste Management Strategy 2017–2026, complemented by a tentative action plan that, among others, seeks to formulate practicable and enforceable waste management regulations that would be enacted by 2019.

Recent reports indicate that some steps have been taken toward implementing the water and sanitation master plan, although these (e.g., repairs to some water storage tanks, a local brackish water supply scheme) seem to be quick fixes. The planned water distribution system under the master plan is constrained by lack of capacity and funds. The status of implementation of the solid waste management strategy is uncertain as the clarification of relevant entities' responsibilities remains pending.

Finally, to ease the density in existing coastal settlements, the Government of Nauru is seeking to rehabilitate the Topside area. Apart from working to address its operational issues, the Nauru Rehabilitation Corporation is developing a new plan that would begin with rehabilitating a quarter of the land. Significant public works will be required. In addition, land ownership will be an important consideration for many of these urban development interventions.

PUTTING PLANS INTO ACTION

Due to decades of underinvestment, Nauru now requires significant capital outlay to provide adequate water and sanitation services to its people, as well as to ensure that future needs for the same are met. Official development assistance is expected to remain the main source of support, given that earnings from phosphate exports are dwindling, and the Regional Processing Centre is expected to downscale or shut down in 2018. In this regard, development partners should promote interventions that consider local skills constraints as well as the costs associated with importing equipment and spare parts.

However, even with simpler technologies and systems, operations and maintenance should remain a priority. The Nauru Utilities Corporation charges tariffs for its power and water services, but recent financial analyses indicate that revenues are insufficient to cover operating costs. In this case, tariff increases would be necessary to ensure that operations are sustainable and assets properly handled over the longer term. It is recognized that this would impose additional costs on consumers, so local buy-in would need to be sought and the degree and pacing of increases carefully considered. This would also help decrease the Nauru Utilities Corporation's dependence on subsidies, and free up government resources that could then be channeled toward other, more productive uses.

On the institutional front, continued work is necessary to improve the management and performance of the entities tasked to plan, implement, and monitor urban development in the country. Nauru is expected to continue receiving assistance to rehabilitate and strengthen these, but this assistance should be provided with a view toward developing local capacity rather than simply ensuring that development partners' projects are completed.

Green urban development in Solomon Islands and Vanuatu

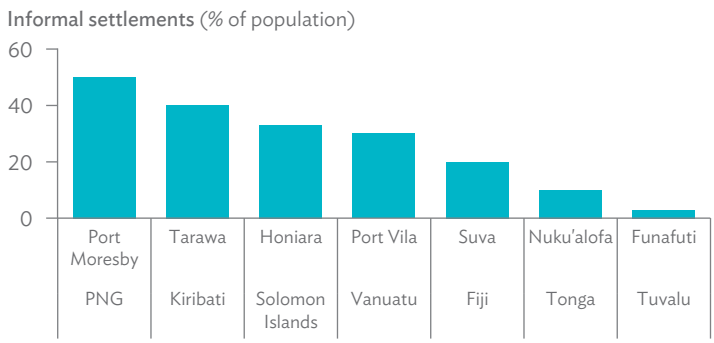
Lead author: Prince Cruz.

Around 80% of the output of countries in Asia and the Pacific are generated by cities. As people flock to cities in search of employment, education, and opportunities, rapid urbanization is associated with faster economic growth. In turn, cities typically become crowded and polluted with people living in informal settlements that lack access to water and sanitation. These settlements are vulnerable to impacts of severe weather events such as flooding, landslides, droughts, or heat waves. With proper planning and investments, these can be avoided through green urban development, wherein an integrated planning approach is used to ensure long-term sustainability and create "green cities."

Green cities are those that have already achieved, or are moving toward, long-term environmental sustainability in all of its aspects. ADB (2012) identified six types of investments required to become a green city, and thus ensure sustainability of the urban environment: (i) low-carbon transport systems; (ii) a green industrial sector; (iii) energy-efficient buildings; (iv) greening of the city itself; (v) green, resilient infrastructure; and (vi) intelligent systems. Benefits of green urban development include better health, sanitation, and other social outcomes; faster and more efficient transportation; and lower damages and losses due to disasters.

In the Pacific, rapid urbanization has led to the emergence of what are commonly referred to as village cities, such as Honiara in Solomon Islands and Port Vila in Vanuatu. These village cities are characterized by an urban structure in which informal settlements dominate and in which legal and planning processes, including formal town planning systems, are generally ignored. An ADB study found that the urban structure in village cities is dominated by informal settlements that "have inadequate levels of basic services and infrastructure such as sanitation, water, waste disposal, electricity, roads, and drainage" (ADB 2016). About a third of residents of Honiara and Port Vila are estimated to live in such settlements (Figure 9). These village cities in the Pacific do not meet the requirements of green cities.

Figure 9: Village Cities in the Pacific



PNG = Papua New Guinea.
Source: UN-Habitat. 2015. Draft Habitat III Report for the Pacific Region. Quoted in ADB. 2016. *The Emergence of Pacific Urban Villages: Urbanization Trends in the Pacific Islands.* Manila.

Cyclones that devastated Honiara in April 2014 and Port Vila in March 2015 resulted in deaths and destruction of property and exposed the inadequacies of infrastructure such as drainage systems and of disaster preparedness programs. These events highlighted the desirability of green urban development, which minimizes damages and losses, while uplifting lives and promoting development.

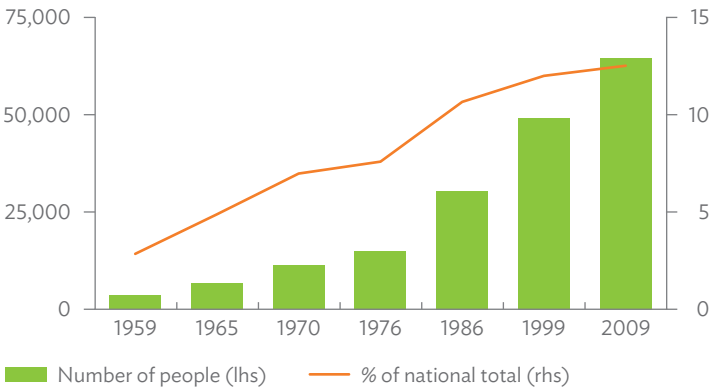
Even before these cyclones, Solomon Islands and Vanuatu had already started exploring the adoption of green city investments, although to different degrees. The cyclones, however, exposed the urgency of planning and completing these investments. Climate change is also expected to exacerbate existing conditions with more powerful cyclones during the La Niña phase, and longer, more intense droughts during El Niño. Rising sea levels also threaten Honiara and Port Vila as both are coastal cities with ports serving as vital entry points for people and goods. Further, climate change is encroaching on the finite supply of developable land and infrastructure.

SOLOMON ISLANDS

Compared to other capital cities in the Pacific, Honiara as a city is relatively young. Tulagi, the capital city during the British Solomon Islands Protectorate, was heavily damaged during World War II. Honiara, the base of the United States war operations, was chosen as the new capital in 1952 due to its deep seas port, access to freshwater from nearby streams, and availability of ample space for expansion. As workers moved to the new capital in search of employment, education, and business opportunities, Honiara's population grew rapidly, and this further accelerated in the 1970s as the government needed workers for construction of new public and private infrastructure. With limited public housing available, workers and their families settled in informal settlements on the fringes of Honiara. Private sector employees were likewise given free land by the government at the request of employers, who were mainly government contractors.

From around 2,500 in the mid-1950s, Honiara's population jumped to around 18,000 by the time of independence in 1978. In the most recent census of 2009, Honiara's population was 64,609 (Figure 10).

Figure 10: Honiara Population



lhs = left-hand scale, rhs = right-hand scale.
Source: Solomon Islands National Statistics Office.

Together with a further 10,000 people in the surrounding areas of Guadalcanal Province, this represented 14.6% of the Solomon Islands population. Informal settlements house approximately 33% of the 9,000 households in the city, and 35% of the population. There are over 38 such settlements, mostly on government land along the rivers and streams of the hilly peri-urban areas around the boundary of Honiara (Keen et al. 2017).

The provision of social services in Honiara and its environs is more extensive than in other parts of the country, but is still lacking compared with other capital cities in the Pacific. This was unable to keep up with the city's rapid growth. In 2009, only 75% of the city had access to piped water while only two-thirds had lighting through an electricity grid. Sewerage coverage is also extremely limited, with only 54% of households having a private flush toilet and 9% with shared flush toilets. The raw sewage, however, outfalls to the sea and the Mataniko River, as there is no sewage treatment plant in the entire country. For areas not connected to the sewerage system, a septic tank emptying and septage disposal collection service is provided by Honiara City Council, but coverage and quality of this service is limited.

Flooding is common as there is no effective drainage system in Honiara or in any other urban area in Solomon Islands. This became more apparent when Cyclone Ita passed near Honiara causing heavy floods and widespread damage. Twenty-two people died in flooding along the Mataniko River while 10,000 people were displaced. Total damage was estimated at $108 million, equivalent to 9.2% of GDP, with the number of affected at around 52,000. There was major damage to infrastructure, with the Old Mataniko Bridge, which links the central market to the Chinatown Central Business District, washed away and Henderson Airport severely damaged. An estimated 675 houses were destroyed along with their food gardens and farms, a critical source of food and livelihood. The Post Disaster Needs Assessment placed the recovery and reconstruction cost at more than $55 million, with the bulk for restoring transport infrastructure (Government of Solomon Islands 2014).

In reconstructing damaged transport infrastructure, the focus has been on climate- and disaster- proofing roads, bridges, and crossings. For instance, a new bailey bridge was completed in June 2014 to replace the Old Mataniko Bridge, while a modern two-lane bridge is being constructed as part of the Kukum Highway Upgrading Project. The New Mataniko Bridge, which links Honiara to the international airport, will be a four-lane bridge, which should ease traffic and spur economic activities in and around city.

Water and sanitation services in Honiara are provided mainly by Solomon Water, a state-owned enterprise. Although its financial position has improved dramatically since 2011, it continues to rely heavily on support from development partners for capital funding and technical expertise. It is developing a 30-year strategic plan to ensure that current mandates can be fulfilled while future demand can also be serviced. Part of the plan is the development of a wastewater strategy.

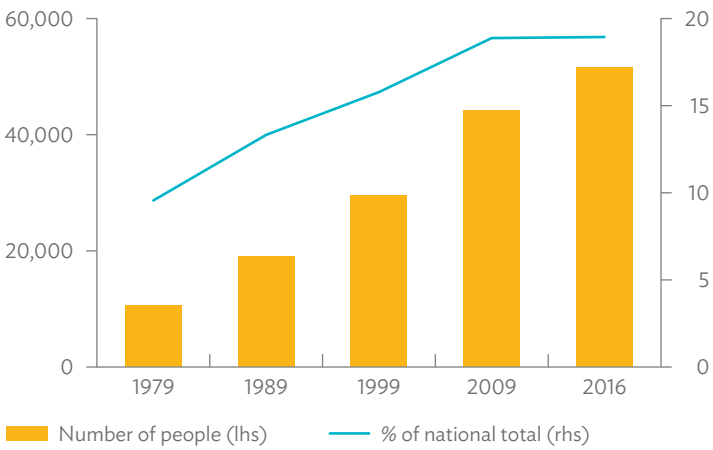
The government is also currently developing several frameworks such as the National Urban Policy and National Housing Policy. It organized the Solomon Islands National Urban Conference in 2016 and 2017 to bring together development partners, academics,

and stakeholders in shaping the county's urban policy. Although Honiara is relatively far from reaching green city status, these initial steps are moves in the right direction.

VANUATU

Port Vila has been the capital of Vanuatu since the late 1800s. From 10,601 in 1979 (a year before independence was granted), Port Vila's population almost doubled to 18,905 in 1989 and reached 44,039 in 2009. It rose from 9.5% of the country's total population in 1979 to 18.8% in 2009 (Figure 11). The rapid population growth, fueled mainly by migration from rural areas, led to the rise of informal settlements in the city and its environs within the Shefa Province. Although Port Vila was heavily devastated by Cyclone Pam in March 2015, it managed to recover quickly thanks to projects and programs already in place (or that were initiated).

Figure 11: Port Vila Population



lhs = left-hand scale, rhs = right-hand scale.
Source: Vanuatu National Statistics Office.

All land within the boundaries of Port Vila was acquired by the government from the indigenous owners and any freehold owners in the 1980s. The national government now leases land to individuals for 50–75 years (renewable). According to the 2009 census, around half of the households in Port Vila, mostly from higher-income groups, hold direct long-term leases. The remainder live as "renters" (39%) or with no recognized use rights (10%) in the more than 30 informal settlements within the city's boundary, or within other settlements located in the peri-urban *kastom* lands (Government of Vanuatu 2015).

Most of these informal settlements lack basic services such as running water, sanitation, and electricity because the Port Vila Municipal Council and other responsible agencies have insufficient resources to provide them. Under existing legislation, leases to land are not allowed unless these services are provided (Chung and Hill 2002). Most of the housing in these informal settlements is constructed from light, makeshift materials and was severely affected by Cyclone Pam.

Until recently, Port Vila's infrastructure lacked planning and policy guidance. A draft urban master plan (zoning codes) developed during the colonial period was never finalized. In 2009, the Port Vila Master Plan for Sanitation and Drainage was developed. Development of a master plan for the city, the Port Vila Zoning and Development Control Plan, commenced in 2010 and consultations with key sectors started in early 2017. In 2014, the Greater Port Vila Traffic and Pedestrian Management Plan, which includes designated parking zones, taxi stands, bus terminals and stops, and facilities for cyclists, was finalized. At the national level, principles of green city development are incorporated in the government's 2016–2030 National Sustainable Development Plan (also called "The People's Plan").

Green city development principles have been employed in the rehabilitation and rebuilding of Port Vila and Vanuatu. These principles are also seen in the Port Vila Urban Development Project, started in 2013, which aims to lay the foundations for sustainable urban development with better hygiene conditions and reduced water-based hazards. The project has five main outputs: (i) improved roads and drainage; (ii) improved sanitation; (iii) improved hygiene for central area and settlement communities; (iv) improved capacity by government agencies and community organizations to manage sanitation, roads, and drainage systems effectively and efficiently; and (v) efficient project management services.

The project is expected to be completed by December 2018, at which time 75% of households in the greater Port Vila area would have access to improved sanitation facilities (up from 50% of households in 2009). The project also aims to construct four new sanitation and hygiene facilities and rehabilitate another four. All eight are located in informal settlements. Three new public toilet facilities will also be constructed while 14 will be refurbished. The Port Vila Urban Development Project also targets that all domestic and commercial sludge in Port Vila is treated and disposed of properly. To minimize flooding, 14.5 kilometers of urban drainage is to be constructed or rehabilitated. The storm water drainage system within three catchments will also be upgraded by 2018.

Vanuatu was the first country in the Pacific to integrate disaster risk management into national planning. In 2013, a new state-of-the-art disaster warning center, capable of monitoring disasters such as volcanic, seismic, and tsunami activities round the clock, opened in Port Vila. As Cyclone Pam approached, warnings were sent through text messages. More than 80% of the population was notified, drastically reducing damage and loss of lives. To identify critical areas most vulnerable to flooding and other impacts of extreme weather, the Climate Change Vulnerability Assessment of the Greater Port Vila area was published in 2015.

Green city development is important for Vanuatu's tourism industry. Vanuatu's urbanization rate is expected to increase from 25% in 2009 to more than 50% by 2050. This substantial increase in urban population places significant pressure on the environment and must be carefully managed to ensure environmental degradation does not adversely impact locals and tourists alike.

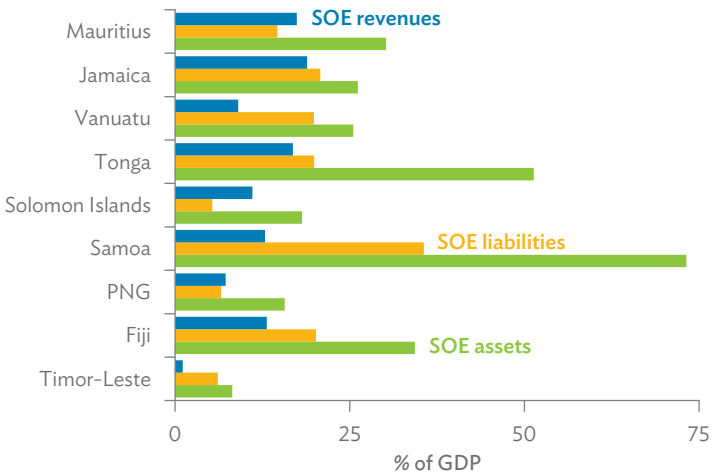
State-owned enterprises in Timor-Leste

Lead author: David Freedman.

COMPARING THE SOE SECTOR IN TIMOR-LESTE AND OTHER SMALL STATES

Although the state-owned enterprise (SOE) sector in Timor-Leste is small compared with some other countries in Asia and the Pacific (Figure 12), SOEs already play a significant role in the petroleum and finance sectors and are likely to play an increasing role in infrastructure services. However, there are several gaps in the current policy framework that should be addressed to ensure that SOEs do not burden the public finances or crowd out private investment.

Figure 12: State-owned Enterprise Sector in Timor-Leste vs. Comparator Countries

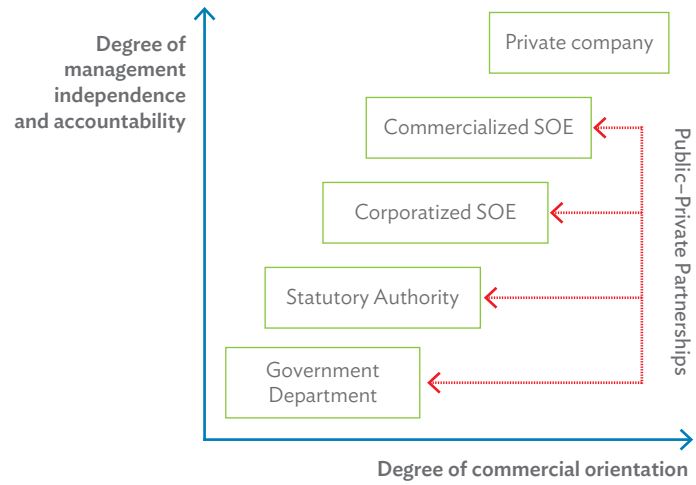


GDP = gross domestic product, PNG = Papua New Guinea, SOE = state-owned enterprise.
Source: ADB. 2016. *Finding Balance 2016: Benchmarking the Performance of State-Owned enterprises in Island Countries.* Manila.

State-owned enterprises (SOEs) are corporate entities with full or majority government ownership that are engaged in commercial activities. They lie between government departments and privately owned businesses on a spectrum of managerial autonomy and commercial orientation and may be established to manage natural monopolies such as ports and airports, foster the growth of new sectors of the economy or participate in natural resource developments (Figure 13).

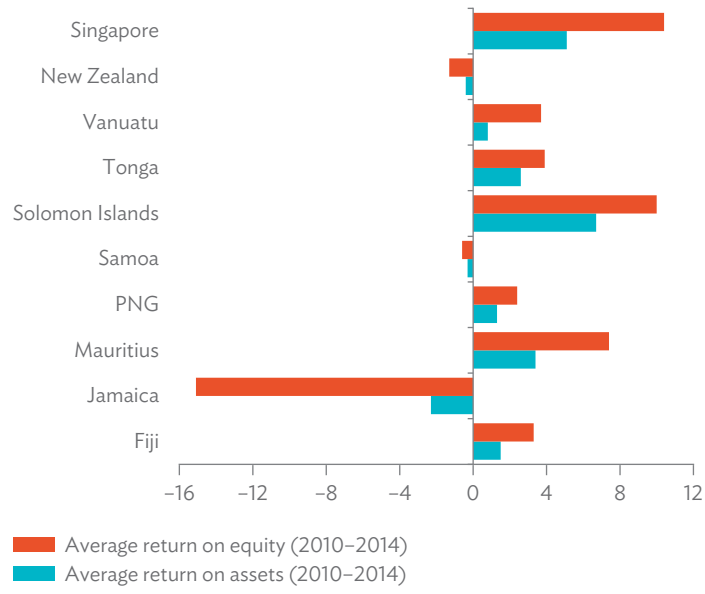
Weak performance incentives, political interference, limited accountability, and a lack of market discipline can all contribute to inefficiencies in SOE operations. When SOEs control extensive economic assets, these inefficiencies can place a drag on growth, strain public finances, and penalize consumers. Analysis of SOE performance in a range of small island developing economies has highlighted the ongoing challenge of commercializing publicly owned businesses (Figure 14). This experience suggests that Timor-Leste should be careful not to underestimate the challenges of developing SOEs with strong commercial performance.

Figure 13: Managerial Autonomy and Commercial Orientation in Public Entities



SOE = state-owned enterprise.
Source: Asian Development Bank.

Figure 14: Commercial Performance of State-owned Enterprises in Small Island Economies



PNG = Papua New Guinea, SOE = state-owned enterprise.
Source: ADB. 2016. *Finding Balance 2016. Benchmarking the Performance of State-Owned Enterprises in Island Countries.* Manila.

In the Pacific, many SOEs were created through corporatization of services previously provided by government departments and agencies. In contrast, in Timor-Leste, most infrastructure services are still provided through government departments and agencies (Table 2). The 2003 Public Enterprises Act provides the legal framework for SOEs in Timor-Leste and defines the *empresa publica* as a specific and separate class of business. The first SOE to be set up under this framework in 2004 was SAMES E.P, a medicine procurement and supply business that was designed to hold monopoly rights for the supply of medicines to both public and private health facilities. A 2009 review noted that the legal

and regulatory framework that was designed for SAMES was overly ambitious and was mostly not implemented (World Bank 2009). In 2015, SAMES was restructured as an autonomous agency with a non-commercial mandate.

Table 2: Infrastructure Services Provided by State-Owned Enterprises in Selected Island Countries

	Timor-Leste	Fiji	Jamaica	Mauritius	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Postal services		■			■	■	■	■	■
Port operations		■	■	■	■	■	■	■	
Airport operations	■	■	■	■		■		■	■
Electricity		■		■	■	■	■	■	
Water and sanitation			■	■	■	■	■	■	
Other	■	■	■	■	■	■	■	■	■

Sources: ADB. 2016. *Finding Balance 2016. Benchmarking the Performance of State-Owned Enterprises in Island Countries.* Manila; ADB staff estimates.

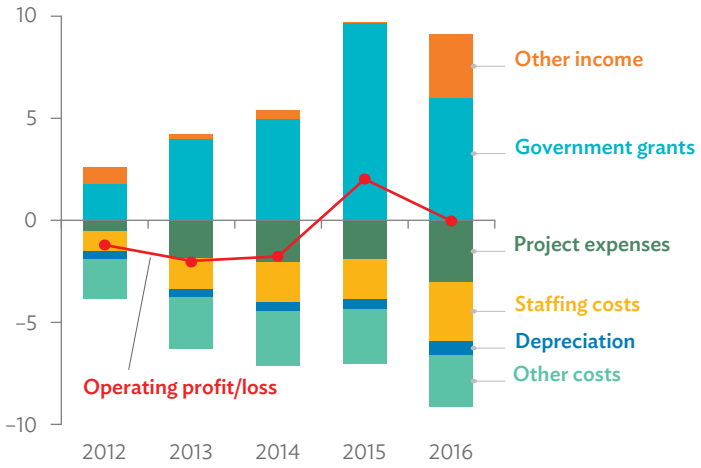
Other SOEs that were established in the years following approval of the public enterprise law have also struggled to implement the governance and management frameworks that were envisaged. The Aerial Navigation and Airports of Timor-Leste (ANATL) was established in 2005 to manage Timor-Leste's airports and other aeronautical assets, but a 2014 review found that the planned separation of policy and regulatory functions between ANATL and the Civil Aviation Authority was yet to happen (Court of Accounts 2014a). ANATL's current operations are more directly comparable to a government department rather than an SOE and it remains reliant on government transfers for around two thirds of its operational expenses. Similarly, Radio and Television Timor-Leste (RTTL E.P) was established in 2008 but a 2014 review found that it was not functioning as an SOE, was not fully compliant with its own statutes, lacked autonomy in the management of its assets and income, and remained highly dependent on government transfers (Court of Accounts 2014b).

The experience with SAMES, ANATL, and RTTL shows that establishing the basic governance structures and operating models that differentiate SOEs from other public-sector bodies has not been straightforward in Timor-Leste. There has been more progress in establishing SOEs in the oil and gas and finance sectors but the growth of these businesses has also highlighted serious weaknesses in current policy and legal frameworks.

Timor-Leste's national oil company, Timor Gap, was established through a law and associated corporate statute, that are aligned with the provisions of the 2003 Public Enterprise Law. This places Timor Gap under the supervision of the minister responsible for petroleum, and stipulates that the company's strategy should be closely aligned to government plans for the sector. The law defines the governance arrangements for the company and the scope of its operations. This includes petroleum exploration, development, and production (onshore, offshore, and overseas); provision of logistics and services to support the petroleum sector; and storage, refining, processing, distribution, and sales of petroleum and its derivates.

In practice, Timor Gap is already playing an important role in the development of the petroleum sector and the Tasi Mane project. This project aims to maximize Timor-Leste's share of the benefits from oil and gas development through onshore processing in a liquefied natural gas (LNG) plant and oil refinery, downstream processing of petrochemicals, and provision of logistics and other support services to the oil and gas sector. These developments would be underpinned by public investment of approximately $2.2 billion to finance the construction of new townships; a highway linking the proposed sites of the LNG plant and refinery; and an airport, port, and logistics supply base at Suai.

Figure 15: Annual Transfers from the State Budget to Timor Gap
($ million)



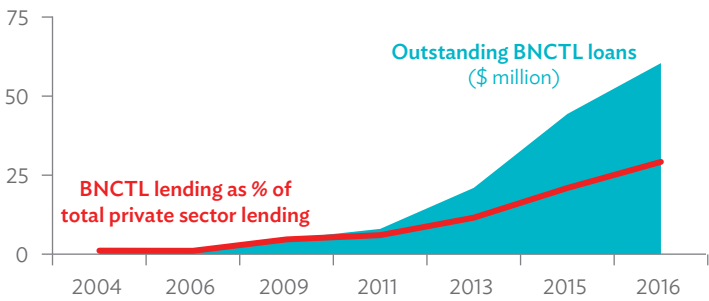
Source: Timor Gap E.P Annual Reports, various years.

In line with its mandate, Timor Gap has commissioned a series of technical studies to prepare the Tasi Mane project. It has established majority-owned subsidiaries to provide transport, logistics, and technical services to the oil and gas sector and has begun to supply petroleum products to retail consumers. It has also entered into production sharing contracts (PSCs) to look for new resources. This includes a 24% share in a PSC for a block in the Joint Petroleum Development Area that Timor-Leste shares with Australia, a 100% share in an offshore block in Timor-Leste's exclusive economic area, and a 50% share in a PSC covering two onshore blocks. Since 2011, Timor Gap's activities have been financed through annual transfers from the state budget (Figure 15). Moving forward, Timor Gap will be required to contribute to the cost of exploration for each of its PSCs in line with its shareholding. No formal projection of PSC financing requirements has been published, but it appears likely that increased annual transfers to Timor Gap will be required. These increases have not been reflected in budget documents suggesting a possible disconnect between SOEs investment planning and the broader budget process.

As the scale and complexity of Timor Gap's operations increase, so too does the importance of strong governance and oversight. The company's enabling legislation provides for a five-person board of directors and an independent audit committee. The chairperson of the board, who is nominated by the minister responsible for petroleum, also serves as chief executive officer. Other board members have also contributed to company management, with one board member appointed as deputy chair and given managerial responsibility for drilling, technology, and new ventures, while two others have been appointed as managing directors of Timor Gap's subsidiaries. The fifth seat on the board remains vacant.

Timor-Leste's National Commercial Bank, BNCTL, has also seen a steady increase in the scale and complexity of its operations. Originally established as a microfinance institution with strict caps on loans and deposits, it became fully state owned in 2008, and secured a full commercial banking license in 2011. An expansion of its branch network and the development of new products have supported strong growth in customer accounts, deposits, and lending with outstanding loans rising from about $1 million in December 2004 to more than $60 million in December 2016, equivalent to 29% of total private sector credit (Figure 16).

Figure 16: Growth in BNCTL Lending



BNCTL = National Commercial Bank of Timor-Leste.
Sources: ADB. 2011. *Timor-Leste Financial Sector Assessment Summary.* Manila; BNCTL. 2017. *Monetary Assets Survey.* Dili; BNCTL. 2017. *2016 Annual Report.* Dili.

Strong governance and shareholder oversight can help to manage and mitigate risks associated with rapid growth. However, like Timor Gap, BNCTL has seen a blurring of the lines between the board and management as directors have assumed executive roles. Giving board members additional managerial responsibilities can be a pragmatic response to capacity constraints. However, there is also a serious risk that the fundamental functions of the board will be undermined or completely negated.

Both BNCTL and Timor Gap are also competing directly with privately owned businesses. Timor Gap's decision to enter the petroleum retailing sector has placed the business in competition with local entrepreneurs, while for BNCTL, Timor-Leste's financial sector is becoming increasingly competitive as new banks enter the market and microfinance institutions expand their operations. Competition can help make markets more efficient. However, government support to SOEs can undermine competition within the market and crowd out private investments, thus undermining long-term efficiency.

POLICY CONSIDERATIONS

SOEs are likely to play a larger role in Timor-Leste's economy in the coming years. Infrastructure services that are currently provided by government departments may be transferred to SOEs through a process of corporatization. Timor Gap and BNCTL are likely to see further growth in their operations, and the government has also committed to establishing a national mining company and is reviewing options for a new national development bank.

The experience from Timor-Leste and other countries suggests that none of this will be easy. There is a clear risk that growth of the SOE sector will undermine the development of competitive markets, waste public resources, and crowd out private investment. A review of international experience suggests that there are a range of actions that should be implemented to mitigate these risks.

It is generally recommended that governments develop a clear SOE policy to define the conditions under which SOEs will be established, and the mechanisms through which the government will perform its oversight function as owner and shareholder. In Timor-Leste's case, development of a clear SOE policy should be a precondition to the establishment of any new SOEs, and should be accompanied by strengthening of the legal and operational basis for SOE governance. This would include reviewing, revising, and harmonizing SOE legislation and the corporate charters of individual SOEs, reestablishing a clear separation between boards of directors and management, and providing practical training for SOE board members and shareholder representatives.

There is also a need to strengthen shareholder monitoring of SOE activities and performance. Consolidating shareholder functions into a single entity is often cited as a best practice that supports the development of a critical mass of expertise within the government. This helps to ensure that SOEs are managed as commercial entities whose performance is regularly monitored. Finally, the government and its partners should continue to think carefully about the best mechanisms for providing high-quality infrastructure services. Development of a commercialized SOE that manages all aspects of service delivery is a major undertaking. In some cases public–private partnerships (PPPs) may offer a better pathway to improved service delivery and more efficient use of resources. It is therefore important to continue to build government capacity to assess PPP options and structure and manage PPPs.

Papua New Guinea: The continuing challenges of fiscal adjustment

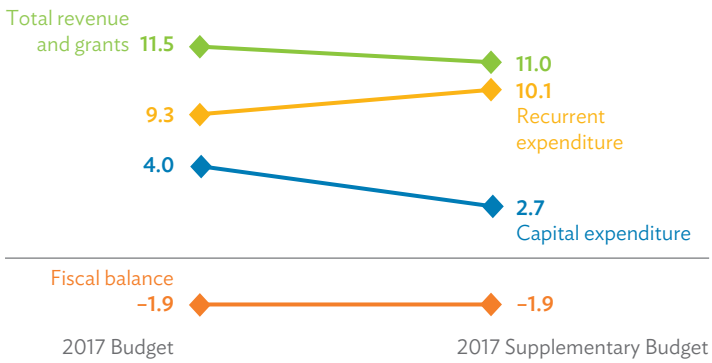
Lead author: Rommel Rabanal.

In July, the Department of Treasury's *2017 Mid-Year Economic and Fiscal Outlook Report* warned of yet another impending revenue shortfall, with company taxes and dividends from SOEs underperforming budget projections. Weak profitability of both private and public enterprises resulted in lower-than-expected government revenue collections. Although year-to-

date expenditures were tracking below budget due to expenditure prioritization and the slow implementation of capital projects, pressure mounted on recurrent spending from a continuing expansion in the public sector wage bill. Given these developments, the report projected that the fiscal deficit could reach the equivalent of 3.8% of GDP, much higher than the original target of 2.5%—absent an adjustment in government expenditures.

The recently formed government responded by introducing a supplementary budget in September 2017, outlining measures to align the public expenditure profile with lower-than-projected revenue collections and thereby maintain the fiscal deficit at about the originally budgeted target. The supplementary budget cut capital expenditures by 32%, mostly by defunding provincial and district services improvement programs by about K900 million. Funding was maintained only for ongoing provincial and district services improvement projects with relatively high disbursement rates and cofinancing from development partners. The supplementary budget also shifts funding away from new capital projects toward maintenance of existing assets. Of the K1.3 billion total reduction in capital expenditures, K774.0 million is effectively reallocated to fund spending overruns, most notably in the wage bill, debt servicing, and purchase of pharmaceutical drugs, among others. This leaves a net reduction in total government expenditure of K494.0 million, to match the projected revenue shortfall from unrealizable collections of company taxes and dividends from SOEs (Figure 17). Overall, total revenue and grants are projected at just under K11.0 billion, against total expenditures of K12.9 billion.

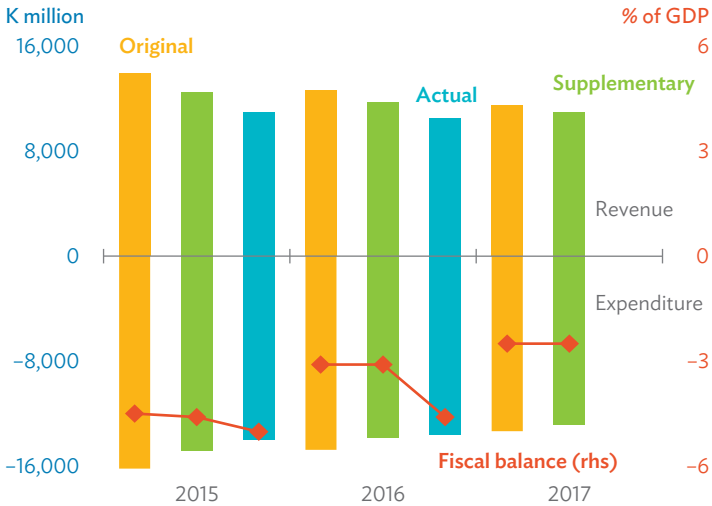
Figure 17: Adjustments in the 2017 Supplementary Budget
(kina billion)



Sources: Papua New Guinea 2017 National Budget; 2017 National Supplementary Budget Speech; and ADB estimates.

However, while previous supplementary budgets have similarly attempted to maintain the fiscal deficit at originally budgeted levels, final outcomes have generally turned out to be worse. At the onset of the current fiscal crisis, caused by a sharp drop in oil prices in 2015, a supplementary budget sought to cut expenditures by almost K1.38 billion amid a looming revenue shortfall then projected at K1.45 billion to keep the fiscal deficit at the equivalent of 4.6% of GDP. The actual shortfall was close to K3.0 billion—with total revenue collections below the 2014 level—pushing the deficit to the equivalent of 5.0% of GDP. In 2016, another supplementary budget responded to lower-than-expected revenues by slashing public spending by a corresponding amount of over K900 million. Again, the actual shortfall exceeded projections, and with further expenditure cuts proving more difficult the fiscal deficit reached the equivalent of 4.6% of GDP compared with a target of 3.1% (Figure 18).

Figure 18: Previous Supplementary Budgets Have Underestimated the Necessary Fiscal Adjustment

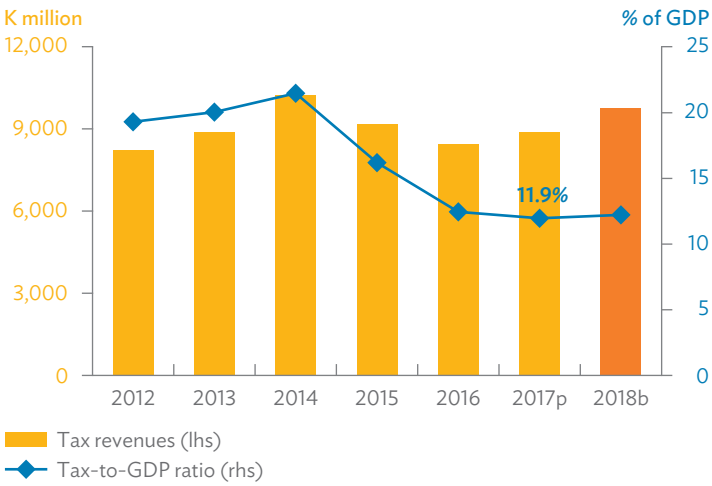


GDP = gross domestic product, K = kina, rhs = right-hand scale.
Sources: Papua New Guinea Mid-Year Economic and Fiscal Outlook (various years); 2017 National Supplementary Budget Speech; and ADB estimates.

Given recent experience, it is probable that the final revenue outturn for 2017 will also fall short of the supplementary budget's revised projection. Further, as successive cuts have already brought down total expenditure from its peak of K14.5 billion in 2014 to K13.6 billion in 2016, it is becoming more difficult to find quick cuts in public spending without adversely affecting core government operations and service delivery. An initial assessment by the International Monetary Fund (IMF) estimates that the 2017 supplementary budget, along with complementary measures in the new government's 25 Point 100 Day Economic Stimulus Plan (100 Day Plan), may be sufficient to keep the fiscal deficit at the equivalent of just above 3% of GDP. Although larger than the 2017 target, this would nonetheless represent substantial progress in reducing the deficit from the equivalent of 4.6% of GDP the previous year. The IMF further recommends targeting a near-balanced budget by 2020 to gradually reduce the debt-to-GDP ratio from an estimated 32% in 2017 back to below PNG's official ceiling of 30%.

Sustained follow-through on reforms included in the 100 Day Plan—crucially in the areas of revenue generation and fiscal discipline—is needed to support a narrowing of the fiscal deficit. Tax compliance issues are being addressed through (i) revenue task forces charged with collection of outstanding company income taxes and customs fees, among others; and (ii) compulsory taxpayer identification number registration with stronger links to investment permits and companies' access to bank accounts. The plan also seeks to start simplifying and modernizing PNG's tax system to help boost the business environment and raise revenues over the longer term. Other revenue-enhancing measures will also be necessary to arrest the sharp decline in PNG's tax effort (Figure 19).

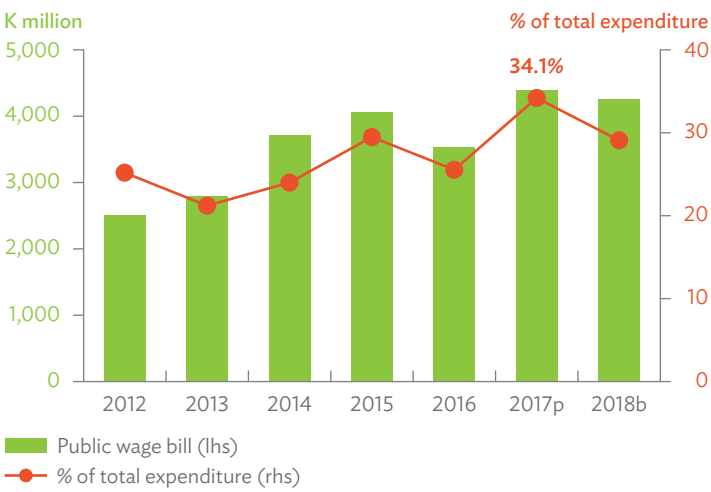
Figure 19: The Tax-to-GDP Ratio Has Plummeted since Peaking in 2014



b = budget, GDP = gross domestic product, K = kina, p = projection.
Sources: DevPolicy PNG Budget Database; 2017 National Supplementary Budget Speech; *2018 Budget Strategy Paper*; and ADB estimates.

On the expenditure side, payroll management to tame a bloated public sector wage bill remains the chief priority. The IMF estimates that, on average, the wage bill accounts for about 27% of government expenditures in developing countries, and about 25% in advanced economies. Inclusive of reallocated funds in the supplementary budget, PNG's wage bill is now projected to shoot back up to over a third of total government expenditures in 2017, reversing the modest gains achieved from just a year ago (Figure 20). The 100 Day Plan pushes for a physical audit of the government payroll—beginning with the education sector, which accounts for about a third of the government wage bill—along with a compulsory national identification registration of all public servants to plug leakages.

Figure 20: Progress in Controlling the Public Wage Bill to be Reversed in 2017



b = budget, K = kina, p = projection.
Sources: DevPolicy PNG Budget Database; 2017 National Supplementary Budget Speech; *2018 Budget Strategy Paper*; and ADB estimates.

Further, the Organization Staffing and Personnel Emoluments Audit Committee has been tasked to identify government agencies and functions that can effectively be merged to reduce inefficiencies. A hiring freeze also remains in place, and payments to all public employees are being migrated to a centralized government payroll system to strengthen control and oversight.

The *2018 Budget Strategy Paper*, released in early November, targets maintaining the fiscal deficit at the equivalent of 2.5% of GDP. A planned gradual reduction of the deficit to the equivalent of 1.2% of GDP by 2022 is underpinned by expectations of a steady decline in the public expenditure-to-GDP ratio. This, in turn, is centered on a renewed focus on reducing the associated operating costs of running the public service. Initial projections presented in the *2018 Budget Strategy Paper* show a planned nominal reduction in the public wage bill of about 3%, bringing its share in total expenditures back to 29%, comparable with its 2015 level. Stronger performance management measures, however, are also needed to complement payroll cleansing efforts to promote effective and efficient delivery of basic government services, particularly in education and health.

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Mounting climate-change-associated risks and vulnerabilities demand more strategic and innovative approaches to develop a comprehensive response. In the Pacific, this will require sustained efforts to enhance coordination between development partners, implement low-carbon development strategies, and promote regional solutions to expand and optimize climate finance. New modalities, including disaster-contingent lines of credit and sovereign or regional insurance schemes, are also being tapped to build financial resilience in these small and highly vulnerable economies.

Fiji's presidency of the recently concluded 23rd annual meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change further pushes the Pacific to a lead role in responding to climate change. By highlighting the subregion's disproportionate vulnerability to the negative impacts of climate change, the event is seen to catalyze a renewed global focus on climate change adaptation and disaster risk management efforts in the Pacific and in small island developing states throughout the world.

Building Resiliency: Climate change and disaster risk management in the Pacific

The Asian Development Bank's (ADB) 14 Pacific developing member countries (DMCs) are leading the way in responding to climate change. Each of these countries has established national policies and institutions to address climate change, and all have issued Intended Nationally Determined Contributions that detail how they plan to implement the Paris Agreement.

Climate change issues were at the development forefront in the region in 2017. Perhaps most importantly, the Pacific Community launched the Framework for Resilient Development in the Pacific, 2017–2030 (FRDP), a regional mechanism for cooperation on climate change and disaster risk management. The FRDP recognizes that resilience is central to development and emphasizes that responses must involve all sectors and stakeholders.

While Pacific DMCs have taken significant steps to improve their resilience to climate change, finding sustainable long-term solutions will require upscaling innovative approaches, strengthening institutional capacities, and expanding access to concessional financing. The following article describes ADB's efforts to support its Pacific DMCs in five main areas.

Low-carbon development

Despite their low per capita and absolute greenhouse gas emissions, all Pacific DMCs are committed to reducing emissions through ambitious plans to shift from diesel to renewable energy sources and promote energy efficiency measures. These can also help reduce local pollution and dependence on diesel imports.

For instance, in Papua New Guinea (PNG), ADB approved the second phase of financial support amounting to $76 million to address lack of access to affordable, clean, and reliable power in provincial centers. The program, part of ADB's $120 million multitranche financing facility for the Town Electrification Investment Program, includes the construction of a small run-of-river hydropower plant with a preliminary capacity of 3 megawatts.

In 2017, ADB also approved the Pacific Renewable Energy Facility with an overall estimated cost of $750 million, including ADB financing of up to $200 million. This facility will support a series of individual small-value renewable energy projects in the Pacific's 11 smaller island countries, which have a combined population of less than 1.5 million. It will do so by seeking out public–private partnerships, facilitating the scaling up of investment by independent power producers, offering guarantee products to support alternative delivery, and supporting regional approaches for energy sector reform.

Climate-resilient infrastructure

Much of the critical infrastructure in the Pacific is at risk from future sea level rise, coastal hazards, flooding, and drought. Infrastructure must therefore be constructed to be resilient to climate change.

In 2017, ADB developed the Sustainable and Climate Resilient Connectivity Project in Nauru. With significant cofinancing from the Government of Australia and the Green Climate Fund, this $80 million project will help support Nauru in developing a climate-resilient port that can operate year-round. The new port will create new opportunities for development, employment, and poverty reduction. In so doing, it will provide a much-needed lifeline for the 11,300 residents of this fragile and vulnerable island nation.

The Nauru port is one of a growing number of ADB projects that benefited from the development of a climate risk vulnerability assessment (CRVA). ADB is increasingly using CRVAs to better determine risks and explore alternative approaches and designs, such as elevating roads and bridges, increasing drainage capacity, drought-proofing water supplies, and upgrading rural health facilities to be more resilient. Since 2016, ADB has developed CRVAs for 12 of its projects in the Pacific.

Innovative climate change adaptation and disaster risk management

Beyond climate-proofing infrastructure, innovative solutions are needed to adapt to climate change and manage disaster risk. Such solutions must address climate impacts on poverty, gender, health, environmental degradation, and public financial management, among others.

One example of an innovative approach is disaster contingent financing through the use of policy-based lending. In 2016, ADB approved the Cook Islands Disaster Resilience Program, which provided a $10 million contingent line of credit to help improve resilience and provide quick disbursal of financing in the event of a disaster for early response, recovery, and reconstruction. This marked the first time ADB had ever provided a contingent credit line anywhere in the world.

In 2017, ADB introduced a regional contingent financing facility to cover three more Pacific DMCs—Samoa, Tonga, and Tuvalu. The Pacific Disaster Resilience Program is a $15 million contingent disaster risk financing facility to improve resilience and financial preparedness against disasters triggered by natural hazards. The program also supports policy reforms in disaster risk management.

Regional transformation through policy dialogue, knowledge sharing, and coordination

As emphasized in the FRDP, paradigm shifts are needed to complete the transition to low-carbon and resilient development. Achieving this transformational change will require strengthening partnerships, building on current knowledge, and promoting policy dialogue across the Pacific.

ADB is helping Pacific DMCs improve their capacity to negotiate climate change agreements and financing. In this regard, 2017 was a significant year for the region, as the Government of Fiji was awarded the presidency for the 23rd annual Conference of the Parties (COP23), held on 6–17 November in Bonn. ADB supported planning, preparatory, and capacity building events in the leadup to COP23, including the Pacific Champions meeting (3–4 July in Suva) and the pre-COP meeting (16–17 October in Nadi).

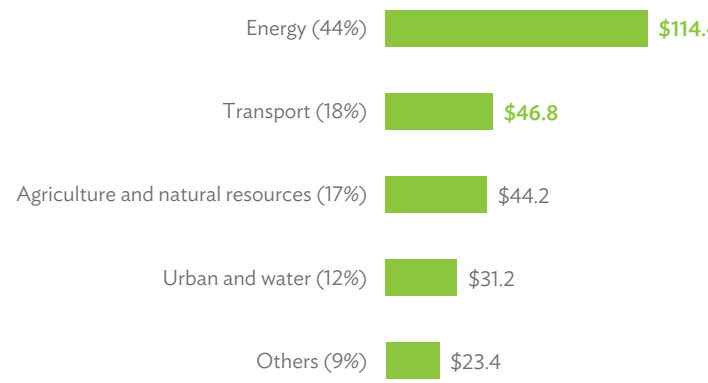
ADB's COP23 support also included helping Fiji consider options to encourage more sustainable transport, such as through greater use of electric and hybrid vehicles, and expand insurance coverage for vulnerable households in the event of disasters. Fiji sees implementation of these activities as a central part of the legacy it hopes to achieve from their COP presidency over the next year. More broadly, COP23 drew global attention to the challenges Pacific islands face in addressing the basic needs of human development—health, education, water, and transport—in a sustainable way despite their precarious environmental situation.

Expanding climate finance

Although Pacific DMCs have been successful in accessing climate finance, current amounts are not nearly enough to cover the expenditures needed to adequately address the impacts of future climate change. Financing needs for coastal communities are especially acute, with most built infrastructure in the Pacific close to vulnerable coastlines.

From 2013 to 2016, ADB facilitated increased flows of climate finance into the Pacific amounting to roughly $250 million, with energy and transport as the leading two sectors (Figure 1). To support activities in the four areas described above, ADB plans to double the level of climate finance for Pacific DMCs to over $500 million over the next 4 years (2017–2020). This is consistent with ADB's broader commitment to double annual climate financing in Asia and the Pacific to $6 billion by 2020.

Figure 1: Climate Change Financing, by Sector ($ million, 2013–2016)



Source: ADB estimates.

As part of this effort, ADB also continues to mobilize global climate resources for Pacific DMCs. In 2017, ADB secured nearly $5 million from the Pilot Program for Climate Resilience to construct a climate-resilient wharf in PNG and $2.6 million from the Global Environment Facility to provide renewable energy to the outer islands of Tonga. These were in addition to the nearly $27 million Green Climate Fund grant for the climate-resilient port in Nauru.

Lead authors: Jay Roop and Jeffrey Bowyer.

Financial resilience to disasters: A tool kit

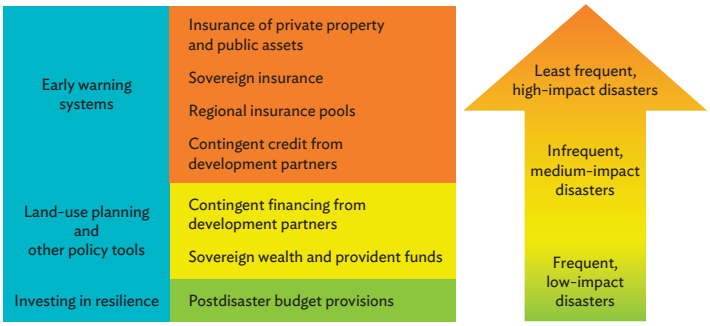
The United Nations Office for Disaster Reduction defines a disaster as "a serious disruption of the functioning of a community or a society at any scale due to hazardous events … leading to one or more of the following: human, material, economic and environmental losses and impacts." These occur in the form of frequent, low-impact events such as smaller floods and droughts, or less frequent, higher-impact events such as cyclones and earthquakes. Both impose significant fiscal burdens on governments, by causing periodic yet irregular spikes in public spending for emergency assistance and postdisaster repairs and reconstruction, or less frequent, massive depletion of fiscal resources following massive losses and casualties. Disasters adversely affect economic growth in the short term, through the fiscal drain and the disruption to regular economic activity. However, these effects can also linger in lower-income economies, which are often less resilient to such events and any consequent disruptions, such as political instability.

In the July 2015 issue of the *Pacific Economic Monitor*, the article "Disasters in the Pacific: An overview" showed that Pacific economies are more vulnerable to disasters than those in other regions and, given their geographic isolation and limited economic resources, the aftermath of these disasters can also be costly. There are many examples of disasters having serious impacts on Pacific economic growth even years after the fact due to the requirements of postdisaster relief, reconstruction, and rehabilitation. For instance, Cyclone Evan in December 2012 had a serious impact in Fiji (affecting 60% of the population, and slowing the long-run tourism growth rate) and Samoa (causing damage and loss equivalent to 26% of gross domestic product [GDP]). Cyclone Pam hit Vanuatu in March 2015 and caused damage and loss equivalent to 55.6% of GDP, and reconstruction and rehabilitation efforts are ongoing at the time of writing. More recently, Cyclone Winston in February 2016 killed 44, affected 62% of the population, and caused damage and loss equivalent to 30% of GDP in Fiji. An El Niño-related drought in the summer of 2016 contributed to a significant drop in visitor arrivals to Palau, whose economy is driven mainly by tourism (see "Dealing with climate-induced volatility: The case of Palau's tourism" on page 9 of this issue for more information).

Pacific economies are also exposed to hazards associated with climate change, especially rising sea levels. The need to mitigate the associated risks places additional strain on resources that tend to be (i) made available only following disasters; and (ii) insufficient to fully fund the more pressing needs of postdisaster recovery, let alone effective disaster risk reduction (DRR).

This policy brief aims to examine the range of tools available to help build financial resilience to disasters in the Pacific. The tool kit identifies different instruments to cover varying levels of disaster risk (Figure 2). Each has its benefits and drawbacks, and some options for addressing gaps are also discussed. This draws on a forthcoming ADB research study, *Addressing the Economic and Fiscal Impacts of Disasters in the Pacific*, which is scheduled for publication in the first quarter of 2018.

Figure 2: Tools for Financial Resilience



Source: ADB.

For frequent, low-impact events

Postdisaster budget provisions. More frequent disaster events causing relatively low damage and loss can be considered as a recurrent public expense. As such, governments can make regular allocations in their annual budgets to fund recovery following such events. However, this means that they must be replenished every year, and are likely to be insufficient to respond to higher-impact events. Governments can ensure sufficient resources for these bigger events by implementing policies ex ante that would identify budget lines from which funds can be reallocated in the event of disasters, facilitating relief and recovery.

For less frequent, medium-impact events

Special purpose funds. Sovereign wealth and provident funds, such as those maintained by many Pacific economies, are intended to supplement limited fiscal resources. As such, these can be tapped in times of emergency, even in the case of less frequent events with higher impacts. To ensure ease of access, policy makers and fund managers can set up trigger mechanisms that would mobilize the funds quickly after the occurrence of a major disaster.

Contingent funds from development partners. Grants, loans, and funds under other special facilities (e.g., the Green Climate Fund) can also help finance DRR measures, as well as postdisaster recovery. These facilities are relatively new and still building their resource bases, and complex procedures to access funds require that recipients be accredited agencies. ADB, as one such accredited agency, helped the Cook Islands become the first Pacific developing member country to receive funding from the Green Climate Fund. This paves the way for similar collaborations between Pacific economies and their development partners to access financing for DRR, or to develop the capacity and become eligible for such financing.

For infrequent, high-impact events

Contingent credit. Under this mechanism, development partners provide prearranged loans that are triggered by disasters or, in certain cases, achievement of milestones relating to disaster

resilience (making it possible to also fund DRM measures). The loans are not intended to (i) support emergency relief, since it can still take time to process and release the loans; or (ii) fully cover short-term reconstruction and rehabilitation, as the mechanism is envisioned to complement other financing options. Nevertheless, they help smooth government spending, and credit can offer subsidized interest rate margins to reduce the burden on borrowing governments. To help facilitate governments' postdisaster response and recovery, development partners may wish to consider ways to expedite the disbursement of contingent credit (e.g., completion of a postdisaster needs assessment).

Insurance of private property and public assets. Insuring private property and essential infrastructure assets (e.g., ports and airports) would help relieve the economy of the cost of repair, and helps ensure the quick restoration of economic assets that is key to bringing about postdisaster recovery.

However, there are a limited number of insurance products available in the Pacific, and what appears to be low demand for the insurance contracts that are available. Policy makers may wish to encourage private financial institutions to broaden the range, improve the quality, and lower the cost of insurance products. An easier first step is to provide support—in cooperation with development partners, if need be—by providing sufficient data to more accurately assess and price risk. Policy makers should attempt to facilitate more insurance coverage in both the residential sector (as housing is typically a family's most valuable asset) and the commercial business sector. In the latter market, contracts can include both coverage for assets held by businesses, and business interruption insurance to facilitate business recovery and prevent formal or informal bankruptcies in the disaster's aftermath.

Insuring public assets is also not yet widespread, but is worth considering since it helps transfer the fiscal burden of repair away from the government. As in the case of contingent financing facilities, development partners may also help Pacific governments access insurance by helping meet or reduce underwriting costs, especially for very expensive infrastructure like port facilities.

Sovereign insurance. This comes in the form of insurance contracts that provide direct budget support to governments in the event of disasters.

Pacific economies are making use of regional insurance arrangements to access sovereign insurance products. The Pacific Catastrophe Risk Assessment and Finance Initiative was highlighted in the July 2015 *Pacific Economic Monitor* disaster overview article as a tool for managing disaster-related financial risk. It has enabled participating countries to pool their resources, thereby reducing underwriting costs. It has also reduced risk at the country level, as shown by the few times the scheme paid out to participating countries. Most importantly, the initiative has generated detailed cyclone and earthquake risk profiles for all participating countries, a valuable resource in informing private- and public-sector disaster risk assessment. However, the initiative does not yet provide sufficient coverage against the full range of potential disasters and damages.

Catastrophe bonds. This financing method can provide additional resources for investing in DRR while limiting risks for borrowers. When issuing these bonds, the borrower's debt is reduced or erased if trigger events occur. Catastrophe bonds can be used to finance hard protections like seawalls and other infrastructure to enhance resilience. These bonds are not currently used, if at all, in the Pacific, as they typically require well-developed financial markets. Development partners would likely need to play a key role in issuing these catastrophe bonds on behalf of borrowers in the region, if they are to be used at all.

General disaster risk mitigation measures

Countries' financial resilience to disasters can also be enhanced by preventive measures that can be employed regardless of the magnitude of risk involved. The financing options described above may be useful in supporting their implementation.

Early warning systems. These are technological solutions that alert the public to incoming disasters, enabling them to secure their homes, evacuate, or take other actions to help minimize disaster-related damage, loss, and casualties. They require investments up front, as well as continued commitment to proper operation and maintenance, but the benefits promise to far outweigh these costs. Early warning systems must be complemented by appropriate policies and information programs to ensure that the public can respond properly to the warnings they issue.

Land-use planning and other policy tools. These tools can help reduce the physical exposure of people and property to disasters, particularly in vulnerable areas such as steep hillsides and areas near major bodies of water. However, they require capacity to conduct the necessary technical analysis and planning to help shape the policy, and commitment to enact and enforce the resulting regulations. Development partners can be tapped to provide or, preferably, help develop this capacity in Pacific governments, as well as to help integrate these policies into national development strategies.

Investing in resilience. It is crucial, especially in the disaster-vulnerable Pacific, to consider DRR and climate change resilience in infrastructure development plans. Doing so helps ensure that essential public assets are built to be as climate- and disaster-proof as possible. Although resilience planning can increase related capital expenditures, which may not be well received by governments, the mid- to long-term economic benefits of investing in resilience compensate for upfront costs.

DRR and climate change resilience should also be streamlined into national policy making, as a comprehensive response is necessary to manage risk and ensure resilience. A number of countries in the Pacific, with the help of the secretariat of the Pacific Community, are formulating joint national action plans, which are useful in consolidating DRR strategies across sectors and helping to integrate them into national planning exercises.

Lead authors: Ilan Noy, Cara Tinio, and Roble Velasco-Rosenheim.

Urban solid waste management towards climate change mitigation in Timor-Leste

Timor-Leste is a small country that comprises the eastern half of the island of Timor and Oecusse, an enclave on the northwestern side of the island. The country has a population of 1.2 million, 23.8% of which resides in Dili, the capital city. Its climate is mainly tropical, with an average 3-month rainy season from December to March and a dry season for the remainder of the year (GHD 2015). Economic growth remains strong, averaging 7.8% per annum over the past decade, largely due to public expenditure financed by petroleum royalties.

Although Timor-Leste's contribution to climate change is small, it faces its severe consequences. Rainfall in the country has decreased over the last decade. Recognizing this, the government has advocated internationally for serious climate change mitigation measures, and has taken steps to implement its commitments as a party to the 2015 Paris Agreement. The document identifies solid waste as one of the main sources of greenhouse gas emissions in Timor-Leste. Solid waste collection and disposal in the country is not developing apace with population growth and risk from the adverse impacts of climate change.

As a first step to reducing greenhouse gas emissions through improved solid waste management, the Timor-Leste government has developed an investment strategy for urban solid waste management in Dili. A national strategy is also necessary to reduce the amount of waste ending up in landfills all over the country. Climate change mitigation will be a powerful extra benefit of implementing an urban solid waste management strategy.

Climate change mitigation in Timor-Leste

For developing countries in the Pacific, climate change is the biggest environmental threat and will especially affect the poorest and most vulnerable communities (IPCC 2007). Not only are changes in weather patterns increasing global temperatures and sea levels, they are also giving rise to extreme weather events that are more frequent and intense, and last for longer periods. Indeed, Timor-Leste is experiencing the consequences of El Niño, involving increasingly long periods of low rainfall leading to severe droughts; and La Niña, with heavy rainfall events that raise the risk of floods. By 2090, temperatures are projected to rise by as high as 4.2 degrees Celsius above 1986–2005 levels if global emissions continue to increase (Table 1).

Globally, emissions of greenhouse gases from urban solid waste have become a concern since population and economic growth, rapid urbanization, and changes in consumption patterns have caused waste production to grow exponentially (AECOM 2017a). The World Bank estimates that urban solid waste accounts for almost 5% of the world's greenhouse gas emissions and 12% of the total emissions of methane, a greenhouse gas with an impact 20 times higher than carbon dioxide. Disposal in dump sites and landfills accounts for 97% of the greenhouse gas emissions from urban solid waste (World Bank 2012).

Table 1: Projected Temperature Changes in Timor-Leste
(degrees Celsius above 1986–2005 levels)

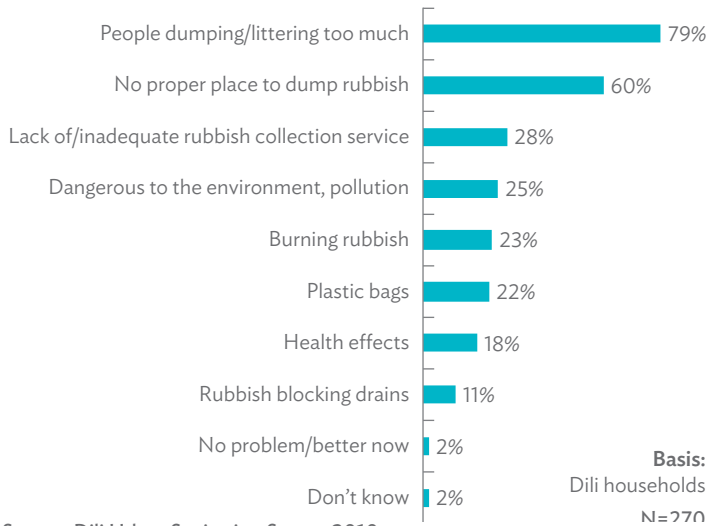
	2030	2050	2070	2090
Very low emissions scenario	0.4–0.8	0.5–1.1	0.4–1.1	0.4–1.2
Low emissions scenario	0.4–1.0	0.8–1.5	0.9–1.9	1.1–2.1
Medium emissions scenario	0.4–1.0	0.7–1.5	1.1–1.9	1.5–2.6
Very high emissions scenario	0.5–1.1	1.0–2.0	1.7–3.1	4.0–4.2

Note: Values represent 90% of the range of the models.
Source: Timor-Leste National Directorate of Meteorology and Geophysics, Australian Bureau of Meteorology and CSIRO. 2015. *Current and future climate of Timor-Leste.* Melbourne.

Response to climate change has been focused on the urgent need to reduce greenhouse gas emissions. Parties to the 2010 Cancun Agreements have agreed to reduce emissions so that global temperature increase does not exceed 2 degrees Celsius (UNFCCC Decision 1/CP.16, 2010). More recently, under the 2015 Paris Agreement, both developed and developing countries started to consider an intended nationally determined contribution where development planning processes must consider not only the impacts of climate change, but also ways to mitigate climate change (UNFCCC Decision 1/CP.21, 2015). Efforts to reduce greenhouse gas emissions from urban solid waste have been focused on reducing waste production; improving collection efficiency; introducing recovery processes like recycling; and preventing methane emissions through the capture, treatment, and use of methane produced in the landfills. Energy generated from the combustion of methane can replace that generated from other fossil fuels, either as a primary energy resource or as electricity (World Bank 2012).

Timor-Leste's greenhouse gas emissions per capita is 20 times less, on average, than that produced by most developed countries and its contribution to climate change negligible. The production of greenhouse gases from urban solid waste is also not a community concern in the country (Figure 3). However, with countless uncontrolled dump sites and other waste deposit locations spread across urban areas (e.g., in canals and waterways), solid waste is becoming a serious threat not only to the environment, but also to public health and the economic development of a country that aims to become a tourist destination.

Figure 3: Solid Waste Community Concerns in Dili



Source: Dili Urban Sanitation Survey 2010.

Timor-Leste's Strategic Development Plan 2011–2030 highlights the country's concerns regarding climate change and states the government's commitment to voluntarily work with the rest of the world to reduce greenhouse gas emissions (SDP 2011–2030). The government has also established policy and institutional frameworks to define and coordinate its response to climate change, and in August 2017 submitted to the United Nations its first intended nationally determined contribution to help implement the 2015 Paris Agreement. The document identifies the main sources of greenhouse gas emissions in the country, which include solid waste, and measures to help improve management and help reduce emissions.

The state of solid waste management

Data on the composition and quantity of waste for all of Timor-Leste is scarce. However, organic waste constitutes the bulk of household solid waste in Dili (Figure 4). Other fractions, like plastics, paper, and cardboard, are growing significantly due to evolving consumption habits of the population. Dili produces around 120 tons of solid waste a day, 7 days a week.

The evolution of solid waste production reflects not only the increase in the amount of waste produced due to population growth, but also changes in consumption patterns related to new habits of Timorese society. Dili currently hosts over 252,000 people, and this is estimated to grow to over 318,000 by 2030 (Government of Timor-Leste 2015). Larger urban populations and higher household incomes have shifted consumption preferences from long life consumer goods to immediately disposable goods, with a direct repercussion on the quantity and composition of the waste produced (GHD 2015). It must also be noted that imported goods entering the economic cycle end up producing some form of waste, creating a significant environmental and economic burden, especially for island economies with limited space for disposal. Around 60% of imported goods entering Timor-Leste will have some type of packaging. Further, the country is faced with the internal challenge of managing the high percentage of organic waste, which comes mainly from subsistence farming (the largest productive sector in the economy).

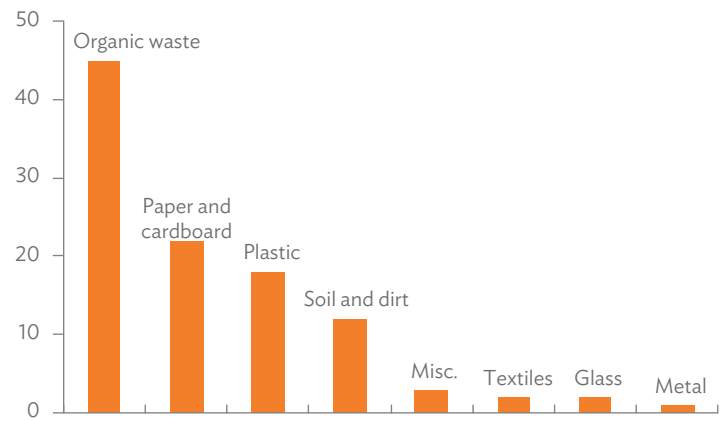
Waste segregation is not widely practiced, if at all. Food scraps would have to be segregated at source to be compostable, and green waste—generally mixed in with other municipal waste—would need to be collected separately. Some of the higher-value recyclable materials, e.g., glass and metals (especially aluminum and copper), occur in very low levels in the common solid waste stream because they are being recovered informally or reused. However, a large amount of paper and cardboard still appears, and therefore is a candidate for greater recovery efforts. The level of plastic waste is typical of similar countries, and there is also scope for greater recovery, especially for plastic drink containers. Soil and dirt, another significant component, cannot be reused without mechanical separation, which is not economically viable (GHD 2015).

Due to limited political engagement, lack of technical knowledge, and limited access to capital funds, Timor-Leste is struggling to implement an integrated urban solid waste management system. Complicating the situation is the rising demographic pressures exerted by internal migration from rural areas to urban.

Basic sanitation infrastructure is not yet in place. Waste disposal containers and collection trucks are lacking in urban areas, and there is a lack of control over the production, selective collection, and disposal of industrial, hospital, and hazardous wastes (e.g., heavy metals, used oils, scrap materials). None of the 13 municipalities in Timor-Leste has a controlled landfill. Only Dili has an organized urban solid waste collection system, although some others benefit from municipal street sweeping services. The irregular geography and bad condition of most roads impose significant costs on both waste collection and disposal.

The absence of reliable collection systems means that it is common to find waste in the streets, but most waste is dumped in uncontrolled dump sites—where it is then burned—or in waterways. There are no controls for the leachate generated. These practices subsequently contaminate aquifers, land, sea, and air, and threaten public health. This is coupled with lack of social pressure on the government to implement an integrated management system because the general population is not yet aware of the impacts of

Figure 4: Waste Composition in Dili (% of total)



misc. = miscellaneous.
Note: Organic waste comprises food scraps and green waste.
Source: GHD. 2015. *Final Report. ADB TA 8750-TIM: Preparing the Urban Services Improvement Sector Project.* Dili.

waste on the environment and public health. Strong competition for available resources from all other areas of development (e.g., transportation, energy, education) has constrained the necessary public investments in solid waste management. Waste valorization is also hard since recycled materials need to be shipped out of the country to be transformed in an industrial hub like Singapore or Surabaya, making it a less attractive business for the private sector.

More efficient intermunicipal urban solid waste collection, expansion into recycling, and the rehabilitation of the Tibar landfill are seen to meet the solid waste management needs of Dili's population until 2030 (GHD 2015). As a step toward implementing these solutions, Timor-Leste has developed with ADB support the Dili Urban Solid Waste Management Investment Strategy, which was approved by the Council of Ministers in October 2016. The strategy details that investments will focus on (i) providing adequate solid waste collection coverage (with waste segregation and recycling); (ii) transforming the existing dumpsite into a controlled landfill; and (iii) improving institutional governance and technical capabilities through, among others, collecting and organizing important data on the production of waste, designing an integrated intermunicipal waste management system, and empowering the public sector to engage with private sector operators and technology providers. The strategy is also completely aligned with the United Nations Framework Convention on Climate Change (UNFCCC), promoting climate change mitigation not only through the reduction of greenhouse gas emissions from landfill, but also by minimizing the risks of water and soil contamination.

CONCLUSION

Like other Pacific economies, which are relatively small and have limited industrial activity, Timor-Leste contributes little to climate change but could very well bear the brunt of its consequences. The country faces the pressing needs to mitigate the effects of climate change and to raise its voice internationally and lobby against the biggest contributors of greenhouse gases.

Besides increasing awareness of the consequences of climate change, Timor-Leste could also present good examples of mitigation measures, including an integrated solid waste management system involving regular, reliable service to prevent waste piling up in the streets and a controlled waste disposal location.

Timor-Leste has the potential to sustainably develop its solid waste management sector, provided that the government has the political will to restructure the sector and make the necessary investments. It is essential to have urban solid waste strategic guidelines not only for Dili, but a national strategy whose immediate priorities should be

(i) sealing of all the dump sites to provide adequate environmental rehabilitation;
(ii) developing infrastructures for treatment, and final destinations for solid waste (e.g., controlled landfills);
(iii) implementing selective collection systems and waste recovery; and
(iv) raising awareness, including environmental education, to promote proper waste disposal.

Although Dili is a relatively big city by Pacific standards, it does not generate a large amount of solid waste and a simple controlled landfill is thus most appropriate for urban solid waste disposal for the time being. The government can consider other technologies (e.g., landfill gas exploitation, composting, and waste-to-energy solutions) later, if sufficient solid waste is generated.

Alternatives to mitigate the impact of greenhouse gas emissions should stem from the implementation of the "3 Rs" policy (reduce, reuse, recycle). This would include the promotion of waste segregation and composting, and recycling green waste into fuel briquettes that could substitute for firewood. Such efforts would help reduce the amount of urban solid waste ending up in landfills without the need for major investments, as well as prevent deforestation. The framework contained in the Dili Urban Solid Waste Management Investment Strategy could also be replicated across the country, where the needs are similar.

Urban solid waste treatment solutions should be evaluated not only in terms of their financial return, but also in relation to long-term social, economic, and environmental benefits. Although climate change mitigation will not be the sole justification to implement an urban solid waste management strategy, it will be a powerful extra benefit.

Lead authors: Tiago de Jesus Ribeiro, Joana Custoias, and Jose Perreira.

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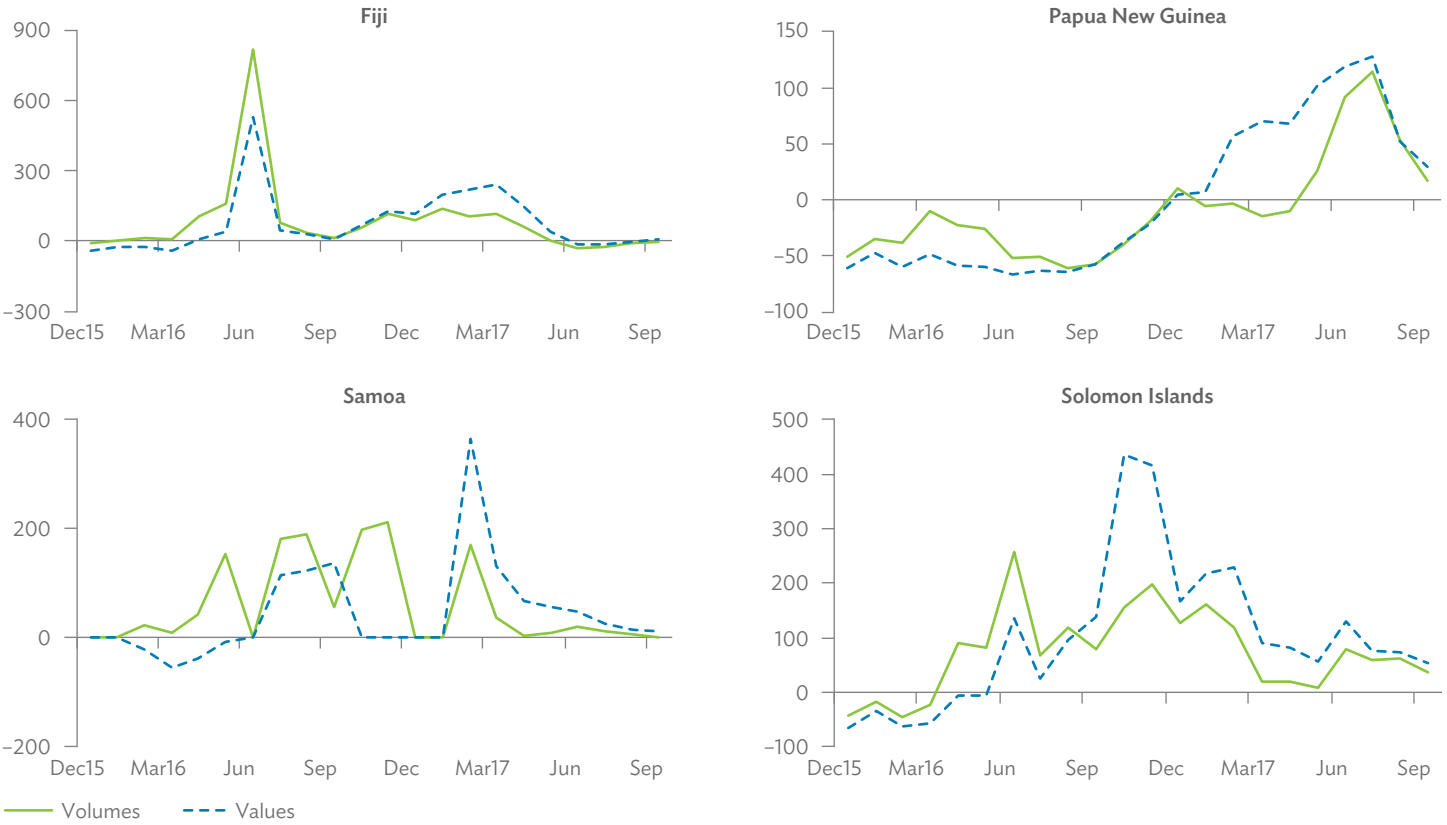
Nonfuel Merchandise Exports from Australia
(A$; y-o-y % change, 3-month m.a.)

A$ = Australian dollars, m.a. = moving average, y-o-y = year-on-year.
Source: Australian Bureau of Statistics.

Nonfuel Merchandise Exports from New Zealand and the United States
(y-o-y % change, 3-month m.a.)

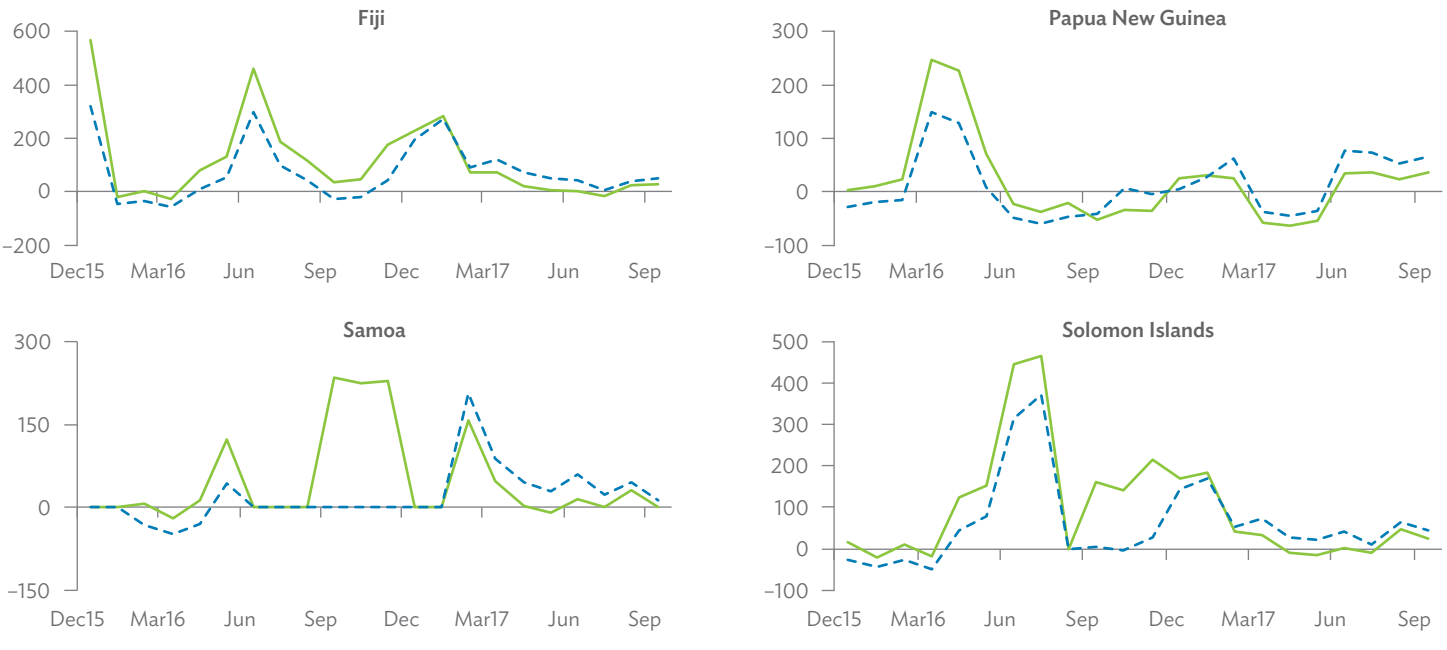
fas = free alongside, fob = free on board, FSM = Federated States of Micronesia, m.a. = moving average, NZ$ = New Zealand dollar, RMI = Republic of the Marshall Islands, US = United States, y-o-y = year-on-year.
Sources: Statistics New Zealand and US Census Bureau.

Diesel Exports from Singapore
(y-o-y % change, 3-month m.a.)



m.a. = moving average, y-o-y = year-on-year.
Source: International Enterprise Singapore.

Gasoline Exports from Singapore
(y-o-y % change, 3-month m.a.)



m.a. = moving average, y-o-y = year-on-year.
Source: International Enterprise Singapore.

Departures from Australia to the Pacific
(monthly)

rhs = right-hand scale, y-o-y = year-on-year.
Source: Australian Bureau of Statistics.

Departures from New Zealand to the Pacific
(monthly)

rhs = right-hand scale, y-o-y = year-on-year.
Source: Statistics New Zealand.

Latest Pacific Economic Updates

	GDP Growth (%, p.a.)			Inflation (%, annual avg.)			Fiscal Balance (% of GDP)		
	2016e	2017p	2018p	2016e	2017p	2018p	2016e	2017p	2018p
Cook Islands	8.8	5.0	5.0	–0.1	–0.1	0.5	3.7	1.4	–6.0
Fiji	0.4	3.6	3.9	3.9	3.5	2.5	–5.8	–7.2	–7.8
Kiribati	1.8	2.0	2.3	0.7	2.0	2.0	–12.4	–7.8	–5.6
Marshall Islands	1.9	4.0	2.5	–1.5	0.5	1.0	4.0	–2.0	–2.0
FSM	–0.1	2.0	2.0	–1.0	1.5	2.0	7.3	10.0	10.0
Nauru	10.4	4.0	–4.0	8.2	6.0	2.0	23.6	10.3	9.1
Palau	0.5	–0.5	3.5	–1.3	1.5	2.0	4.7	4.0	5.0
PNG	2.0	2.5	2.8	6.7	7.5	7.5	–4.6	–2.5	–2.2
Samoa	7.1	3.0	1.0	0.1	1.4	2.0	–0.4	–3.5	–3.5
Solomon Islands	3.2	3.0	3.0	1.1	0.5	1.0	–9.1	–12.5	–2.3
Timor-Leste[a]	5.4	4.0	6.0	–1.4	1.2	3.0	–31.9	34.3	–10.8
Tonga	3.1	2.8	3.5	2.5	2.5	2.5	–3.1	–1.2	–2.2
Tuvalu	4.0	3.2	3.0	3.5	2.9	2.5	33.7	–4.7	–12.9
Vanuatu	4.0	4.5	4.0	0.8	2.8	3.3	0.1	–7.6	–10.0

FSM = Federated States of Micronesia, GDP = gross domestic product, p = projection, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands.
[a] Timor-Leste GDP is exclusive of the offshore petroleum industry.
Sources: ADB. 2017. *Asian Development Outlook 2017 Update.* Manila; and statistical releases of the region's central banks, finance ministries and treasuries, and statistical bureaus.

Key data sources:
Data used in the *Pacific Economic Monitor* are in the ADB PacMonitor database, which is available in spreadsheet form at www.adb.org/pacmonitor

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