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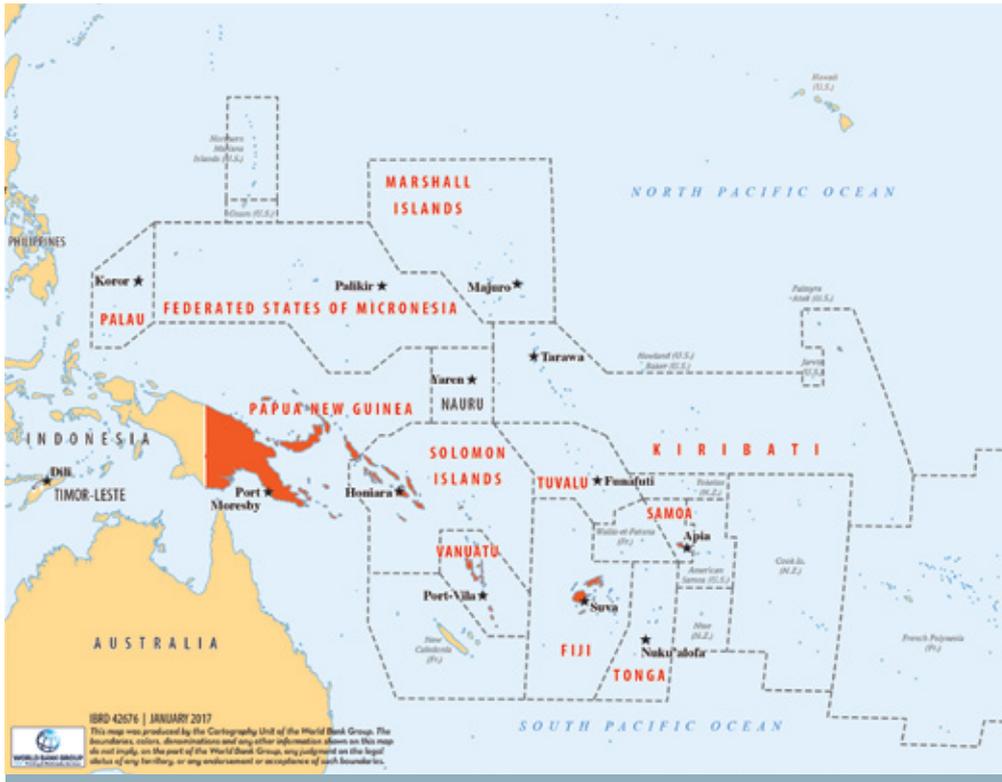
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The Pacific islands were settled by successive waves of intrepid seafarers who sailed boldly west to east across immense distances. Their incredible navigational skills, endurance and courage have shaped the Pacific's people and cultures. Pacific Possible has sought inspiration from these early seafarers to think outside the box and to propose bold solutions. The report's logo evokes the vaka, the traditional canoe of Polynesian seafarers, and its triangular sail.



Long-term Economic Opportunities and Challenges for Pacific Island Countries

Background reports available at
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Dr. Colin Tukuitonga

Director General, Pacific Community

The world is changing dramatically, and so is the Pacific.

Knowledge, ideas and information are now exchanged across invisible borders instantly, and new opportunities are emerging for Pacific Islanders, particularly in tourism, employment and education.

Yet amidst the many opportunities, immense challenges remain, including worsening climate change impacts and increasing rates of noncommunicable diseases, among others.

It's in this context that we're proud to have provided input, ideas and advice to this *Pacific Possible* report; the culmination of a number of years of work across the region. This report provides clear, measurable analysis into potential priorities for the region in next 25 years – among them fisheries, tourism and labour mobility – providing governments, development partners and the region with robust analysis of their potential benefits.

Similarly, *Pacific Possible* considers two of our region's biggest threats – noncommunicable diseases and climate change – and provides realistic steps that can be taken to minimize their impact; both on individual countries and the region as a whole.

On behalf of the Pacific Community, I congratulate the World Bank team for creating a valuable resource for the region that delves deeply into the question: 'What is possible for the Pacific?', and answers by mapping out a potential path to enable all citizens across our region to live ever healthier, more secure and more prosperous lives.

Victoria Kwakwa

Vice President – East Asia and Pacific, World Bank

At the World Bank, we believe that by working together towards common goals extraordinary challenges can be overcome.

This is driving our significant scale-up across the Pacific over the coming years. From the biggest country in the region, Papua New Guinea, to the smallest, Tuvalu, we are investing more resources and expertise to support our Pacific partners as they work to deliver more opportunities and ensure more secure and prosperous lives for their citizens.

It is the belief in the power of working together that drives *Pacific Possible*. This book represents the culmination of a number of years of work by experts from across the Pacific – all of whom have carefully considered what the Pacific could look like 25 years from now.

Pacific Possible contributes a quantitative assessment, revealing how large the potential benefits can be if potential opportunities are effectively seized upon, and the biggest threats to the region are adequately mitigated.

Pacific Possible tells us that by 2040, tourism will provide a crucial economic backbone for many countries in our region. And it tells us that improved internet access and connectivity could not only significantly enhance productivity in the Pacific, but also create new opportunities for Pacific workers to join global value chains. At the same time, it projects that if the region continues on its current path, noncommunicable diseases could cause losses of between three and 10 percent of GDP by 2040 across the region, while the impacts of climate change and natural disasters are expected to continue to increase, negating hard-fought development gains. Crucially, however, *Pacific Possible* offers a set of recommendations to help Pacific countries change this course.

With our government partners around the region, we have already supported investments in many of the fields on which the report focuses; investments which are already improving lives today. We have been supporting programs helping to improve connectivity in the region, manage valuable fish stocks, protect against disasters and climate change, and provide essential infrastructure for the tourism sector. We look forward to continuing to work with you on this journey to make what is possible a reality.

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Photo Tom Perry

Abbreviations

AML/CTF	Anti-Money Laundering/Counter-Terrorism Financing
APTC	Australia-Pacific Technical College
ASEAN	Association of Southeast Asian Nations
BEPS	Base Erosion and Profit Shifting
BPO	Business Process Outsourcing
CFC	Cobalt-rich Ferromanganese Crusts
CNMI	Commonwealth of the Northern Mariana Islands
CRD	Chronic Respiratory Disease
DSA	Debt Sustainability Analysis
DSM	Deep Sea Mineral
EEZ	Exclusive Economic Zone
EPS	Employment Permit System
FAD	Fish-Aggregating Device
FFA	Forum Fisheries Agency
FJI	Fiji
FSM	Federated States of Micronesia
GOS	Global Outsourcing Services
HDI	Human Development Index
ICT	Information and Communications Technology
IFC	International Finance Corporation
ISA	International Seabed Authority
ITO	IT Outsourcing
IUU	Illegal, Unreported and Unregulated
KIR	Kiribati
KPO	Knowledge Process Outsourcing
MIRAB	Migration, Remittances, Aid and Bureaucracy
NCD	Noncommunicable Disease
OECD	Organisation for Economic Co-operation and Development
OO	Online Outsourcing
OOP	Out-Of-Pocket
PAC	Pacific Access Category
PAL	Palau
PCRAFI	Pacific Catastrophic Risk Assessment and Financing Initiative
PEN	Package of Essential NCD Interventions
PIC	Pacific Island Country
PIC11	Tuvalu, Palau, the Marshall Islands, the Federated States of Micronesia, Kiribati, Tonga, Samoa, Vanuatu, the Solomon Islands, Fiji, and Papua New Guinea
PIFS	Pacific Islands Forum Secretariat
PMN	Polymetallic Manganese Nodules
PNA	Parties to the Nauru Agreement
PNG	Papua New Guinea
PT&I	Pacific Islands Trade & Invest
PROFIT	People Considerations, Resource Management, Overseas Engagement, Finance, Insurance and Taxation, Transport
R&D	Research and Development
RIM	Remote Infrastructure Management
RMI	Republic of the Marshall Islands
RSE	Recognized Seasonal Employer

SAM	Samoa
SITE	Small Island Tourist Economy
SOL	Solomon Islands
SMS	Seafloor Massive Sulphides
SPC	Secretariat of the Pacific Community
SPTO	South Pacific Tourism Organisation
SQ	Samoa Quota
SWP	Seasonal Worker Program
TFP	Total Factor Productivity
TON	Tonga
TUV	Tuvalu
UNCLOS	United Nations Convention on the Law of the Sea
USA	United States of America
VDS	Vessel Day Scheme
VAN	Vanuatu
WCPO	Western and Central Pacific Ocean

Executive Summary

Introduction

The increasing economic power of East-Asian nations, new technologies, and demographic change in the Pacific Rim countries bring new opportunities for Pacific Islands Countries (PICs). The 21st century is often referred to as the “Pacific Century,” reflecting the rising economic and political importance of East Asian nations and trans-Pacific relationships. This report argues that the PICs can truly make the Pacific Century their own, by taking advantage of new opportunities that are already on the horizon. These developments may help offset the challenges the PICs are facing to achieve sustained high growth, which include extreme remoteness, small size, geographic dispersion, and environmental fragility that limit the range of economic activities where the PICs can be competitive. Indeed, many PICs have seen only very limited increases in per capita incomes over the past 25 years.

***Pacific Possible* assesses whether fully exploiting new economic opportunities and dealing effectively with major threats could lead to a significant acceleration of economic growth and improved standards of living over the next 25 years.** *Pacific Possible* examines specific opportunities and risks for the PICs in seven selected areas. These include opportunities for increased incomes (tourism, knowledge economy, fisheries, deep sea mining, and labor mobility) as well as risks (climate change and disaster risks, noncommunicable diseases - NCDs) that, if not managed well, could undermine development gains. While *Pacific Possible* focuses on those economic opportunities that have the greatest potential to drive faster economic growth in the future, it is important to note that other economic activities such as agriculture, coastal fisheries and so forth will remain important sources of livelihoods for much of the population of the PICs and require continued attention by policy makers.

For each of the transformational opportunities, *Pacific Possible* develops an “opportunity scenario” that considers external developments (such as demographic developments or technological changes) as well as policy decisions that drive the opportunity. The “opportunity scenario” typically presents an ambitious, although realistic, outlook on what is possible. For each of the opportunities, we then estimate the achievable impact on per capita incomes, employment, and government revenue. Comparing this to “business-as-usual” projections, that typically reflect historical trends, gives us the additional income, employment, and government revenue that could be achieved if opportunities are fully exploited and adequate policy decisions taken and implemented.

The report covers 11 World Bank member countries in the Pacific (PIC11-Federated States of Micronesia, Fiji, Kiribati, the Marshall Islands, Palau, Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu, and Vanuatu).¹ Opportunities and risks discussed best describe the smaller PICs but are also valid for larger countries (Fiji, Papua New Guinea), although in these countries there are many more economic opportunities (for example, Liquefied Natural Gas in Papua New Guinea or niche manufacturing in Fiji) which are beyond the scope of *Pacific Possible*.

The Pacific Growth Challenge

Economic growth in most of the PICs has been low during the last two decades and has been lagging significantly behind what other developing countries have been able to achieve. This has been an ongoing source of debate—and often also frustration—among Pacific policy makers, citizens, and development partners.

One frequently held view is that low growth is due to a poor policy and institutional environment and that, with greater reform effort, higher economic growth would be possible. This view often comes with long lists of reforms that the PICs should pursue—covering broad reform areas such as governance, the business environment, and infrastructure, but also very specific issues such as land reform.

The alternative view is that the unique geographic situation of the PICs explains much of the observed low growth. The combination of extreme remoteness from major markets, very small size, dispersion over vast tracts of the Pacific Ocean, and environmental fragility results in very high cost of production of goods and services by both the private and public sector. As a consequence, the PICs tend to be competitive only in areas where natural resource rents outweigh the high costs of production. This second view is generally more pessimistic about the potential of the PICs to achieve faster economic

¹ Nauru joined the World Bank in April 2016, at which point work on *Pacific Possible* was already well underway; as a result, Nauru is not included in this report.

growth, and highlights the importance of alternative development strategies focused on: (i) the role of the public sector as the main source of formal sector employment and driver of economic activity; (ii) the need for, and appropriate management of, development assistance to sustain public services and standards of living in the PICs; and (iii) labor mobility opportunities as a key source of employment and income. It is important to note that the more extreme these aspects of geography are, the more severe will be the constraints on economic growth. Papua New Guinea and Fiji, the largest among the PIC11 economies, certainly have wider and more complex growth opportunities than the smaller PICs.

***Pacific Possible* recognizes the constraints that geography imposes, but asks the question as to what would be possible if the few existing opportunities for economic growth were fully exploited and what reforms would be necessary to unlock these opportunities.** This approach aims to realistically assess growth opportunities and reform requirements, accounting for the binding capacity constraints faced by most of the PIC11 countries. Although the public sectors in most of the PIC11 are relatively large in relation to the size of the economy, they are still very small in absolute size, with very thin technical capacity to design and implement reforms and provide services. The *Pacific Possible* approach suggests that reform efforts should be narrowly targeted at unlocking existing growth opportunities as compared to an approach that recommends broad-based reforms in the hope that they would trigger economic growth.

Changes in the Global Environment Create New Opportunities for the PICs

Why should the economic growth performance over the next 25 years be better than what it has been over the past 25 years? This is an important question as many of the constraints that have held back economic growth over the past 25 years will continue to be present in the future, including geographic and capacity constraints. *Pacific Possible* thus identifies a range of global and regional developments that could be the source of new growth opportunities for the PIC11. Growing economic prosperity and a growing middle class in China, the aging of the population of developed countries in the region, including Australia, New Zealand, Japan, and Korea, technological progress, as well as the shift to a more multipolar geopolitical environment with growing levels of insecurity, are among the global megatrends that could give rise to greater demand for what the PIC11 can offer competitively—an attractive and safe island and marine environment, labor, natural resources, especially fish and potentially deep sea minerals, and their geostrategic position.

China's middle class is projected to increase from 54 million in 2005 to 1 billion by 2030, which is likely to result in continuously growing outbound tourism from China, providing an important opportunity for the PIC11 to grow their tourism sectors. The aging of societies around the Pacific will see continued demand for low-skilled, manual migrant labor in the developed countries of the region, but also increasing demand for more specialized labor, especially for the care of the growing number of elderly. The Information and Communications Technology (ICT) revolution may open new opportunities for the export of knowledge services. With very limited job and employment opportunities at home to date, seasonal and permanent migration has been the only pathway to access overseas employment opportunities—improved Internet connectivity opens new opportunities to contribute labor to overseas activities without having to move physically. Technological progress may also make the mining of deep sea minerals feasible and economical.

Climate change represents the major risk for the future of the PICs. The PIC11 are already now among those countries with the highest vulnerability to natural hazards, including tropical cyclones, volcanic activity, earthquakes, droughts, and flooding. Climate change has the potential to raise the frequency and intensity of these threats and also brings new threats, in particular in the form of sea level rise. In many of the atoll islands of the Pacific, the highest elevation is only a few meters above sea level. Under various climate change scenarios, there is a real possibility that atoll nations such as Kiribati, Tuvalu, and the Marshall Islands may see a significant reduction in their habitable landmass and become ultimately entirely submerged.

How Big are the Main Transformational Economic Opportunities?

With a projected additional 1 million in tourist arrivals to the region by 2040, tourism will provide the main opportunity to accelerate growth and generate employment for many countries. Increasing the Chinese market, increasing the number of luxury resorts, capturing the retiree market, and basing cruise ships in the Pacific could increase the number of tourists visiting the Pacific by about 1 million, generate additional spending of more than US\$1.6 billion, and create more than 110,000 additional jobs by 2040. Vanuatu, Samoa, and Palau are well positioned to be the biggest beneficiaries of the projected increase in arrivals to the region. Over the period to 2040, this could yield an additional increase in per capita incomes of 20-30 percent for these countries. Fiji and Tonga could garner an additional increase in per capita incomes of about 10 percent.

Improved Internet access and connectivity could translate into additional GDP of more than US\$5 billion and close to 300,000 additional jobs by 2040. In recent years, the PICs have liberalized their telecoms markets and invested heavily in fiber optic cable connections. This creates the basis for significant increases in mobile and Internet penetration over the next 25 years. Improved connectivity and widespread use of ICT will support the growth of the ICT sector in most countries; create new market opportunities (for example, business process outsourcing - BPO); and enhance economy-wide productivity (for example, by facilitating the dissemination of new agricultural technologies) and the quality and attractiveness of existing activities (for example, by offering low-cost Internet services to tourists).

For the larger economies in the Pacific, in particular the Melanesian countries, improved connectivity has the potential to accelerate the spread of knowledge and adoption of productivity-enhancing technologies, helping to close productivity gaps to other countries. For countries such as Fiji, Samoa, and Tonga, it can also facilitate the export of services through business and knowledge process outsourcing. We estimate that ICT-related opportunities could lead to additional per capita income growth of around 20 percent in PNG, 7-10 percent in Fiji and the Solomon Islands, and around 5 percent in Samoa and Tonga.

Fisheries could generate more than US\$300 million in additional revenue by 2040 and significantly boost incomes in Kiribati, Tuvalu, and the Federated States of Micronesia. These increases in revenue would require:

- **Broadening participation in the Vessel Day Scheme (VDS)** beyond the Parties to the Nauru Agreement (PNA)² to include major resource owners such as the Philippines and Indonesia;
- **Ensuring compliance with robust catch limits** to maintain valuable tuna fisheries stocks—including limits in the high seas;
- **Flexible access** (including through easier trading of vessel days among countries and companies and eventual pooling of access rights among countries) and a gradual move from a vessel-based to a catch-based system;
- **Significant investments in skills and capacity, and inclusion of coastal communities in the fisheries** where feasible, through dedicated access (that is, a dedicated portion of the total limit on fish catch and effort could be allocated to coastal fishing communities to prevent a food fish gap) and inshore fish-aggregating device (FAD) networks; and
- **Targeted investments to maintain food security.**

Regional processing clusters and vessel support hubs could generate an additional US\$80 million in value added and create between 7,500 and 15,000 new jobs. By 2040, fisheries opportunities could translate into an additional increase in per capita income of between 50 and 60 percent in Kiribati and Tuvalu, and around 20 percent in Micronesia.

Expanded labor mobility opportunities could generate an additional net income of about US\$13 billion for about 240,000 permanent migrants by 2040. Additional labor-mobility opportunities would generate benefits for the labor-receiving and labor-sending countries as well as for the migrants themselves. *Pacific Possible* estimates that Australia-New Zealand Atoll Access Agreements, a Pacific Access Category (PAC) for Australia, Pacific caregiver programs, and entry into new labor markets such as Canada and Korea could generate an additional net income of about US\$13 billion for about 240,000

² The eight member nations are the Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu.

permanent migrants by 2040, with workers from Fiji, Papua New Guinea, Samoa, and Tonga likely to capture the lion's share. The impact on the labor-sending countries derives from remittances and incomes earned by seasonal workers and slowed-down population growth through emigration. Over the period to 2040, we estimate that these measures could support an additional increase in per capita incomes of close to 50 percent for Kiribati, around 20 percent for Tuvalu, Vanuatu, and Tonga and around 10 percent for Samoa and the Solomon Islands.

Deep sea mineral (DSM) mining still entails significant uncertainty and knowledge gaps with regard to resource potential, technology, economic viability, social, cultural and environmental impacts. *Pacific Possible* undertook a stocktake of current activities and knowledge in this area. Significant potential mineral resources include Seafloor Massive Sulphides (SMS) in the waters of Fiji, Papua New Guinea, the Solomon Islands, Tonga and Vanuatu, Polymetallic Manganese Nodules (PMN) in the waters of Kiribati, and to a lesser extent in Tuvalu, and Cobalt-rich Ferromanganese Crusts (CFCs) in Kiribati, the Marshall Islands, the Federated States of Micronesia, Palau, Samoa and Tuvalu. Several countries have granted deep sea mining exploration permits, however, Papua New Guinea is the only country to have granted a permit to exploit.

Given the many unknowns and risks, *Pacific Possible* recommends the application of the Precautionary Approach to deep sea mining, which requires continuous updating of information, monitoring and stakeholder consultations. The high institutional and technical capacity demands of this process leads *Pacific Possible* to recommend collaboration around a regional technical advisory body. *Pacific Possible* also recommends that investments be made to close knowledge gaps around deep sea mining to allow for greater evidence-based decision making.

What Does it Mean for Income, Employment, and Government Revenue by 2040?

Adding it all up, exploiting these opportunities could increase the long-term average growth rate for most countries by between 0.6 and 1.3 percentage points, resulting in incomes that are about 15 to 40 percent higher in 2040 compared to projections based on historical trends. For Vanuatu, Samoa, and Palau, tourism would be the main driver of higher growth, while fisheries and labor mobility could support higher growth for Tuvalu, Kiribati, and the Federated States of Micronesia. Fiji, Samoa and Tonga could use multiple opportunities to achieve higher growth, including tourism, labor mobility, and ICT-related opportunities. Papua New Guinea and the Solomon Islands could also harness significant gains from the opportunities discussed in *Pacific Possible* in absolute terms. In comparison to the size of these economies, however, the potential gains from the opportunities discussed in *Pacific Possible* are relatively modest and the potential opportunities and drivers of growth are likely to be wider (and a discussion of which is beyond the scope of *Pacific Possible*).

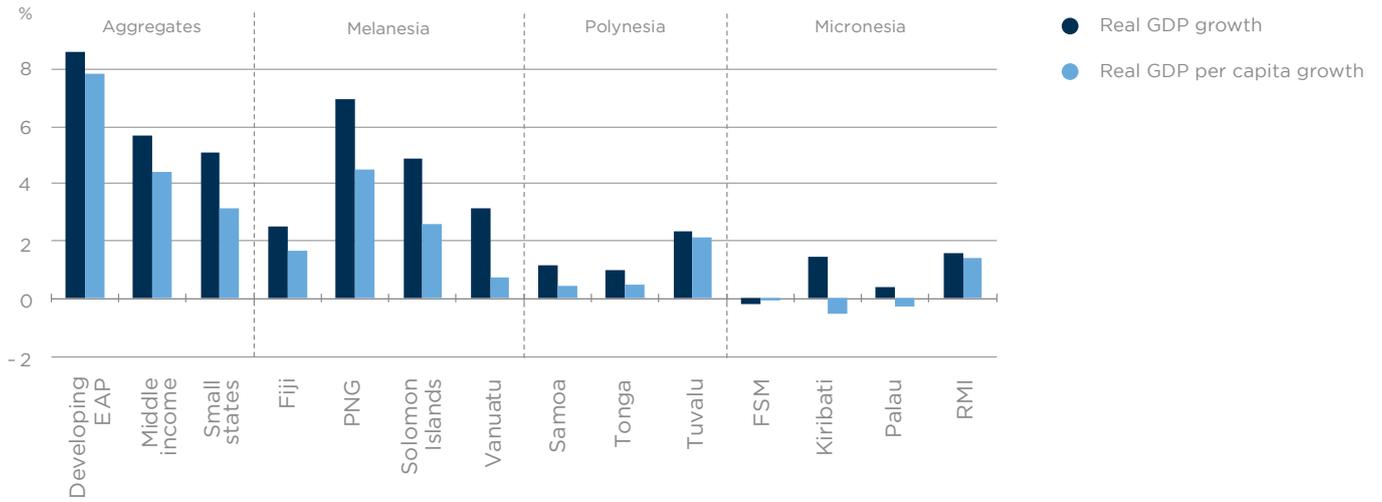
The Marshall Islands is the only country examined by *Pacific Possible* where we do not show any significant growth opportunities, even though the set of likely drivers of growth does not extend much beyond those discussed by *Pacific Possible*. This reflects the special challenges faced by atoll nations and the fact that additional gains from fisheries are likely to be more modest for the Marshall Islands than for Kiribati and Tuvalu. Since the Marshall Islands already has open access to the US labor market, there is also more limited potential to achieve gains in this area. One issue not fully explored by *Pacific Possible*, however, is a potential gain from making better use of this labor market access through better education and skills development which would allow migrants to access higher-paying jobs.

Tourism, labor-mobility, and ICT-related opportunities can boost job growth in the Pacific. The opportunities and threats discussed in *Pacific Possible* have direct and indirect impacts on employment in the PICs. Tourism and ICT-related opportunities would create up to 400,000 additional new jobs. The enhancements of labor-mobility schemes discussed in this report could create up to 240,000 opportunities for permanent migration and thus reduce pressures in domestic labor markets. Employment opportunities in fisheries are more limited, with up to 15,000 jobs largely in onshore processing of fish, but also opportunities for employment on ships.

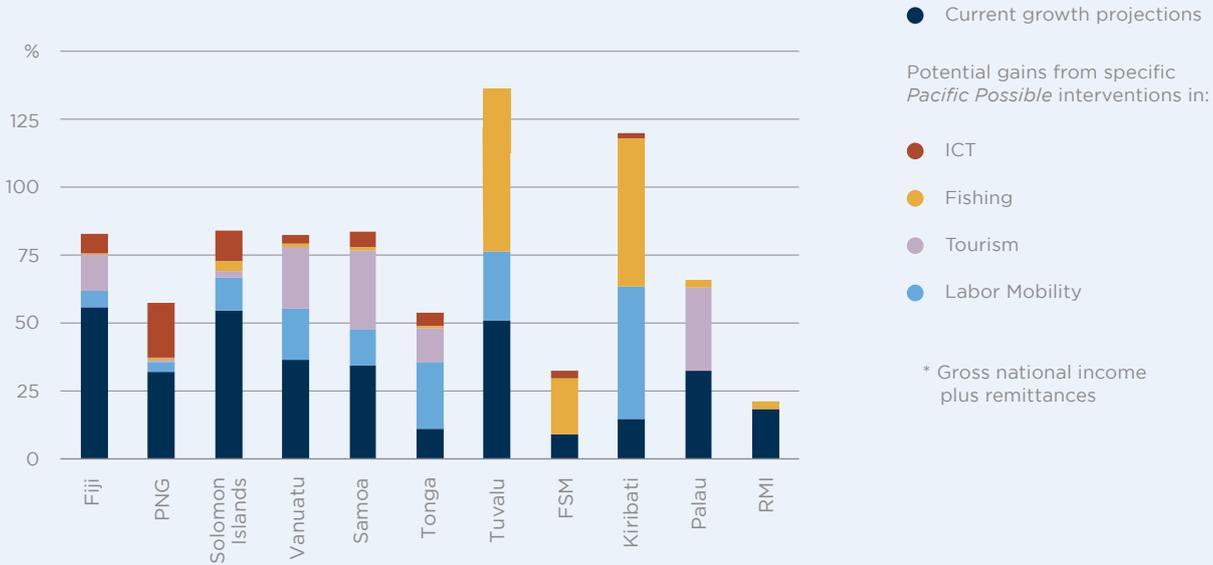
While climate change and natural disasters have an overall negative impact on the PICs, implementation of climate adaptation measures would not only help to protect jobs, but also create new jobs primarily in the construction sector. For all the opportunities and threats discussed, there will also be increased demand for highly specialized technical and managerial skills. While, at present, many of these skills are imported, with adequate investments in education and training it will be possible to fill many of these positions locally.

What is Possible by 2040?

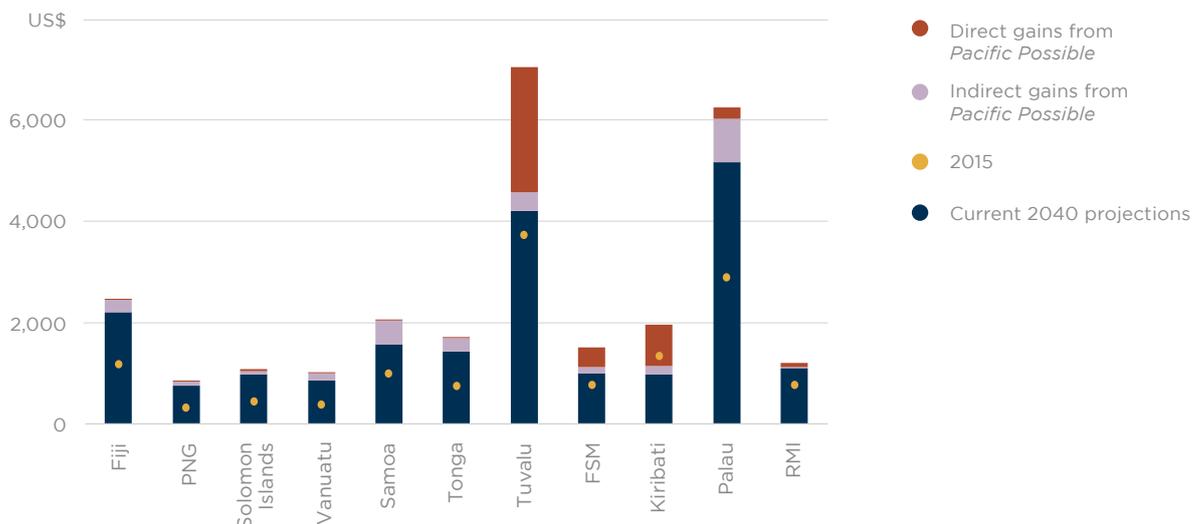
Average Annual Growth in the Pacific 2005 to 2015



Growth in Real Income per Capita* - Opportunity Scenarios 2015 to 2040

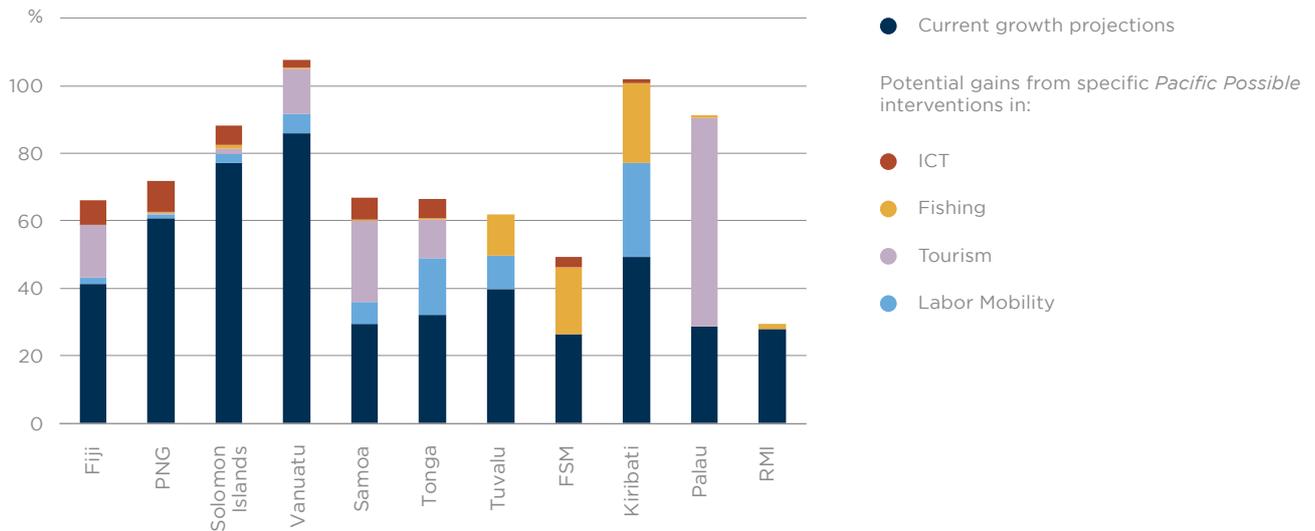


Domestic Revenues per Capita - Opportunity Scenarios 2015 and 2040



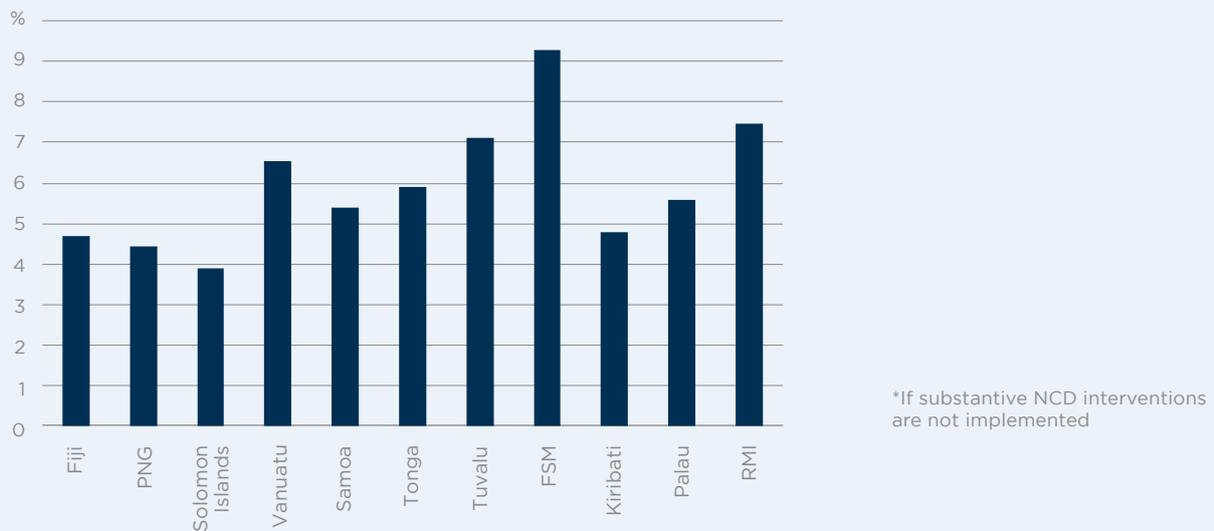
Employment Growth - Opportunity Scenarios

2015 to 2040



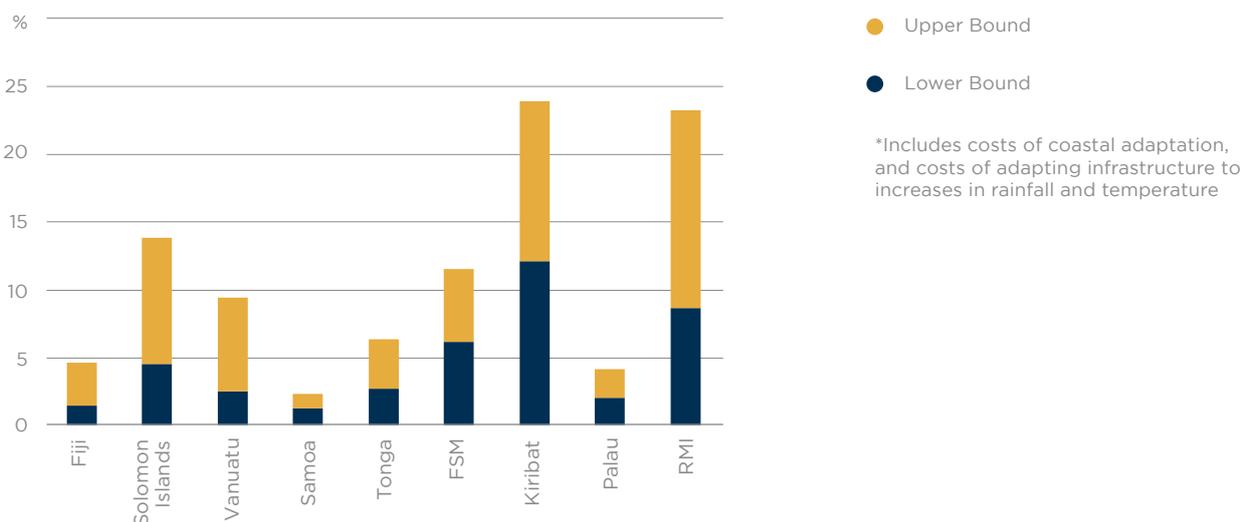
Additional Annual Economic Cost of NCDs*

As a proportion of currently-projected 2040 GDP



Annual Cost of Coastal and Infrastructure Adaptation*

As a proportion of currently-projected 2040 GDP



Fisheries, ICT, and tourism have the potential to significantly boost government revenue. Under the PNA, fisheries revenue from access fees has increased over the five years to 2014 to around US\$400 million, generating large fiscal surpluses in Kiribati, Tuvalu and the Federated States of Micronesia. *Pacific Possible* projects that, by 2040, access fees from fisheries could increase by between US\$160 to US\$320 million, without an increase in catch levels or threats to the sustainability of the fisheries stock. Accelerated growth of the tourism and ICT-based sectors would help to broaden the tax base and thus increase resources available to governments. For most of the PIC11, real per capita revenue in 2040 will be double that of 2015. Only the Federated States of Micronesia, the Marshall Islands, and Kiribati are likely to see more moderate increases in per capita revenue. Improvements in tax policy and administration will remain important to ensure efficient and equitable tax systems.

Development assistance will remain important for PICs to be able to deliver an adequate level of public services. *Pacific Possible* assesses the resource requirements that would enable the PICs to achieve human development outcomes and infrastructure levels comparable to the average for developing small state comparators. Even with increased revenue levels projected under the opportunity scenario, adequate funding of public services will remain difficult in the North Pacific countries, Papua New Guinea, the Solomon Islands, and Vanuatu. Our projections of the cost of adaptation to climate change are in addition to spending needs required to improve human development and infrastructure. International climate finance is, therefore, critical if climate financing needs are not to crowd out human development and infrastructure funding.

How Big are the Main Risks to Prosperity?

Pacific Possible examines the impact of two risks that could significantly impact on growth outcomes and standards of living by 2040: (i) the NCD crisis, which is affecting the lives of many Pacific Islanders; and (ii) climate change and natural disasters, which could have more dire impacts on the Pacific Islands than on any other country in the world. *Pacific Possible* estimates the economic burden of increased morbidity and mortality due to NCDs as well as the potential cost of selected measures to enhance climate and disaster resilience.

Climate and Disaster Resilience

The economic costs of natural disasters are already high for most PICs—on average between 0.5 to 6.6 percent of GDP is lost annually—and climate change will increase vulnerabilities. There are, however, deep uncertainties around the speed and intensity of climate change. Annual costs of coastal adaptation and adaptation of infrastructure to changes in rainfall and temperature alone are estimated to range from US\$400 million to US\$1.2 billion by 2040, with the size of the range driven by the variability between climate scenarios used for the analysis, including on changes in temperature and rainfall as well as low and high estimates of likely sea-level rise. It is important to note that these costs reflect additional adaptation requirements due to projected climate-change impacts over the next 25 years on top of what is currently required to adapt to the current weather conditions.

Although no detailed estimates of current climate-adaptation expenditure exist, it is broadly recognized that there is an adaptation gap—with adaptation spending significantly below requirements. Considering the high uncertainty about the evolution of climate-change impacts for specific PICs and the prospect that available resources are likely to be significantly less than what full adaptation would require, *Pacific Possible* describes a range of strategies for choosing appropriate climate-adaptation approaches. Regarding the economic impact of climate change, it is important to differentiate between the direct economic impact of climate change, which is significantly negative, and the impact of climate-adaptation measures that, depending on the source of financing, could have a positive impact on incomes and employment. While additional revenue will allow countries to increase their contribution to climate-adaptation measures, effective international climate finance will remain central to the PICs' ability to deal with climate change.

Noncommunicable Diseases

The economic burden of NCDs in the Pacific is already high compared with other middle-income countries, and is increasing over time, especially as incomes rise. Without measures such as strengthening tobacco controls and increasing excise duties; reducing the consumption of unhealthy foods through targeted preventive measures, taxes, and better regulation; improving the efficiency and impact of the health budget; and strengthening the evidence base on NCDs, countries could lose between 3 and 10 percent of GDP by 2040. While interventions to curb NCDs are known, there is currently insufficient knowledge that would allow the link between interventions and the incidence of NCDs to be quantified.

How Can it be Achieved?

In addition to specific recommendations for each of the opportunities discussed, *Pacific Possible* highlights five cross-cutting issues that are central to capturing opportunities and managing threats:

- focusing policies and investments;
- investing in people;
- promoting regional cooperation to unlock economic opportunities;
- ensuring sustainability and sound environmental management; and
- addressing the special challenges of low-lying atoll nations.

Focusing Policies and Investments

The combination of extremely thin capacity in the public sector, limited financial resources, high cost of production and service delivery, and scarce political capital requires that PICs choose very carefully which reforms to pursue and which investments to make. This implies that countries identify clearly which are the most promising economic opportunities and what is needed to capture them. Too often, scarce capacity is drawn into many different directions. As a result of thin capacity, implementation of reforms frequently requires technical assistance from development partners who then play an important role in defacto determining which reforms can move forward and which ones are put on hold. The capacity constraints also imply that when a new reform is being pursued, reform efforts in another area are being crowded out. This section highlights some of the policy issues that require particular attention going forward.

Managing Economic Volatility

Although capturing economic opportunities can result in accelerated economic growth and higher per capita incomes for the PICs, volatility of growth is likely to remain high or to even increase due to the undiversified nature of sources of growth and exposure to external shocks. Migration patterns of tuna can result in significant year-to-year variation in fisheries revenue for individual countries; tourist arrivals are subject to economic conditions in the source markets and vulnerable to natural disasters in the destination countries; labor-mobility benefits are not only vulnerable to economic conditions, but also to policy changes in labor-receiving countries; and damages and losses due to natural disasters are likely to increase over the *Pacific Possible* horizon.

Managing economic volatility will require measures at the sectoral level as well as at the macroeconomic level. At the sectoral level, examples of such measures are moving from an annual sale of vessel days to multiyear arrangements or enhancing climate and disaster resilience. At the macroeconomic level, a range of instruments are available. They include strengthening fiscal buffers through appropriate revenue and expenditure management, trust funds and sovereign wealth funds, and insurance mechanisms such as the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). The significant increase in fisheries revenue in recent years has given rise to significant budget surpluses in countries such as Kiribati, the Federated States of Micronesia, and Tuvalu. The expanded fiscal headroom provides these countries with a new opportunity to reassess priority spending needs and the allocation of resources over time.

Public Expenditure and Development Assistance

Strengthened public expenditure and aid management will be essential to using resources effectively and efficiently, both with respect to public spending necessary to unlock economic opportunities, as well as to ensure that higher revenue is effectively used to increase standards of living. With respect to transformational economic opportunities, tourism development will require, in most cases, well-targeted infrastructure enhancements, be it improved air and sea connectivity, development of new tourism sites, or better water and sanitation. Well-sequenced and prioritized tourism sector strategies will need to be linked to medium-term expenditure plans and governments' overall fiscal strategies to be able to make tangible progress. Similarly, NCD and climate-related public expenditures should also be adequately reflected.

Improving standards of living will require, for most countries, increased per-capita expenditure on health, education, and infrastructure. Fully exploiting economic opportunities will result in significant increases in per-capita government revenue that will allow most countries to achieve significant improvements in human development. Some countries—especially countries in the North Pacific and the Melanesian countries (except for Fiji) will, however, need to undertake additional measures to reach human development outcomes that are similar to the average for developing small states. Such measures would include increasing the effectiveness of public spending, complemented by efforts to increase domestic revenue and aid.

Financial Sector Reform

Selected financial sector reforms targeting improved access to credit, de-risking, and reducing the cost of sending remittances will be particularly important for growth of the tourism sector and drawing the full benefits from labor mobility. The financial sectors of most of the PICs are small. Weak financial sector regulation and supervision puts them at heightened risk of being cut off from the international financial system in the context of global de-risking. After “9/11”, there has been a tightening of international anti-money-laundering/counter-terrorism financing (AML/CTF) rules that impose significantly heightened compliance requirements on the PICs. This affects incoming remittances, donor funding, imports and outgoing transactions as well as some niche activities that are important for some of the PICs such as offshore financial centers (Nauru, Palau, Samoa, Vanuatu) and registration of ships (the Marshall Islands). While all PICs are affected by global de-risking, Vanuatu, the Marshall Islands, Nauru and Tuvalu already have lost correspondent bank relationships or are under threat of losing access. The increase in the cost of sending remittances—combined with closures of Money or Value Transfer Services’ bank accounts including in Samoa, the Solomon Islands, and Tonga—reduces the benefits from expanded labor mobility. Strengthening financial sector regulation to meet AML/CTF requirements is, therefore, critical for the PICs.

Conducive Business Conditions

Improvements in the business environment should focus on facilitating activities in the tourism sector.

Considering the thin capacity in most PICs, it is important that reform efforts are clearly prioritized through a dialogue between governments, tourism sector stakeholders, and potential investors. Given the small size of the tourism sector in most PICs (in absolute terms, even though in relation to the size of the economy they may be large), harmonized business regulations that make it easier for tourism operators to operate in multiple countries may increase the attractiveness of the region for international investors. Such international investors would not only bring resources and know-how to the region, but could also play an important role in market development, knowledge transfer, and capacity building.

Investment incentives can be costly and their effectiveness in attracting investment may be limited. As in many other regions, fiscal and financial incentives seem to be an important tool for PICs that seek to attract investment. Pacific Trade & Invest (PT&I), the region’s largest trade-promotion organization, notes on its website (2017) that “Great tax incentives and hardworking people make the Pacific Islands perfect for investment.” Discounts under the VDS are a particular incentive found in some of the PICs, used to incentivize onshore activities.

Global evidence suggests that the effectiveness of incentives in attracting investments may be limited and, at best, only influence investment decisions at the margins. Other factors such as political and macroeconomic stability or quality of infrastructure seem to be the primary drivers of investment decisions. As the geography of the PICs raises cost of production and limits their international competitiveness for many activities, there is also the risk that investment incentives provided for a limited time to attract new investment may turn into permanent subsidies to retain activities that would not be competitive without such subsidies. In addition, there is also a risk that if PICs compete against each other using tax incentives, this may lead to a suboptimal situation for the entire region. As a consequence, the case for investment incentives should be very carefully studied whenever they are considered. In addition, it is also of critical importance to assess the lifetime cost of any incentives considered.

Investing in People

Realizing the opportunities will rely critically on the availability of adequate skills and education at all levels. Broad-based job opportunities through labor mobility, tourism, and the knowledge economy will require improved basic education and market-responsive skills development. In addition to a broad-based strengthening of the skills base, there is the potential to further develop world-class, high-end managerial and technical skills in areas such as deep sea mining, fisheries, and tourism management. With respect to labor mobility, appropriate policies in labor-sending countries can help ensure positive impacts on the domestic skill base, not only by broadening opportunities for education and skills development, but also by putting in place measures that would make it easier to draw on the diaspora and harness its skills and experience for the benefit of the domestic economy.

Promoting Regional Cooperation to Unlock Economic Opportunities

***Pacific Possible* highlights the importance of regional cooperation to unlock economic opportunities.**

Experience with regional collaboration in the Pacific suggest that the chances for success are highest when collaboration is driven by shared economic interests of participating countries. The dramatic increase in revenue from fisheries under the PNA is a clear example of how cooperation among PICs can help to unlock economic opportunities. Collaboration between labor-sending and labor-receiving countries is another example of a collaborative arrangement that brings significant benefits to all parties involved. Further strengthening collaboration in these two areas holds significant potential for further enhancing these benefits. Regional cooperation will, however, also be essential to support the growth of the Pacific tourism industry and for deep sea mining.

Ensuring Sustainability and Sound Environmental Management

Three of the opportunities discussed in *Pacific Possible* are based on the PICs' natural resources—fisheries, deep sea mining, and tourism. Each of these areas faces its specific environmental and sustainability challenges. There are, however, also important interactions among these three areas where environmental damage in one area could severely affect performance in the other two areas. For example, deep sea mining could adversely affect tuna fisheries, especially if spawning grounds are disturbed. Climate change and natural disasters also have significant environmental impacts that directly affect performance in the other three areas.

Addressing the Special Challenges of Low-lying Atoll Nations

Because of their extreme remoteness and small size, economic opportunities in the atoll nations are even more limited than those in other PICs, including in the areas of knowledge economy and tourism.

At the same time, these countries are most exposed to the negative effects of climate change. Sea-level rise will increase the likelihood of king tides and worsen the salinization of land and water resources, which further reduces already very low agricultural productivity. Although some of the atoll nations are projected to be able to benefit from increased fisheries revenues, they will incur particularly high costs to protect themselves against climate and disaster risks. Targeted measures such as special labor-mobility schemes and climate-change funding are, therefore, of particular importance for the atoll nations.





Photo Tom Perry

PART I

The Pacific Islands' Growth Challenge in a Regional and Global Context

This part of the report sets out the unique economic geography of the PICs and its implications for their growth opportunities and prospects. Global mega trends—such as a more prosperous East Asia, a slowdown in population growth, a multipolar geopolitical environment, technological advances, climate change, agglomeration and specialization as drivers of global production—provide not only a spate of new opportunities but also new threats for the PICs.



1. Introduction

Pacific Island Countries (PICs) face unique development challenges due to their economic geography.

Past analytical work highlighted structural barriers to growth and international competitiveness (remoteness from major markets, fragmentation, small population size, vulnerability to external shocks, and environmental fragility). For most of the smaller PICs, potential drivers of economic growth are thus limited to a few sectors, where natural endowments (such as tourism and fishing) help overcome these structural barriers. If historical low growth trends were to continue, most PICs would see only modest increases in living standards over the span of a generation.

***Pacific Possible* looks at long-term improvements in living standards and asks the question “What is possible?”**

It does this by examining potential transformational development opportunities and challenges faced by PICs which, in many cases, could be triggered or facilitated by changes in the external environment. It seeks to provide a realistic assessment of these opportunities and quantify potential increases in per capita Gross National Income (GNI), employment, and government revenue by 2040. It is important to note that the quantitative outlook on 2040 should not be interpreted as projections of what is the most likely economic situation of the PICs by 2040, but an indication of what is possible if the right policies are implemented and the necessary investments made. As with any quantitative long-term outlook, there is a fairly large degree of uncertainty. The estimates offered by *Pacific Possible*, therefore, need to be considered as an indication of the order of magnitude of possible change and not as a numerically precise estimate.

The focus is on the PICs that are members of the World Bank Group—Tuvalu, Palau, the Marshall Islands, the Federated States of Micronesia, Kiribati, Tonga, Samoa, Vanuatu, the Solomon Islands, Fiji, and Papua New Guinea.³

Many of the findings of *Pacific Possible* are, however, likely to be of interest and relevance for all PICs. Some of the larger PICs such as Papua New Guinea, Fiji, and the Solomon Islands clearly have a wider set of development opportunities than those covered in this report. The issues discussed in *Pacific Possible* are, however, clearly relevant to them and they often play important roles in regional and subregional solutions.

***Pacific Possible* does not intend to provide a comprehensive review of development issues, a development vision or detailed action plans.**

The focus on transformational development opportunities does not imply that themes and sectors not covered in this report are not important for the Pacific. For example, agriculture is central to the livelihoods of many Pacific Islanders and will require continued attention by policy makers. We do not, however, see agriculture as a sector that is likely to experience transformational change that would result in rapid growth across the region.

Issues such as macroeconomic stability and property rights are clearly important and *Pacific Possible* works on the assumption that countries maintain the standards currently achieved.

It only comments on these issues when a significant change from the current situation is essential to unlock an opportunity or to manage a threat. In this, the approach of *Pacific Possible* differs from much of the existing work that tends to focus on broad-based improvements in the foundations of growth. Such an approach, however, is likely to yield recommendations that are incompatible with available implementation capacity in the PICs and often result in disappointment, as it may not address the binding constraints to unlock existing opportunities.

***Pacific Possible* also does not provide a national or regional development vision, as this is clearly the task of the PICs themselves and would involve many more considerations than a focus on transformational economic opportunities to increase standards of living.**

Finally, *Pacific Possible* does not provide detailed action plans for the realization of the economic opportunities discussed in this report. This will require further work at the country and regional level to determine approaches that would be most appropriate to the individual country contexts.

³ Nauru joined the World Bank only in April 2016 and is, therefore, not included in this report.

Incomes, Employment, and Government Revenue as Determinants of Wellbeing

Pacific Possible seeks to quantify what improvements in incomes, government revenue, and employment may be achievable if the narrow set of economic opportunities available to the PICs is fully exploited and key risks appropriately addressed. The question as to who benefits from higher incomes, employment, and government revenue is an important one and not addressed in any detail by *Pacific Possible*. Some of the distributional implications are inherent to a particular growth opportunity, while others depend on government policies and public expenditure choices. In parallel with the preparation of *Pacific Possible*, the World Bank has published a Systematic Country Diagnostic (SCD) for eight smaller PICs (World Bank 2016h) and is preparing SCDs for Papua New Guinea, Fiji, and the Solomon Islands. These SCDs seek to identify the most critical constraints and opportunities facing the PICs to meet the global goals of ending absolute poverty and boosting shared prosperity in a sustainable manner and to examine distributional aspects of growth opportunities and public expenditure choices.

As to whether—and to what extent—countries want to pursue these opportunities remains a domestic policy decision. *Pacific Possible* recognizes that there are important interlinkages and tradeoffs between the pursuit of higher economic growth and other dimensions of wellbeing that need to be considered. Such considerations would not only include distributional impacts, but also impacts on social cohesion, the environment, cultural and social preferences, equal opportunities for men and women and so forth. For each opportunity and threat, *Pacific Possible* provides a very brief indication at the end of each section of what the impacts on poverty, gender, and the environment may be, however, consideration of such tradeoffs requires dialogue and consultation among domestic stakeholders. All that *Pacific Possible* can hope to contribute to this debate is to present information on the magnitude of economic opportunities.

This overview report summarizes in-depth research and consultations undertaken as part of the *Pacific Possible* program.⁴ It is organized in four parts. Part I provides background information on the 11 countries covered by this report and offers a discussion of the growth challenges faced by the PICs because of their economic geography. It also highlights some of the global and regional mega trends that can create new opportunities, but also bring new threats to the PICs. Part II discusses potential transformative opportunities, including tourism, labor mobility, ICT-related activities, oceanic fisheries, and deep sea mining. The discussion of individual opportunities generally starts with a description of the current situation, proceeds to describing what new opportunities may emerge over the next 25 years and what their likely impact on incomes, employment, and government revenue could be, and concludes by highlighting what needs to be done to capture an opportunity. Part III focuses on major threats to Pacific livelihoods—climate change and natural disasters as well as NCDs. For each of the opportunities and threats discussed, we also highlight potential impacts on the environment, gender, and poverty. Finally, Part IV adds it all up and discusses what levels of national income, government revenue (and, thus, public service delivery), and employment could be reached by 2040 if opportunities are fully exploited and threats adequately managed. It also highlights common threads across individual opportunities. Appendix 1 outlines the approach taken to develop projections of per capita incomes, employment and government revenue, with details for specific sectors to be found in the *Pacific Possible* background reports. Appendix 2 illustrates how increased public revenues and incomes could translate into improved human development outcomes by 2040.

⁴Detailed background reports and summaries are available at <http://www.worldbank.org/en/country/pacificislands/brief/pacific-possible>.

The Pasifikis – Celebrating the Birth of Saia and Eka in 2015

The Pasifikis are a fictional family of Pacific Islanders and clearly cannot capture the richness and diversity of Pacific societies and individuals. Throughout the report, The Pasifikis will help us understand the potential impact of the transformative economic opportunities and threats on the lives of Pacific Islanders.

Tafu and Maeva, a young Pacific couple, are excited to introduce their newborn twins, Saia and Eka, to their family, friends and their local community. They are preparing to host the many visitors who will come through their home with food and gifts for their family. They know exactly what to expect as they've been through this before—with their first born, Tiera, who is now a bubbly five year old.

Maeva is expecting the ladies from the local handicraft market, where she sells her own handicrafts every day. She has been at home for over a week, so she knows they will take that as a sign that she has given birth. They will eventually pop by with dishes of food, and maybe even a few carefully sewn outfits for the twins. Maeva is thankful for her friends, but most of all for her family. Her mother-in-law, Mere, came to live with them after she became a widow some years ago. Maeva has cared for her as if she was her own mother, and is thankful that today, Mere is returning the same care as Maeva recovers from childbirth, while also watching over little Tiera, who usually stays with her at home.

Tafu, a teacher at the local primary school, is looking forward to seeing his work colleagues, who have called ahead to see if they were ready for visitors. Their home is nestled in a small community on the archipelago's main island. Their village is about a half hour's walk from the capital, where Tafu's school is located. When Tafu started working there, he had to walk on a dirt road. Today, he is thankful for his beloved 2012 Toyota Corolla, which thankfully has not had much damage, given that the road to their village was only tar sealed two years ago.

Tafu's cousins, who live on the other side of the island, have called him with their congratulations. Thankfully, technology keeps them in touch, even though his mother Mere views technology with suspicion. She is worried it will begin to undermine traditional customs, and drifts their family apart. But Tafu reminds her that his cousins find it difficult to travel without a car, because of the condition of the dirt roads that connect them to the town. Like many other villages, his cousins have limited access to electricity and piped water—but they do have their mobile phones. Before they had mobile phones, Tafu's cousins would not be able to congratulate them until they had the means to get to them, which could have been weeks.

Mobiles and the Internet also mean that they are connected to their friends and relatives who have moved overseas, while also giving them access to more diverse entertainment. Tafu can watch as much sport as his mobile data allows, and Maeva can stay up to date with her friends on Facebook. Mere, however, does not like the amount of time they spend on their phones, but because it allows them contact with long-lost relatives overseas, she tries not to complain too much.

Tafu, Maeva and their family are not alone in their way of life. Some other villages on the main island have the same access to tar-sealed roads, electricity and piped water. Over the years, they have noticed a rise in the number of people who have visited, and moved over, from the outer islands. Many have come in search of new opportunities—to see how stronger houses are built, to make the most of public services, and most of all; for education and better employment opportunities.

Of all the people who have come from outer islands, Tafu and Maeva have welcomed family members as they passed through, before getting on their feet. At the moment, two of Maeva's cousins have asked if they can stay with them for a few months, while they look for work. They are also caring for Tafu's niece and nephew from another outer island as they complete their studies in high school. These family

members tell them stories of how eking out a living on the outer islands is becoming more difficult. Tropical cyclones seem to be becoming more intense and are often accompanied by king tides which not only wipe out their crops, but also reduce the fertility of land. While some have chosen to relocate within the outer islands, they, and many others, have decided to migrate to the main land, not only for better opportunities, but also for a sense of stability.

While they have a full house, Tafu and Maeva are happy. Everyone pitches in, both with household chores and with food and money where they can. It is a comfort to know that they are not alone in raising and providing for their family.



GEOGRAPHY, DEMOGRAPHICS, AND GOVERNANCE

The 11 Pacific World Bank member countries covered in this report represent a unique group of countries that share many commonalities, but also significant differences. The Pacific is the largest expanse of ocean in the world, and the PICs are situated far from countries of any substantial size. While the combined land area of the 11 countries is only about 517,000 km² – about the size of Thailand – their combined Exclusive Economic Zones (EEZ) cover 16.8 million km², which is larger than the United States and almost the size of Russia. Papua New Guinea is by far the largest country in terms of land area, while Tuvalu with an area of only 26km² is the smallest. The distance between the easternmost country, Kiribati, and the westernmost country, Palau, is about 7,500 kilometers, while the distance between the northernmost country, the Marshall Islands, and the southernmost country, Tonga is about 4,200 kilometers.

Table 2-1: The PIC11 – Selected Indicators

Indicator	Melanesia			
	Fiji	PNG	Solomon Islands	Vanuatu
<i>Spatial and Situational</i>				
Population	886,450	7,463,577	572,171	258,883
Population Growth (%)	0.7	2.5	2.5	2.3
Land Area (Km ²)	18,270	452,860	27,990	12,190
EEZ (Km ²)	1,281,703	2,396,575	1,596,464	827,891
Inhabited Islands	100	—	300	72
Remoteness (Kms)	12,183	11,254	11,428	12,061
Average Population per Populated Island	8,865	—	1,907	2,596
<i>Economic Indicators</i>				
GDP per capita (PPP US\$)	8,825	2,896	2,138	3,042
GDP (PPP, Current US\$ millions)	7,823	21,384	1,223	787
Indicator	Polynesia			
	Samoa	Tonga	Tuvalu	
<i>Spatial and Situational</i>				
Population	191,845	105,586	9,893	
Population Growth (%)	0.6	0.5	0.4	
Land Area (Km ²)	2,830	720	26	
EEZ (Km ²)	131,812	664,853	751,797	
Inhabited Islands	4	36	9	
Remoteness (Kms)	11,848	12,410	11,573	
Average Population per Populated Island	47,961	2,933	1,099	
<i>Economic Indicators</i>				
GDP per capita (PPP US\$)	5,811	5,230	3,779	
GDP (PPP, Current US\$ millions)	1,115	552	37	

Indicator	Micronesia			
	FSM	Kiribati	Palau	RMI
<i>Spatial and Situational</i>				
Population	104,044	110,470	21,097	52,898
Population Growth (%)	-0.1	1.8	1.1	0.2
Land Area (Km ²)	700	810	460	180
EEZ (Km ²)	2,992,597	3,550,000	604,289	1,992,232
Inhabited Islands	65	21	8	24
Remoteness (Kms)	10,305	10,865	9,884	10,457
Average Population per Populated Island	1,601	5,260	2,637	2,204
<i>Economic Indicators</i>				
GDP per capita (PPP US\$)	3,343	1,816	13,966	3,817
GDP (PPP, Current US\$ millions)	348	201	295	202

Note: (i) Data for latest year available (2014) except GDP per capita growth and population growth which is a 20 year average to 2014. (ii) Remoteness is measured as the average distance from other economies, weighted by their GDP.

In terms of geology, the Pacific Islands are mostly of volcanic origin or atolls that formed around now-submerged oceanic volcanos, located around the southwestern part of the Pacific Rim of Fire.

All 11 countries are archipelagos, ranging from a minimum of four inhabited islands (Samoa) to more than 300 (Solomon Islands). They range from low-lying atolls to larger islands with significant elevations, and finally Papua New Guinea, which shares the world's second largest island—New Guinea—with the Indonesian provinces of Papua and West Papua. Their location around the equator and on the Pacific Ring of Fire exposes them to frequent and intense natural disasters, including tropical cyclones, earthquakes, volcanic eruptions, and tsunamis.

The total population of the 11 countries is 9.7 million, of whom 7.5 million live in Papua New Guinea.

Each of the other 10 countries has a population of less than 1 million, with Tuvalu (with a population of around 10,000 people) being the smallest country in the group. The populations of Papua New Guinea, the Solomon Islands, Kiribati, and Vanuatu grow at an annual rate of about 2 percent, while most of the smaller PICs have population growth rates of less than 1 percent, partly because of emigration.

With the exception of Fiji, populations tend to be fairly young—with a median age of around 21 years.

Fiji and Kiribati have about 50 percent of their populations living in urban areas, while the other countries tend to have urbanization rates of around 20 percent or less. It is important to note that urban areas in the Pacific tend to be small in international terms. Port Moresby in Papua New Guinea and Suva in Fiji are the only towns with a population of more than 100,000 inhabitants. The Pacific islands fall broadly into three cultural groups, Melanesia, Micronesia, and Polynesia.

All 11 countries are democracies, although forms of government differ. This includes four constitutional monarchies—Tonga and the Commonwealth realms of Papua New Guinea, the Solomon Islands, and Tuvalu—and seven republics. Eight countries are members of the Commonwealth while three countries in the North Pacific are closely associated with the United States through a Compact of Free Association.

While all countries have adopted western forms of government, traditional systems for the organization of society and exercise of power still play an important role. The literature on the Pacific (McLeod 2007) tends to distinguish between “big men” and “chiefly” systems. In “big men” systems, power is personal and acquired and retained based on skills and generosity, with influence over fluctuating groups. In “chiefly” systems, power resides in the position, not the person, with authority over permanent groups. “Big men” systems tend to dominate in the Melanesian countries, while “chiefly” systems tend to prevail in Micronesia and, especially, Polynesian societies.

▷ HISTORY

Human settlement in the Pacific Islands started about 50,000 years ago and took place in several waves originating from East and Southeast Asia.⁵ Historians think that the first humans arrived in Papua New Guinea about 50,000 years ago, spreading from there to an area that is now known as Melanesia and includes Papua New Guinea, the Solomon Islands, Vanuatu, Fiji, and New Caledonia (Matisoo-Smith 2015).

Settlement of Micronesia (an area that includes Palau, the Federated States of Micronesia, the Marshall Islands, Kiribati, and Nauru) started from Southeast Asia about 4,000 years ago according to prevailing theories. A decentralized chieftain-based system eventually evolved into a more centralized economic and religious culture centered on Yap and Pohnpei, with impressive megalithic structures such as those of Nan Madol, which date back to around 1,200 A.D.

Polynesia is located across a vast area of the Pacific Ocean commonly described as the Polynesian Triangle, with Hawaii, the Easter Islands, and New Zealand at its corners and Samoa, Tonga, Tuvalu, French Polynesia, Niue, Tokelau, and the Cook Islands within. The Polynesian settlement is thought to have originated from what is now Taiwan, China, via the Philippines and eastern Indonesia and from the north-west of New Guinea, on to island Melanesia by roughly 1,400 BCE. The archeological record suggests that within a mere three or four centuries between about 1,300 and 900 BCE, Polynesians spread 6,000 kilometers further to the east from the Bismarck Archipelago, until they reached as far as Fiji, Tonga, and Samoa. The area of Tonga, Fiji, and Samoa served as a gateway into the rest of the Pacific region known as Polynesia.

The Pacific Islands were first encountered by European explorers from the sixteenth century onwards. By the end of the eighteenth century, the Pacific had become a hotspot for whaling activity that supplied European markets with commodities derived from sperm whales—including candles, cosmetics, and lamp oil. European settlers began arriving in the Pacific in the early nineteenth century. As Europe urbanized, the market for imported agricultural products grew and plantations, particularly to produce the coconut product copra, developed. Trading networks of large European powers such as Germany and England plied routes across the Pacific, which provided the economic rationale for the colonization of many of the Pacific Islands. As trade and colonial linkages developed, other natural resources were discovered and exploited, including large phosphate reserves in Kiribati, marine products such as sea cucumbers collected by Chinese traders and valuable hardwoods. The period from the outbreak of the First World War through to the Second World War brought intense suffering to the Pacific Islands, with devastating battles being waged on their shores and countries being exchanged between colonial powers.

Most Pacific Islands have regained their independence, but typically retain close economic ties to larger nations. The Marshall Islands, the Federated States of Micronesia, and Palau have compacts of free association with the United States that include free movement of people, sharing of territorial waters and international fiscal transfers. Tongans and Samoans were afforded open access to New Zealand after independence and, while they no longer have open access, a large proportion of their populations now possess dual nationality or have family across both New Zealand and their country of origin.

▷ SOCIOECONOMIC DEVELOPMENT

The 11 countries differ significantly with respect to their socioeconomic development. According to the UNDP's Human Development Index, Palau, Fiji, Tonga, and Samoa show the best human development outcomes and are in the high human development group. The Federated States of Micronesia, Vanuatu, and Kiribati are in the medium human development group, and the Solomon Islands and Papua New Guinea in the low human development group (Figure 2-1).

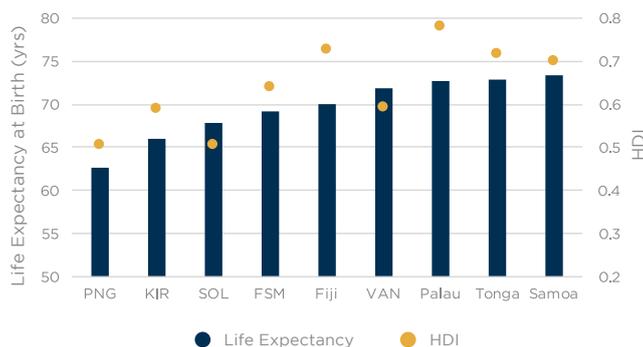
⁵ It is important to note that there is still significant uncertainty about the origins and timelines of human settlement of the Pacific Islands.

Figure 2-1: Human Development in the Pacific

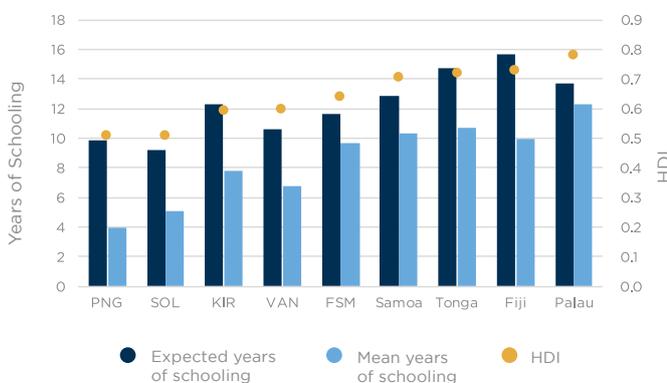
Human Development Index and Country Rank



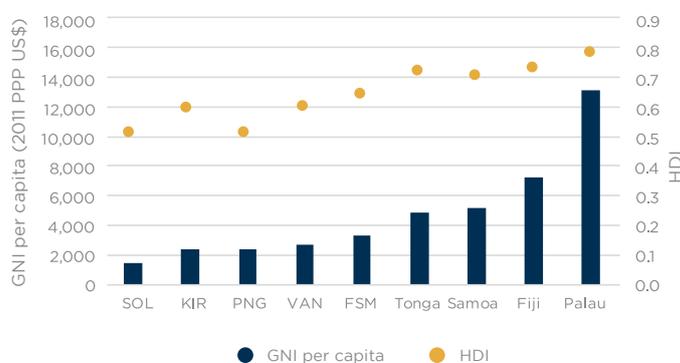
HDI and Life Expectancy



Years of Schooling and HDI



HDI and Gross National Income per capita



Per capita gross national incomes at purchasing power parity of the 11 countries range from US\$1,540 for the Solomon Islands to US\$13,496 for Palau.

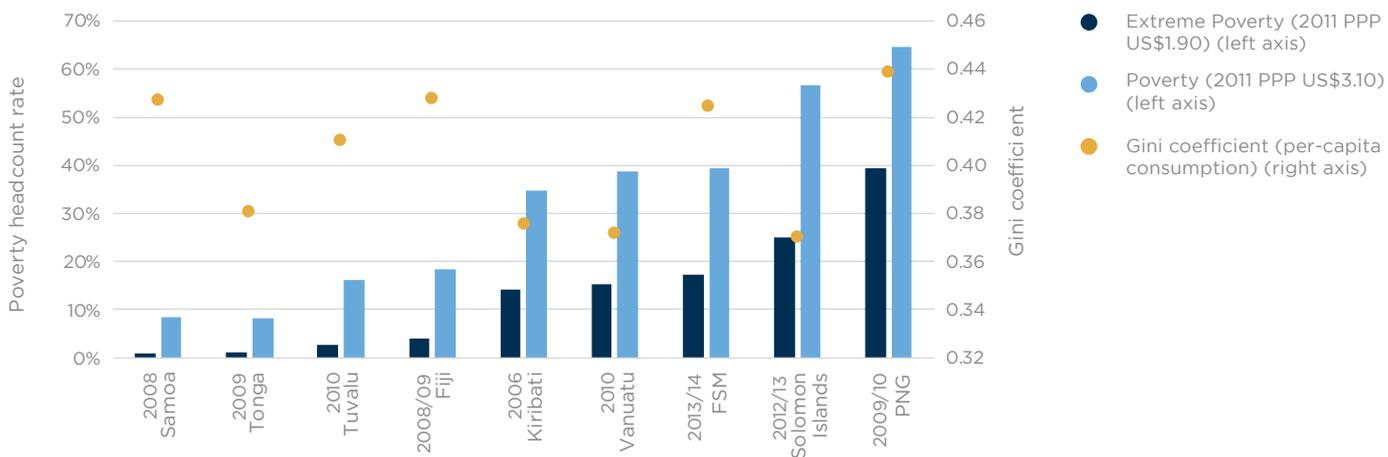
The countries are classified by the World Bank either as lower-middle-income economies (Kiribati, the Federated States of Micronesia, Papua New Guinea, Samoa, the Solomon Islands, Tonga, and Vanuatu) or as upper-middle-income economies (Fiji, the Marshall Islands, Palau, and Tuvalu).⁶ Life expectancy and educational attainment show similar differences across the 11 economies, with a life expectancy ranging from 63 years in Papua New Guinea to 74 years in Samoa. Mean years of schooling range from four years in Papua New Guinea to 12 years in Palau. It is, however, important to note, that as most countries have undertaken significant investments in their education sectors in recent years, the cohort of children entering school now can expect to achieve a significantly higher level of educational attainment than previous generations. For Papua New Guinea, the expected years of schooling will increase to 10 years and, at the high end, for Fiji the expected increase is to 15 years of schooling.

Poverty outcomes also differ widely across the PICs, with moderate levels of poverty and very low levels of extreme poverty in the Polynesian countries and Fiji, while the Micronesian and Melanesian countries have a much higher incidence of poverty.

Similarly, there are relatively large differences in inequality among the 11 countries. These differences seem to be driven, however, by country-specific factors and do not correlate in any obvious manner with the level of poverty or income of a particular country, nor with cultural country groupings. Higher educational attainment and formal sector employment tend to reduce the likelihood of being poor. In addition, poverty rates tend to be higher on outer islands, where the populations tend to have more limited access to economic opportunities and quality public services (World Bank 2016h).

⁶ As of July 1, 2016, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas Method, of US\$1,025 or less in 2015; lower-middle-income economies are those with a GNI per capita between US\$1,026 and US\$4,035; upper-middle-income economies are those with a GNI per capita between US\$4,036 and US\$12,475; and high-income economies are those with a GNI per capita of US\$12,476 or more.

Figure 2-2: Poverty in the Pacific Islands



Source World Bank staff estimates based on Household Income and Expenditure Survey data.



Photo Tom Perry

3.

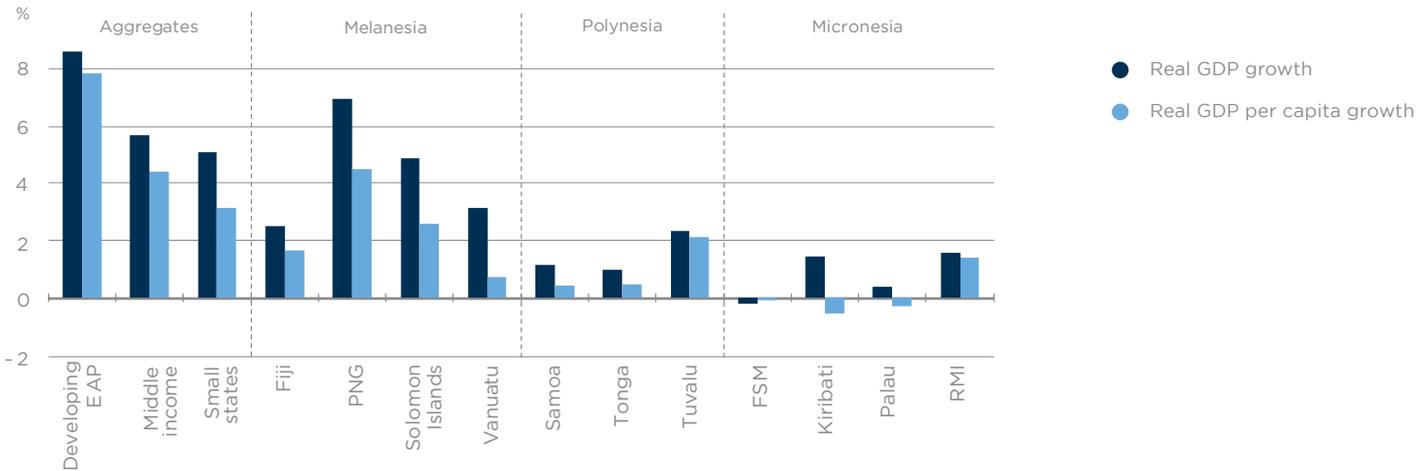
The Pacific Island Countries' Growth Challenge

THE PIC'S GROWTH PERFORMANCE

Most PICs have generated only very modest rates of economic growth during the decade from 2005 to 2015 (Figure 3-1). Most Polynesian and Micronesian economies have registered per capita income growth rates of less than 1 percent. Only the Melanesian countries have been able to achieve higher growth, reflecting partly their more abundant resource endowments, especially mining and logging, and also their larger size.

Figure 3-1: Economic Growth Has Been Low for Most of the PIC11

Average Annual Growth in the Pacific, 2005 to 2015



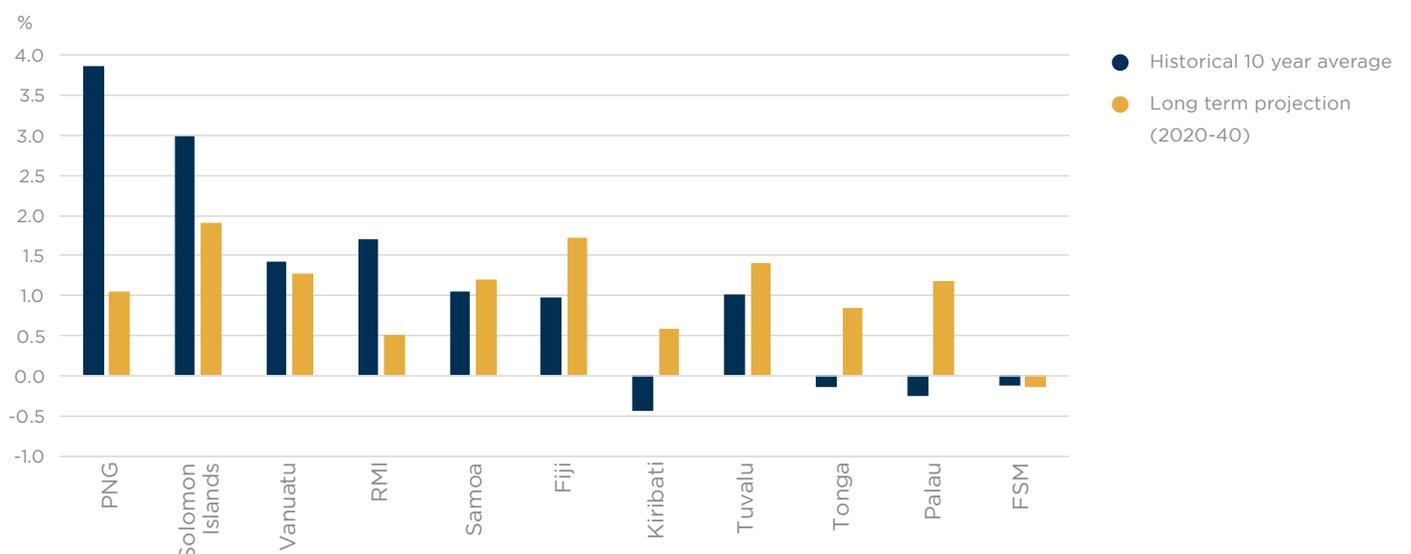
Source World Development Indicators and World Bank staff calculations.

The International Monetary Fund (IMF)/World Bank (WB) project a decline in long-term per capita GDP growth for four countries compared to the period 2005-15 and small improvements, albeit still relatively low growth rates, for most of the other countries (Figure 3-2). Only Fiji and the Solomon Islands are projected to be able to generate per capita GDP growth of more than 1.5 percent annually in the long term. Especially worrying is the fact that some countries with currently lower per capita GDP also have lower projected growth rates. None of the countries come close to the high growth rates of several East Asian economies of 6 to 7 percent. This implies that, on current trends, economic prosperity in the PICs is going to fall significantly behind that in other countries.

Figure 3-2: Current Projections Show Little Improvement in Economic Growth Performance

Real GDP per capita growth projections

Annual average growth rates



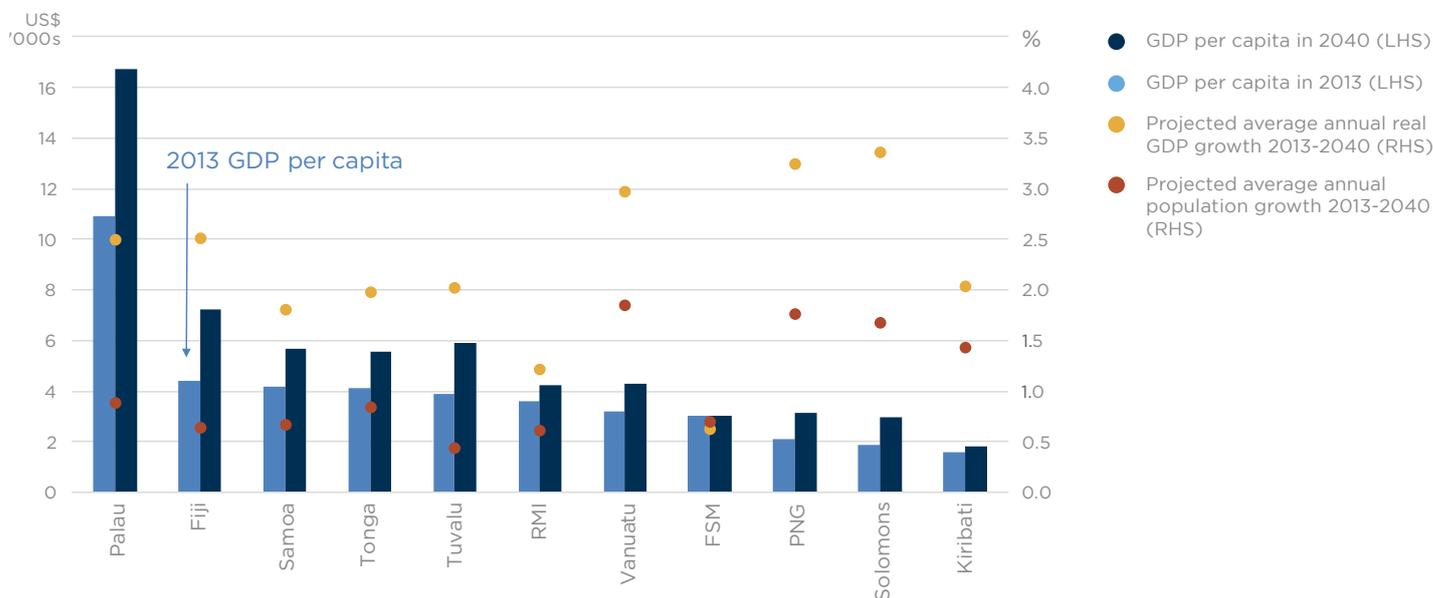
Source Real GDP growth historical averages and projections based on IMF Article IV reports and IMF-WB Debt Sustainability Analyses. Population data and projections from the UN.

Because of low projected growth rates, per capita income levels in 2040 are projected to be only moderately higher than at present (Figure 3-3). *Pacific Possible* examines whether these modest increases in welfare are, indeed, the unavoidable future for most PICs or whether fully exploiting the most transformative opportunities could lead to significantly better outcomes for these countries. The next section will briefly review what academics and development practitioners say about the economic fate of small island economies.

Figure 3-3: Projected Increases in Per-capita Incomes are Very Small for Most PICs

Real GDP per capita growth projections through 2040

Constant 2013 US dollars

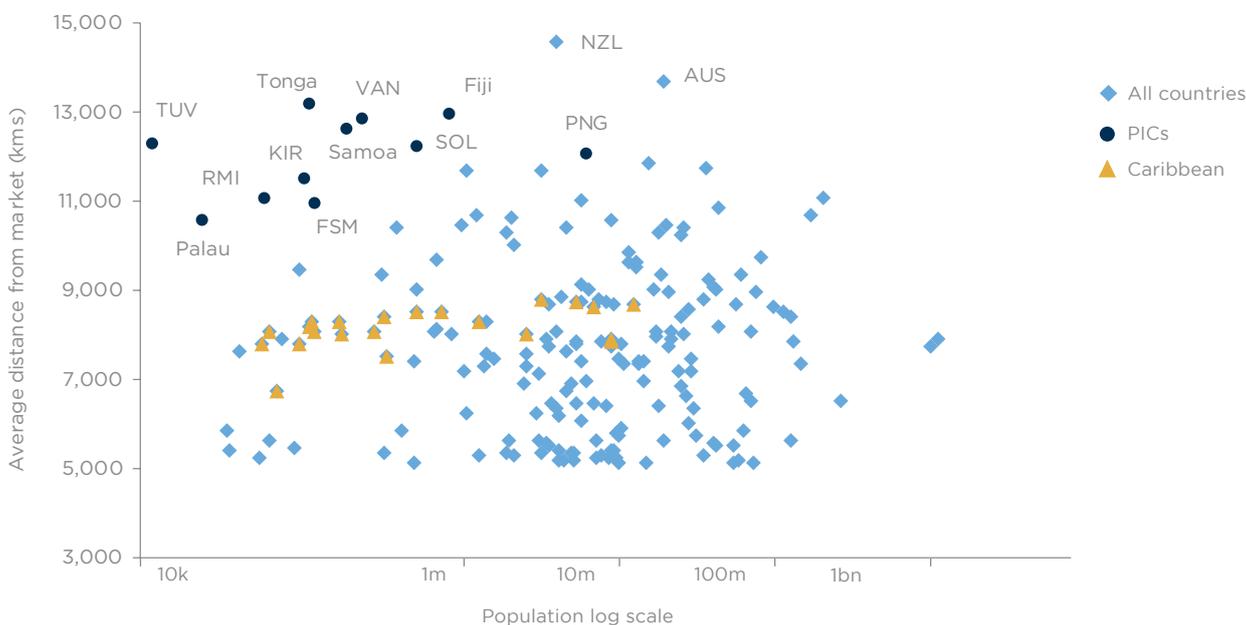


Source GDP and GDP deflator data and projections based on IMF Article IV reports and IMF-WB Debt Sustainability Analyses. Population data and projections from the UN.

GEOGRAPHY AS THE KEY CONSTRAINT TO ECONOMIC GROWTH

Economic growth of the PICs is constrained by geographical features. These constraints include remoteness from international markets, lack of scale due to small land areas and populations, fragmentation through the dispersion of population and production over a large number of islands in far-flung archipelagoes, and environmental fragility. Figure 3-4 shows that PICs combine small population size and remoteness to a much higher degree than other groups of countries, including small island states in the Caribbean.

Figure 3-4: Smallness and Remoteness Sets the PICs Apart



Source World Bank staff calculations using World Development Indicators and CEPII, GeoDist.
 Note (i) x axis in log scale; (ii) average distance from market is the average of distance to other economies weighted by their GDP.

On its own, smallness means that cost advantages that firms obtain due to size, output, or scale of operations (economies of scale) as well as the benefits that firms obtain by locating near each other (agglomeration economies) are harder to achieve in the production of goods and services, including public services. While most small states can at least achieve economies of scale in their export sectors, exploiting the demand of bigger trading partners, the constraints to trade arising from the PICs' remoteness mean that imported inputs to domestic production processes are more expensive, as are the costs associated with exporting to the rest of the world. As a result, PIC exports tend to be uncompetitive on global markets, and exports as a proportion of GDP are relatively low in the PICs, even compared with other small countries. As a consequence, the PIC manufacturing sectors have generally remained insignificant in size, in contrast to the experience of other developing countries in the region, which have developed through progressive increases in the sophistication of their export baskets.

The literature highlights various other economic challenges for small island economies. They include: (i) undiversified domestic production bases and dependence on imports (which increase vulnerability to terms of trade shocks); (ii) lack of domestic capacity (which can result in poorer quality public administration); (iii) lack of opportunity (which can result in the underutilization of human resources); and (iv) exposure to natural disasters (which, among other things, leads to recurring and often substantial reductions in the capital stock). Moreover, many of the PICs have highly dispersed populations scattered across a large number of islands and a broad geographical area. This fragments public infrastructure further and makes it harder again to attain scale economies.

The net effect of these demographic and geographic characteristics—smallness, remoteness, and internal dispersion—is to lower the productivity of capital, labor, and skills (Total Factor Productivity or TFP) and to limit the range of activities in which PICs can be internationally competitive. Given the difficulties associated with achieving economies of scale, for instance, the average output per unit of input is likely to be lower in the PICs than in larger states, and in smaller states which are closer to trading partners. Viewed through a growth accounting framework, therefore, these constraints act to lower the amount of capital accumulation that takes place by reducing the potential return on new investment.

Indeed, the constraints imposed by geography are so severe that even with an optimal environment for private sector activities—infrastructure, regulation, supportive macroeconomic policies—the range of viable economic opportunities will still be narrow. Considering the PICs' thin capacities, fragile political systems with limited political capital for reforms, and financial constraints, this implies that reform efforts and investments need to be narrowly targeted at the most promising opportunities for economic growth. Of course, fostering economic growth is not the only objective of economic reforms and investments. Other objectives include enhancing consumer welfare by promoting competitive practices and regulation, investments that have direct value to consumers, such as ICT, and those which are necessary to sustain existing economic activities. It is important to be clear, however, about what the specific objectives of reforms and investments are, in order to manage expectations that all reforms and investments should lead to higher growth—which is certainly not the case for the PICs.

The geographically determined low productivity of small island countries often results in efforts to gain access to larger economies for the productive use of labor, entrepreneurship, and capital. Labor mobility and overseas investment (including through sovereign wealth funds) are thus important coping strategies for PICs. Bertram (2011) observes that “Much of the ‘modern sector’ of any Pacific island people with migration outlets will lie offshore, inhabited by the diaspora of entrepreneurs and wage-workers which controls a large share of the financial and human capital of the people as a whole.” While, to date, taking advantage of more productive environments typically required the physical relocation of people, the spread of ICT connectivity may provide new opportunities for Pacific Islanders to participate in overseas value chains without having to leave their islands.

▷ DRIVERS OF GROWTH IN PACIFIC ISLAND COUNTRIES

Based on potential drivers of growth and sources of foreign exchange to fund welfare-enhancing imports, the literature (Bertram 2006) identifies three archetypes of small-island economies:

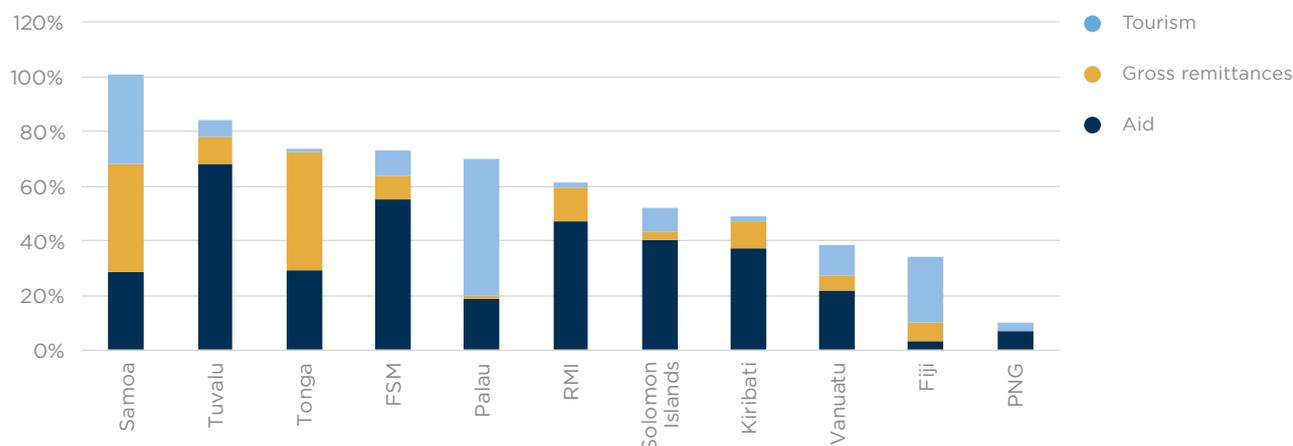
- a. **MIRAB** (Migration, Remittances, Aid and Bureaucracy): Welfare and per capita incomes in these economies are determined by two stock-flow relationships:
 - The stock of overseas-resident migrants and their descendants, which sustain the flow of remittances and new migrants; and
 - The stock of domestic public-sector employment, which is sustained by the flow of aid.
- b. **SITE** (Small Island Tourist Economy): In these countries, tourism is the main driver of economic activity.

c. **PROFIT** (People Considerations, Resource Management, Overseas Engagement, Finance, Insurance and Taxation, and Transport): PROFIT economies seek to exploit a broader set of economic opportunities through: (i) shrewd immigration and cyclical migration policy; (ii) engaging in tough external negotiations concerning the use of local mineral, natural, political and other imaginative resources; (iii) securing and controlling viable means of transportation; and (iv) luring foreign direct investment via very low/no taxes.

Figure 3-5: Many of the PICs Rely on Remittances and Aid to Finance Imports

Sources of Foreign Exchange

(as percent of imports of goods and services, 2013)



Source World Development Indicators, World Bank.

Exports as a proportion of GDP are low in the PICs, even compared with other small countries, and the manufacturing sector has generally remained insignificant, in contrast to the experience of other developing countries in East Asia. Instead, PIC exports tend to be dominated by natural endowments (for example, fish, minerals, forestry, and tourism), for which economic rents can be extracted even when the costs of production are relatively high. Understandably, remittances and international development assistance have also historically been very important in financing imports and consumption in the PICs (Figure 3-5).

Economic growth in MIRAB countries depends primarily on inflows of aid and the number and generosity of overseas resident migrants. Increases in these flows generate economic growth, while constant or declining levels of aid and remittances result in economic stagnation or decline in the PICs. This is indeed the pattern found by Duncan (2015) in his review of growth episodes of PICs. The vast majority of growth episodes of PICs are triggered by changes in the amount of aid received or by external shocks such as cyclones. PROFITS and SITEs on the other hand have some capacity for private sector-led growth.

Many efforts aimed at fostering economic growth in the PICs could be characterized as trying to move countries in the MIRAB category towards the SITE and PROFIT category. As Bertram notes, however, MIRAB-type economies have, in many instances, been able to generate higher levels of welfare for their citizens than other types and may thus represent a fairly stable type of equilibrium.

Bertram (2006) classified most of the Pacific Islands as MIRABs (Samoa, Tonga, the Marshall Islands, the Federated States of Micronesia, Palau, Tuvalu, and Kiribati). Only Vanuatu was classified as a PROFIT. Ten years later, the classification probably still broadly holds—with two exceptions. The first is Palau, which has developed an important tourism sector while, at the same time, remittances and foreign aid continue to play an important role. The other development is the Nauru Agreement, under which PICs derive significant additional revenue from a cap and trade scheme (the “Vessel Day Scheme”) for tuna fishery licenses. The Parties to the Nauru Agreement (PNA) are eight Pacific Island countries⁷ that control the world’s largest sustainable tuna purse seine fishery supplying 50 percent of the world’s skipjack tuna (a popular tuna for canned products).

There have been a number of attempts to identify feasible development paths and opportunities in the PICs, including through increased regional integration. Regional economic reports by the World Bank prepared in 1990 and 1993 already highlighted the poor economic growth performance of the Pacific during the 1980s as the main challenge. To foster higher economic growth, the 1990 report suggested

⁷ The PNA members are the Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, the Solomon Islands, and Tuvalu.

that “...development strategy be geared to growth in the few areas where there is a clear comparative advantage.” and discussed reforms in the areas of macroeconomic management, public sector management, and private sector development. The 1993 report added human resource development and environment as additional issues that require attention.

AusAid supported the ANU-led studies *Pacific 2010: Challenging the Future (Cole 1993)* and *Pacific 2020—Challenges and Opportunities for Economic Growth (2006)*. Pacific 2010 highlighted demographic developments as a major concern. It projected that by 2010 the Pacific population could double and that, unless adequate policy measures were taken, malnutrition, poverty, disease, and crime risked becoming endemic. Action in the policy areas of managing population growth, cleaning up the environment, and economic adjustment were highlighted as necessary to prevent a doomsday scenario.

***Pacific 2020* focused on the long-term growth prospects of PICs and how these could be improved.** It analyzed four cross-cutting ‘growth factors’—investment (of capital), labor, land, and political governance—and five important ‘productive sectors’—agriculture, fisheries, forestry, mining and petroleum, and tourism. It concluded that for most countries in the region—with the exception of perhaps the smallest—higher growth could be achieved. A two-pronged approach to reform was recommended: structural policy reforms and sensible public investment where a relatively quick growth impact can be expected, combined with more attention to the tough, long-term growth constraints (such as political governance and land tenure).

Between 2009 and 2013, the World Bank organized a series of workshops, seminars, and meetings under the title ‘*Pacific Futures,*’ aimed at sparking renewed discussion by analyzing the prospects for economic development in the PICs considering the unique constraints posed by their geography. In particular, the PICs’ small size, remoteness from major trading partners, and internally dispersed populations make it difficult to achieve economies of scale, increasing the costs of private sector production and trade as well as the costs of providing public services and infrastructure.

***Pacific Futures* was less optimistic about the prospects for sustainable high economic growth of small PICs than was *Pacific 2020*.** Because of their unique economic geography, the feasible development paths for PICs are likely to differ from the typical strategy followed by many other developing countries, which focuses on progressive increases in the value and sophistication of exports. In particular, in the PICs, reforms to improve the business environment are unlikely to be sufficient to ensure global competitiveness given the costs imposed by size and distance from markets. Moreover, implementing a full suite of policy and institutional reforms to assist exporters is likely to be beyond the reach of most PICs, given their constrained fiscal resources and limited capacity in many areas. A key implication is that reforms should be targeted toward reducing the disadvantages imposed by geography, and on economic opportunities that are less affected by these disadvantages.

The analysis in *Pacific Futures* suggests that the most likely prospects for development lie in four main areas:

- **First, pursuing integration - with larger economies and among the PICs.** This would reduce the economic costs of distance, including through increased labor market integration, better transport and communication links, and the alignment of regulatory frameworks and services.
- **Second, pooling the provision of public services across small PICs** (for example, in telecommunications and competition regulation) to simultaneously reduce costs and mitigate demands on individual country capacity.
- **Third, ensuring that gains from natural resource industries (including tourism) are maximized, and that these benefits are distributed broadly across the population.**
- **Fourth, maximizing the benefits from international assistance,** recognizing that, in many cases, financial aid and capacity support are likely to continue to be required over the longer term. By suggesting that reforms should be narrowly focused on a small set of growth opportunities, *Pacific Futures* addresses the main finding of *Pacific 2020*, which identified poor implementation as the principal constraint to better growth outcomes.

Building on the previous literature and, in particular, on the common conclusion that small island economies only have a very limited set of economic opportunities, *Pacific Possible* analyzes these opportunities and their potential to contribute to significant increases in incomes, government revenue and employment:

- ***Harnessing the riches of the Pacific*** – opportunities from *oceanic fisheries* and *seabed mining*;
- ***Islands in a sea of knowledge*** – opportunities from development of a *knowledge economy*;
- ***Host to the world*** – opportunities to expand *tourism* and other types of visitor arrivals (for example, conference attendees, retirees for longer-term stays); and
- ***Labor mobility*** – opportunities from *expanding seasonal labor market schemes* and *liberalizing market access*.

In addition, we also look at the major risks to the economic development of the PICs:

- ***Managing increasing stress on Pacific livelihoods*** – opportunities to reduce costs by strengthening PICs' resilience to threats from *natural disasters*, *climate change*, and *NCDs*.





Photo Tom Perry

4.

A Changing Pacific in a Changing World

INTRODUCTION

Changes in the global environment create both new opportunities and new challenges for the PICs.

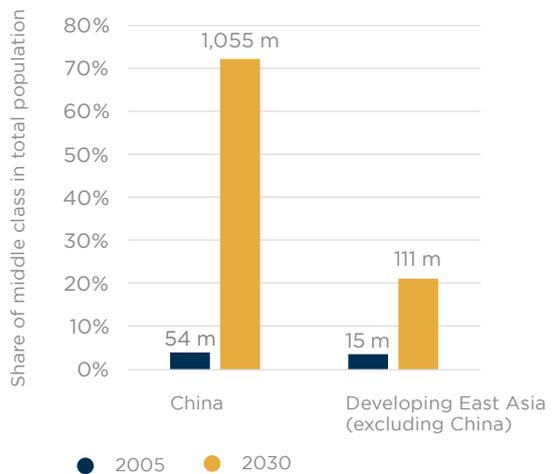
Although it is difficult to predict how the global environment will change over the next 25 years, a number of trends that are likely to have significant impacts on the PICs are clearly discernible. The increasing prosperity of East Asia, the aging of populations in Australia and New Zealand and in East Asia, a move towards a multipolar world where more countries compete for influence and power, and technological advances that have the potential to create new opportunities for the PICs. At the same time, climate change poses a major and even existential threat to the PICs. The evolution of the global governance of the sea will also be of critical importance for the PICs, including with regard to the sustainable use of marine resources.

A PROSPEROUS EAST ASIA

The global economy is projected to grow at an average of 3.2 percent annually between 2015 and 2040, with continuing expansion in trade integration, urbanization, and technological advances as the main drivers.

The rise of China, India, and members of the Association of Southeast Asian Nations (ASEAN), matched by the (relative) decline of the United States, Europe, and Japan will be the most apparent shift in the global economic structure in coming decades. Not only are the East Asian economies expected to grow more rapidly and thus gain in economic weight, but they are also projected to experience significant increases in the size of their middle classes and the number of rich people (Figure 4-1). With the shift of economic gravity towards East Asia and a rising middle class, the economic distance of PICs is going to decline and demand for products and services offered by the PICs—especially tourism—is likely to increase.

Figure 4-1: Growth of the Middle Class* in East Asia (2005 to 2030)



Source: The Rise of the Middle Class, MIC forum, World Bank
*Middle class: Per-capita income of \$10-50/day in 2005 PPP

AGING, URBANIZATION, AND SLOWDOWN IN POPULATION IN AND AROUND THE PACIFIC

Global population is projected to increase by 25 percent from 7.3 billion in 2015 to nearly 9.2 billion in 2040 (Table 4-1). Most of this growth is projected to take place in South Asia and Africa. On the other hand, the population of East Asia will increase only marginally by 1 percent over the period. The combined population of Australia and New Zealand is projected to grow rather rapidly by 28 percent from 28.5 million in 2015 to 36.4 million in 2040.

Dependency ratios will increase globally, driven by an increase in the old age population, while the proportion of children will decline. This is most pronounced in East Asia, where the old-age population will increase from 15 to 41 percent of the working age population between 2015 and 2040. New Zealand and Australia will also see aging societies, with the dependency ratio increasing from 23 to 36 percent. The aging of the East Asian and Australian and New Zealand populations is expected to bring about fundamental changes to these societies, impacting on economic growth, saving and capital formation. They also will require adequate policy responses with respect to the development of adapted pension, health, and long-term care systems.

Table 4-1: Regional and Global Demographic Outlook

Region	Population ('000s)			Dependency Ratios					
	2015	2040	Change (%)	Child		Old Age		Total	
				2015	2040	2015	2040	2015	2040
World	7,349,472	9,157,234	25	40	35	13	22	52	57
East Asia	1,612,287	1,622,927	1	23	22	15	41	39	63
Oceania	39,331	52,150	33	36	33	18	28	55	61
Australia/ New Zealand	28,497	36,427	28	29	28	23	36	51	64
Melanesia	9,623	14,275	48	60	45	6	10	66	55
Micronesia	526	655	25	46	38	9	22	55	60
Polynesia	684	793	16	47	39	10	23	57	62

Source UNDESA 2015.

Note Child and old age dependency ratios may not add up to total due to the effects of rounding.

Within the Pacific, there are significant differences in the projected demographic evolution of Melanesia, Micronesia, and Polynesia. The Melanesian countries are projected to witness continued rapid population growth, which would increase the population by 48 percent from around 9.6 million in 2015 to 14.3 million in 2040. The Micronesian and Polynesian countries are projected to grow at a slower pace by 25 and 16 percent, respectively. All Pacific countries are projected to see increases in the average age of their populations, implying that child dependency ratios will decrease and old age dependency ratios will increase. Only the Melanesian countries, however, are projected to harvest a demographic dividend from a decline in the total dependency ratio from 66 in 2015 to 55 in 2040. On the other hand, for Micronesian and Polynesian countries, the increase in the old-age population is greater than the slowdown in the growth of the population of children, and overall dependency ratios thus increase—from 55 to 60 for Micronesian countries and from 57 to 62 for Polynesian countries.

▷ A MULTIPOLAR GEOPOLITICAL ENVIRONMENT WITH INCREASED LEVELS OF INSECURITY

The current shift in the world's economic and geopolitical axis from west to east and from north to south will define the coming decades. The rise of China is particularly significant. The geopolitical shifts will, however, be even more complex. Other regional powers—including developed economies such as Japan and Korea and emerging powers such as Brazil, India, Mexico, Russia, and Turkey—are also likely to try to expand their own spheres of influence. At the same time, a multipolar world could also be a world of increased insecurity, where none of the major powers has the ability to effectively exercise the role of global policeman.

The move towards a multipolar world is likely to see increased competition for positive relations with, and support from, the PICs, which in turn could translate into sustained and possibly even increased levels of development assistance. The PICs' votes in regional and international bodies as well as their ability to provide a basis for defense, security, satellite, and space installations, have become coveted by many countries and development assistance has become an important instrument to establish amicable relationships. The prospect of access to strategic minerals (such as rare earths) through seabed mining could generate strategic as well as commercial interest from established and emerging powers. If global security threats persist in a multipolar world, the PICs could gain in attractiveness for relatively secure locations that are rarely the focus of terrorist activities or cross-border conflict.

▷ TECHNOLOGICAL ADVANCES TO SUPPORT ON- AND OFFSHORE ACTIVITIES

A range of technological advances are likely to impact significantly on on- and offshore activities and economic opportunities for the PICs. With regard to onshore activities, the information revolution and related technological advances already have played an important role in reducing the isolation of the PICs and allowing them to become part of the global knowledge economy. Digital technologies such as three-dimensional (3D) printing, may open up new opportunities in manufacturing for PICs. Major advances in renewable energy such as solar, wind, and ocean power (wave, tidal, thermal conversion, and salinity gradient technology) hold the potential to reduce the PIC's dependence on imported fuel. Offshore activities are likely to benefit from progress in advanced materials, nanotechnology, biotechnology, subsea engineering and technology, sensors and imaging, satellite technologies, computerization and big data analytics, autonomous systems, ocean floor mapping, e-navigation, sea traffic management and smart shipping, and the traceability of fish stocks and fish products (OECD 2016).

▷ GLOBAL CLIMATE CHANGE AND OCEAN ACIDIFICATION

The PICs are among the countries most affected by climate change. Greenhouse gas emissions are on a path to a 3.5-4.0 degrees Celsius (°C) warmer planet by the end of the century (World Bank 2014; UNEP 2016). Over the coming decades, tropical cyclones are expected to increase in intensity, although not necessarily in frequency. Rising sea levels increase the risk of storm surges and it is likely that seasonal droughts will continue to increase in intensity and floods in both intensity and frequency. For some of the low-lying atolls such as Kiribati, the Marshall Islands, and Tuvalu, projections of sea-level rise imply that significant portions of their land area might become more exposed to storm surges and submerged, and that salinization will reduce the availability of fresh water resources. Climate change is also projected to affect the location and migration patterns of fish in the Pacific.

The Paris Agreement to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to aim to limit the temperature increase to 1.5°C, is of fundamental importance for the PICs. Advocacy by the PICs has played an important role in reaching that agreement. Reaching these goals will, however, require major efforts by all countries. Although the contribution of PICs to global emissions is small, many PICs have drawn up plans for Intended Nationally Determined Contributions (INDCs) that spell out which actions governments plan to take under the Paris Agreement, often with a focus on renewable energies. Sustained action by the largest emitters of greenhouse gases will, however, be critical to the achievement of climate goals.

▷ AGGLOMERATION AND SPECIALIZATION AS DRIVERS OF GLOBAL PRODUCTION

The reduction of barriers to trade, capital mobility, and falling transport and communication costs facilitate the exploitation of economies of scale on a global scale and lead to greater concentration and international specialization in economic activities (World Bank 2009). This has underpinned much of the decline in the price of tradables observed over the past decades. Unfortunately, these trends have exacerbated the disadvantages imposed on the PICs by their small size and remoteness. Recent political developments that reflect popular concern about the impact of globalization—such as the decision by the UK to leave the EU and the US decision to withdraw from the Trans-Pacific Partnership (TPP)—could slow down the pace of agglomeration and specialization as drivers of global production. To the extent that this results in a slowdown in global growth and trade, such developments could have negative impacts on long-term growth prospects for the PICs.

Although transport costs have been declining, this has been mainly the result of the exploitation of economies of scale in the maritime transport sector through significant increases in the size of container vessels. While this resulted in significant reductions in shipping costs for countries with access to container ports, the impact on the PICs is likely to be much less, as transshipment cost remains high. The situation is different with respect to the increase in capacity and reduction in cost of ICT services. This is an area that could potentially open new opportunities for the PICs to develop new niches in the global economy through the production of knowledge services tradable over the Internet.

Global governance of the seas is of fundamental importance for the PICs as it defines who controls and can benefit from ocean resources. The United Nations Convention on the Law of the Sea (UNCLOS) came into force in 1994 and by January 2015 had been ratified by 167 countries and the European Union. The United States is among the countries that have not yet ratified the UNCLOS. UNCLOS defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources. It opened the way for PICs to develop new approaches to the use of fisheries and seabed resources.

A number of initiatives related to ocean governance are likely to impact significantly on economic opportunities for the PICs. The Global Ocean Commission (2014, 2016), highlights the following challenges for ocean governance:

- the negotiation of an international legally binding instrument under UNCLOS on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction;
- the ongoing processes related to the state applications to establish outer limits of their juridical continental shelves beyond the 200 mile EEZ under the UN Commission on the Limits of the Continental Shelf;
- first steps forward to prepare for negotiations on an exploitation regulation for deep sea mining under the International Seabed Authority (ISA);
- continued efforts to devise and implement rules to counter overfishing and, in particular, illegal, unreported and unregulated (IUU) fishing; and
- increasing calls for the development of international agreements pertaining to environmental and safety standards for offshore drilling on the continental shelf, as well as for an international convention to regulate compensation and liability.

At the same time, resolution of these issues and general ocean governance face a range of challenges.

These include a plethora of different agencies looking after different activities, gaps in the governance framework, weak compliance, lack of enforcement, new and emerging issues (including high-seas industries such as energy production), and the lack of a framework that would ensure the equitable exploitation of genetic resources.

The prospect of islands or island states becoming submerged by sea-level rise poses particularly vexing legal issues. As rising sea levels threaten the very existence of low-lying atoll states such as the Marshall Islands, Kiribati, and Tuvalu, unresolved legal issues on a range of issues come to the fore. These include (Stoutenburg 2015):

- At which point would a sovereign state disappear?
- Who could make that determination?
- What legal status would its citizens have?
- What would happen to the state's maritime entitlements and its international rights and obligations?
- Does international law protect the international legal personality of states that lose their effective statehood for reasons beyond their control?



PART II

Transformative Economic Opportunities for Pacific Island Countries

Economic opportunities for the PICs are few and far between. Significant improvements in standards of living by 2040 will be contingent on making the best of these opportunities. This part of the report discusses five potential sources of transformational growth for achieving significant increases in incomes, employment, and government revenue.

- Sustainable expansion of the tourism sector by taking advantage of increasing demand from four key markets—Chinese tourists, high-income individuals, the retirees, and ocean cruises.
- Broadening opportunities for labor mobility, emphasizing the benefits for individuals as well as for labor-sending and labor-receiving countries.
- Investments in improved connectivity through fiber optic cable and reforms of the telecommunication sectors can open the door for the PICs' participation in a range of ICT-related opportunities.
- Deepening and expanding the successful arrangements for sustainable Pacific tuna fisheries.
- Given the still limited understanding of the environmental impacts of deep sea mineral (DSM) mining as well as regulatory frameworks that are still in their infancy, taking a precautionary approach and funding research to increase the knowledge base around DSM to reduce risks.

5.

Welcoming People to the Pacific – Opportunities from New Tourism Markets

The Pasifikis – Tiera Studies Mandarin in 2040

Tiera, Tafu and Maeva's first born, is now 30 years old. She works at a beach resort that was recently developed close to their village. The family is celebrating her promotion, which sees her role at work change to the position of Guest Relations Manager.

Tiera enjoys her work, and loves meeting new and interesting people from all over the world. Most of the tourists who visit are from China, and Tiera is taking Mandarin classes offered by the hotel to their staff. The class is full, and Tiera recognises a handful of people from her village who also work at the resort, or run their own business.

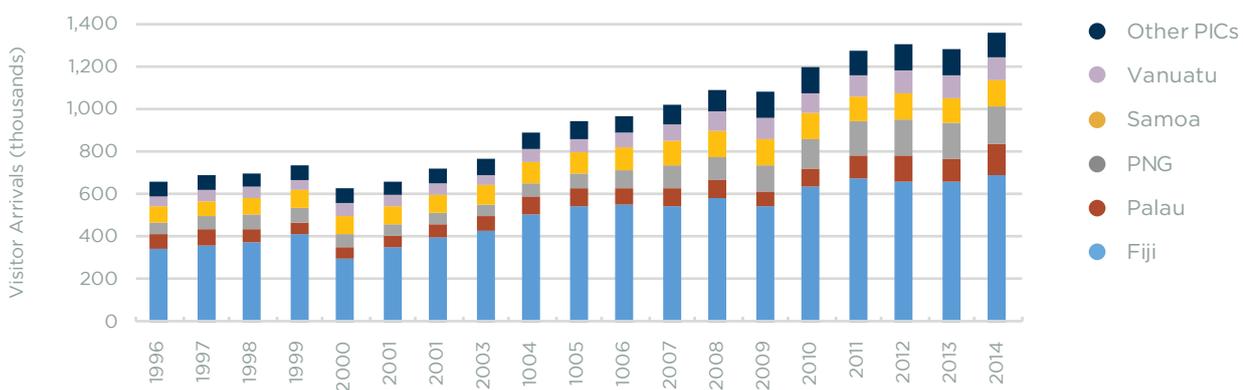


Tourism offers significant opportunities for economic growth and shared prosperity in the PICs. These opportunities derive from the comparative advantage of their resource endowments that are suited to tourism: pristine natural environments and cultural diversity. While pristine natural environments are not the exclusive domain of the PIC11-competing island destinations in the Indian Ocean and the Caribbean also have them—the PIC11’s unique and diverse cultural heritages are what differentiates them in the global market. Further, tourism presents the chance to preserve the environment and cultural heritage through sustainable development practices. Tourism represents a unique opportunity because it is less subject to—and can actually benefit from—factors that are barriers to other forms of economic growth: small and dispersed populations, small land areas, remoteness from markets, and limited natural resources (UNWTO 2012).

▷ CURRENT SITUATION

The PIC11 received 1.37 million overnight visitor arrivals in 2014, a record number (Figure 5-1). The five most popular destinations in order of visitor arrivals were Fiji, Papua New Guinea, Palau, Samoa and Vanuatu. Fiji received 100,000 more than the other 10 countries combined. Two-thirds of the visitor-arrival market for the PIC11 is sourced from Australia and New Zealand. The United States, China, Japan and Europe are relatively small but still very important markets as they have the potential to generate much more growth in arrivals given the size of their populations.

Figure 5-1
Long-term Tourism Growth has been Positive, but Performance Varies Among PICs



Source UNWTO

Tourism already plays an important role in the economies of Palau, Fiji, Samoa, Tonga, and Vanuatu. Tourism is an important source of export earnings for many PICs. In Samoa and Vanuatu, tourism generates the majority of export earnings. It is the largest single source of income for Tonga, about five times the size of export earnings from agriculture and fisheries combined. For Fiji, it has replaced sugar as the primary export earner. Tourism is also a tax base which, in addition to income and consumption taxes, can also generate revenue from targeted taxes, like Fiji’s service turnover tax on hotels and restaurants. Targeted taxes also give governments another means to influence visitor-arrival numbers by affecting prices, like Palau’s effort to limit arrivals via increased departure and hotel taxes. Tourism is a significant employer in those PIC11 countries where tourism is a major industry. The South Pacific Tourism Organisation (SPTO) estimates that the share of the workforce employed by the tourism sector is 15 percent for Tonga, 18 percent for Samoa, and 50 percent for Palau.

Compared to global average annual growth of 3.9 percent from 2005 to 2014, PIC11 visitor arrivals have grown by 4.5 percent. While long-term growth is positive for the PIC11, performance varies between countries and short-term decreases have resulted from political instability, natural disasters and global market conditions. The average annual growth rate for the five top destinations from 1995 to 2014 was 5.5 percent, while the other six averaged only 2.5 percent.

The PIC11 countries are significantly underrepresented in international brand name hotels. This is largely due to the very small average size of hotels in the region. There are fewer than 60 hotels with more than 100 rooms in the PIC11 and less than 60 percent of these carry an international brand. In terms of large international hotel groups, Accor (France), Starwood (US) and InterContinental Hotel Group (UK) dominate the region with 60 percent of the branded properties. The absence of a critical mass of international brand names limits recognition in international markets. Analysis of individual source markets and market trends suggest that, in order to ensure long-term, balanced

and manageable visitor growth, the Pacific will need to work on several fronts to maintain its strong position in the short-haul markets of Australia and New Zealand and capture a share of the emerging Asian markets while, at the same time, significantly improving penetration into the traditional, but slower growth, long-haul markets of Europe and North America.

BOX 5-1

Tourism in Seychelles and Maldives

Tourism has transformed many emerging economies in the last 50 years—including the Seychelles and Maldives. In 1995, Maldives received 315,000 international arrivals and US\$211 million in tourism receipts. By 2014 arrivals exceeded 1.2 million and tourism receipts were US\$2,645 million. In 2013, tourism accounted for 27.9 percent of GDP (Ministry of Tourism 2014). Maldives, a country consisting of 26 atolls with a population of 393,500 inhabitants, has successfully attracted the Chinese market through a combination of marketing and easing direct flight access. China grew from nearly zero to over 30 percent of the market in an eight-year period, making it the top source market since 2010. Tourist arrivals in the Seychelles, a country consisting of 115 islands with about 92,000 inhabitants, increased from 120,716 in 1995 to 231,857 in 2014, an increase of 92 percent. The Seychelles was quick to change strategy when the 2008 financial crisis hit its main European source market and diversified its source markets.

Under the assumption of long-term visitor growth of 3 percent, tourism will continue to be important to the PIC11 economies. Long-term growth at this level will not, however, generate significant changes in economic performance of the PIC11. For this to happen, it will be necessary to significantly expand demand in selected segments. Significant growth in visitor arrivals above trend is possible.

▶ OPPORTUNITIES AND OUTLOOK

Based on long-term performance, emerging market trends, specific product opportunities and its natural attractions and selling points, the Pacific has opportunities that hold the potential to generate transformational change. These opportunities include aggressively targeting the Chinese visitor market, engaging more directly in the rapidly growing Pacific cruising product, expansion of the high-end resort market and capitalizing on the aging population in key origin markets by developing a long-stay visitor opportunity for retirees. These opportunities have the potential to deliver substantially higher revenues but will also bring impacts that will need to be managed.

Capturing the Chinese Market

The market share of Chinese tourists can be increased substantially beyond the 7 percent achieved in 2014. Chinese visitor numbers to the PIC11 have rapidly increased during the past five years, and now represent 7 percent of the inbound market. Annual growth rates have ranged from 10-12 percent in Fiji (2010-14) and Tonga (2011-14) to 73 percent in Vanuatu (2011-14) and 171 percent in Palau (2010-14). Based on the experience of other destinations that implemented well-targeted policy interventions that facilitated improved access, such as aviation and visa policies, together with targeted marketing, the annual growth rate of Chinese arrivals could continue at 20 percent per annum over the next 10 to 20 years. Limitations on carrying capacity and absorption rates would, however, act to reduce the growth of Chinese visitors to the PIC11 over time. This is especially relevant for Palau, where the government is focused on increasing revenue per tourist rather than the number of tourists. Consequently, the study assumes growth rates of only 2 percent.

Palau’s Success in Attracting Tourists from China

Palau is an archipelago consisting of about 250 islands in the North Pacific with a total population of 21,000 inhabitants. Under Palau’s Compact of Free Association with the United States, Palau not only receives significant transfers from the United States, but its citizens also have open access to the U.S. labor market.

The country’s economy relies heavily on tourism, capitalizing on the pristine islands, world-class diving sites, and unique natural attractions such as Jellyfish Lake and Rock Islands. With its relative proximity to East Asia, it has for long been a popular destination for tourists from Japan, Korea, and Taiwan, China. In recent years and with the introduction of direct flight connections to China, the number of Chinese tourists increased rapidly from less than 9,000 arrivals in 2013 to about 87,000 in 2015. This contributed to a doubling of total tourist arrivals to Palau to about 160,000 in 2015.

With the number of tourists from China increasing so rapidly, Palauans became concerned about limited economic benefits and significant negative impacts on the environment. Since Palau has open access to the U.S. labor market, reservation wages tend to be high and labor demand in the tourism sector exceeds supply by a wide margin. As a consequence, Palau is employing about 5,000 migrant workers and employment opportunities from an expansion of the tourism sector are thus limited for local Palauans. In addition, much of the investment to accommodate the increase in tourism arrivals originates from overseas. Furthermore, there is also concern that Palau may become too dependent on the Chinese markets and that Chinese tourists may crowd out tourists from traditional markets.

In response to these concerns, Palau halved the number of charter flights from China to Palau in 2016, increased the environmental impact fee to US\$100 per tourist and also introduced a visa fee of US\$50. In addition, the President of Palau proposed legislation that would limit expansion of the tourism sector to high-end resorts with strict environmental conditions to promote quality over quantity.



The PIC11 can attract nearly 1 million Chinese tourists in 2040. Chinese visitors could represent a 26 percent share of total PIC11 tourism, resulting in a figure of approximately 965,000 visitors by 2040. At that time the PIC11 would welcome nearly 3.7 million international tourists. Compared to a standard growth rate of around 5 percent, the transformational scenario estimates the economic potential of the Chinese market opportunity in 2040 at over 650,000 additional tourists, which bring nearly US\$950 million in additional tourism receipts, and generate over 65,000 additional jobs.

Additional transformational impact in 2040



Increasing the Chinese Market



650,000
tourists



65,000
jobs



US\$950m
receipts



US\$35m
airport taxes

Home-basing Cruise Ships

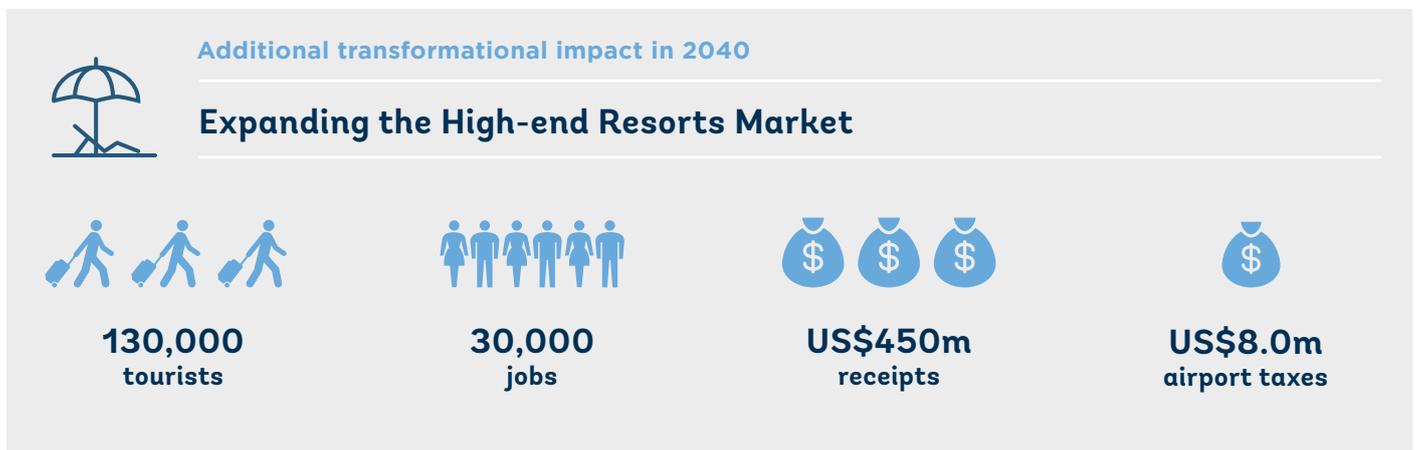
Home-basing cruise ships in the Pacific can generate multiplier effects in the hosting country, and open up new destinations. The growth of the Australian market has transformed cruising in the Pacific. Since 2004, cruising to all destinations by Australians has grown at an annual rate of 20 percent, reaching 1 million passengers in 2014. One way to increase both the number of visitors to the PIC11 and the socioeconomic impact of cruising is by basing large cruise ships in the islands. Not only would this bring benefits to the homeport country, but it would also bring more cruise arrivals to the PICs that are too far from Australia to reach on the most popular seven-10 day cruises.

Cruise lines are already considering basing a cruise ship in Fiji and Pacific Possible considers that, in the medium term, Fiji could host between two to three cruise ships. Papua New Guinea is the other country with the potential to host one or two cruise ships in the medium to long term. For our assessment of the potential of cruise-ship tourism, we assume that by 2040 a total of four cruise ships would be home based in the PICs. While the countries that host the cruise ship would see the largest economic gains, countries visited by these cruise ships would also benefit. In 2040, the economic potential of the home-basing cruise ships market opportunity is estimated at over 250,000 additional tourists, which generate an additional US\$60 million in tourism receipts, and over 4,000 additional jobs. The country hosting the cruise ship can earn over two-thirds of these benefits.



Increasing the Presence of Luxury Resorts

Developing high-end luxury properties can bring an extra 130,000 high-yield tourists. For the PIC11, with limited ability to serve mass markets of the scale emerging globally, it will also be important to pursue strategies that increase yield. Achieving yield, however, requires properties that meet the demands of discerning international travelers, with either international standard resorts or specialty resort products. There is an opportunity to develop about 100 rooms in first-tier exclusive resorts, 200 rooms in second-tier luxury hotels and 700 rooms in third-tier luxury hotels by 2030. In 2040, the potential of the luxury market is estimated at over 130,000 additional tourists, which bring over US\$450 million in additional tourism receipts, and generate over 30,000 additional jobs.



Capturing the Retiree Market

The increasing retiree market has the potential of bringing over US\$200 million to the PIC11 in 2040.

The number of Australians over the age of 65 is projected to increase by 75 percent over the next 20 years, from 3.3 million in 2012 to 5.8 million in 2032, and postretirement assets will grow from around US\$300 billion to US\$1.3 trillion by 2032. Moreover, the number of New Zealanders aged over 65 is expected to double by 2036. The current senior tourism market is disaggregated into three segments by length of stay: leisure travelers, long-stay travelers and home owners or permanent stay.

For the home owners and permanent-stay segment, long-term certainty of residency, access to high-quality medical care, ease of communication, and ease of visa and immigration process are critical factors.

In addition, affordability, safety, ease of international and local connectivity, tax status and property ownership rights, including disposal on death or departure with repatriation of assets, are also important to this segment. Based on the experience of other destinations and with appropriate conditions, it is plausible for the PIC11 to target a total of 5,000 retirees by 2025. The growth is likely to slow after 2025 and it is reasonable to assume that retirees would only stay for a period of up to 10 years. Growth is likely to continue beyond 2025 and the PIC11 could potentially have 10,000 resident foreign retirees by 2040. These 10,000 retirees could bring US\$200 million in additional receipts and generate over 13,000 additional jobs.



HOW CAN THIS BE REALIZED?

Difficulties in access; declining competitiveness with dated facilities; limited demand, particularly from long-haul markets; and constrained marketing are among the main constraints for faster growth of the tourism industry in the Pacific. This is coupled with a lack of effective data for decision making. It will be necessary for the Pacific to address these underlying fundamentals in order to build a stronger platform for growth.

Realizing the potential growth of tourism in the Pacific requires a strategy of improving yields and developing markets. It means being less dependent on Australia and New Zealand markets. To achieve this requires a four part strategy:

- **Improving connectivity with growing and established markets.** The first step is improving access to long-haul markets, which has declined over the last decade as demand from northern hemisphere markets was constrained by the Global Financial Crisis. It requires direct connections between those markets and PIC11s, avoiding the hubs of Australia, Fiji, New Zealand and Guam.
- **Attracting more and higher yielding tourists.** Overcoming dependence on Australia and New Zealand as the principal markets for the PIC11 will require concerted, long-term market development that emphasizes yield, rather than volume.
- **Improving the investment climate and the effectiveness of public sector participation in the sector.** There are a number of issues to be managed in ensuring that PIC11 governments and regional agencies are equipped to manage the future demands of a fast-growing tourist industry, including the business-enabling environment, the quality of the labor force, the effectiveness of public institutions to attract visitors, and the capacity of regional destination marketing. Attracting the right tourists will depend on securing the right type of investment. PIC governments will need to develop a more strategic approach to attracting investments in a highly competitive

marketplace. It will also be necessary to reduce barriers to travel, including improving visa regimes where required. Visitors regularly report the cost and convenience of the visa process is an important determinant of destination selection since it directly feeds into the cost of travel. Many countries are rapidly moving to no-cost visa on arrivals now. Several PICs have had this for many years (Fiji, Samoa) making those countries which still have more challenging visa regimes (for example, Papua New Guinea) appear less competitive and visitor friendly.

- **Improving the efficiency of the tourism sector.** This would include improving linkages between tourism and the local economy such as food supplies and services to hotels, improved destination management and strategy, pooling of private sector resources such as cold storage and access to warehousing financing for this purpose, and regional training facilities. The Caribbean tourism strategy now incorporates a number of these initiatives designed to improve efficiency. Fiscal revenues from the sector can also be better managed.

In addition to building a stronger platform for growth, the PIC11 need to adopt a series of specific actions in order to capture the four transformational opportunities. The number of Australians over the age of 65 is projected to increase by 75 percent over the next 20 years, from 3.3 million in 2012 to 5.8 million in 2032, and postretirement assets will grow from around US\$300 billion to US\$1.3 trillion by 2032. Moreover, the number of New Zealanders aged over 65 is expected to double by 2036. The current senior tourism market is disaggregated into three segments by length of stay: leisure travelers, long-stay travelers and home owners or permanent stay.

Opportunity	Actions Required
 <p>Increasing the Chinese Market</p>	<ul style="list-style-type: none"> • Negotiate new air routes between PICs and Chinese cities with frequencies to fit with limited holiday opportunities, price points to match competing destinations and minimal stops. Scheduled routes may initially be developed by charters or supplemented by charters at times of high demand. • Upgrade airports and provide support to attract new carriers, to cater for larger aircraft and volume traffic, to minimize processing delays on arrival and departure and facilitate transfers to their destination. • Tailor offerings to Chinese tourists, such as providing translators, improving service standards, installing Chinese signage and coverage of Wi-Fi. Prioritize market segments and understand the preferences of these segments. Develop information for independent travelers which minimizes uncertainty, and provides clarity from the point of product selection to destination arrival. • Build relationships with major Chinese outbound operators, wholesalers and China-based agents selling the Pacific to develop concrete sales and distribution channels for marketing efforts. • Implement a fully-resourced, long-term targeted promotion campaign, covering all cities, including travel trade, public relations and a major online presence through leading booking and trading websites. • Identify specific segments of the Chinese market which match PIC11 offerings, including soft adventure, diving, weddings, incentives, and overnight cruising. • Increase the efficiency of visa application processes across all PICs targeting the Chinese market where visas are a barrier. <ul style="list-style-type: none"> – Improve the communication of visa requirements to intending Chinese tourists. – Streamline and simplify the visa application process as much as possible. – Introduce multiple entry electronic visas (e-visa) and extend the allowed duration. – Promote a regional visa scheme or visa waiver programs to facilitate travel among PIC11s eliminating individual visa requirements for each destination. – Introduce no-cost Visa on Arrival where possible. • Improve the shopping product in key destinations and at resorts through a retail development program. • Implement a major campaign through Chinese media to raise awareness of the Pacific.

Opportunity	Actions Required
 <p>Increasing the PIC-based cruise ship market</p>	<ul style="list-style-type: none"> • Work with the cruise lines and the Fiji government to ensure the formal procedures, authorities and rights for Fiji-based cruise operations are in place and that essential services are provided. • Work with Fiji Ports to bring Lautoka Wharf up to the necessary standard for alongside berthing and passenger embarking-disembarking, including predeparture assembly, baggage handling and coach loading areas. • Work with Fiji Roads to ensure the Nadi-Lautoka Road is at a standard for large-volume coach traffic. • Work with Airports Fiji Limited to ensure terminal capacity can meet the needs of multiple arrivals and departures of cruise passengers to coincide with scheduled cruise vessel movements. • Build relationships directly with cruise companies and airlines to ensure that charter flights to and from main source markets can operate in coordination with cruise ship schedules. • Assist the development of existing and new destination ports in PICs, including safe navigation, adequate services and the development of ground operations where not already in place. • Negotiate with cruise companies for sector fares to enable multistop, alternative fly-in fly-out, or extended shore breaks—for example in Samoa, Tonga, Fiji, and Vanuatu to increase yield. • Encourage the use of smaller cruise vessels (less than 500 passengers) for remote island cruising, enabling low-impact visits to sensitive communities. These already exist in some locations including Fiji, Papua New Guinea and the Solomon Islands. Tonga has potential in the Ha’apai and Vava’u island groups. • Upgrade ports to improve the visitor experience with weather-protected markets close to the wharf and control over local tour operations. • Assist agencies operating potential new cruise ports to attract cruise vessels through financial or in-kind subsidies where economic impact from cruise traffic is sufficient to meet the goals of the destination. • Promote the Pacific as a fly-cruise destination in both the Pacific Rim and global markets.
 <p>Attracting investments in high-end resorts</p>	<ul style="list-style-type: none"> • PIC governments to develop an exclusive accommodation policy and implementation strategy at a national level to minimize concerns of elitism. • Support by governments to assist the purchase or lease of land under conditions acceptable to investors but ensuring full protection and benefits to traditional land owners. • Identify prospective locations, their characteristics and suitability for development as well as accessibility. • Identify a Pacific champion to lead, guide and assist in the development of a regional strategy, an individual respected by his or her peers and who can, with assistance, bring investors and opportunities together. • Develop a Pacific luxury marketing strategy similar to Tourism New Zealand’s Premium Strategy and, if possible, establish links to enhance the South Pacific offering. • Increase availability of private jet aircraft facilities at gateway airports.

Opportunity	Actions Required
 <p>Attracting the Retiree Market</p>	<ul style="list-style-type: none"> • Establish visa and taxation regimes to attract long-stay retirees. • Invest in high-quality and affordable health care offerings that are crucial to the retiree market—including private hospitals and aged-care homes. • Invest in infrastructure and provide incentives to attract the private sector to develop accommodation options for foreign retirees. Provide policy incentives for foreign retirees to own and dispose of properties in the PIC11. • Determine rights of individuals to import personal effects duty free, and vehicles for their own use either duty free (with a claw-back on sale) or at a minimal charge. • Determine rights of retirees to import capital and receive income from their home country, and to remit capital on sale or to beneficiaries in the event of death. • Establish a system of licensed immigration agents to assist and guide intending immigrants, with an agreed scale of fees and specific skill requirements. • Enhance targeted marketing efforts to potential foreign retirees. Develop annual targets for participant numbers. Given Australia and New Zealand are both top destinations for retirement, the PIC11 need to develop a strategic plan to attract retirees from these two potential markets with a roll-out to wider markets in the future. • Develop a communication plan and provide clear guidance to retirees through a dedicated government website. • Introduce training through authorized providers for aged-care support services. • Determine the interest of Australian and New Zealand aged-care providers to establish facilities in PICs and encourage the development of retirement complexes close to major centers.



SPOTLIGHT 1

Tourism: Impacts on Poverty, Gender, and the Environment

Poverty	Tourism provides jobs which are accessible to persons with limited educational attainment. In addition, as tourism developments are often located away from the main centers of economic activity, they can provide jobs in areas where there are few other employment opportunities.
Gender	Tourism offers significant employment opportunities for women. Women make up the majority of the tourism workforce, but tend to be concentrated in the lowest paid and lowest status jobs.
Environment	Tourism's relationship with the environment is complex. There is an increased interest in managing growth in an environmentally responsible manner. Overall, tourism has the potential to create beneficial effects on the environment by contributing to environmental protection and conservation. It is a way to raise awareness of environmental values and it can serve as a tool to finance protection of natural areas and increase their economic importance. On the other hand, the PICs face the particular challenge of a fragile natural environment which is the source of the PICs' attractiveness to tourists, but which could easily be destroyed if the number of tourists is too high and environmental impacts are not properly managed. Most of the PICs have limited land and fresh water resources and limited capacity to manage waste water and solid waste. Tourism can also be a threat to coral reefs and coastal fisheries. In addition to environmental impacts, social and cultural impacts of growing tourism sectors also require close attention. Initiatives to expand incoming tourism must, therefore, take into account the existing capacity to manage the additional environmental impact and plans to enhance such capacity.

6.

Welcoming People from the Pacific – Broadening Opportunities for Labor Mobility

The Pasifikis – Tafu’s Cousins Run a Diving Center in 2040

Tafu’s cousins, who were staying with his family 25 years ago to find work, are now running a successful diving school. Not long after Tafu’s twins, Saia and Eka were born; the cousins found an exciting new work opportunity, which allowed them to work in a tourist resort in North Australia. Initiated by a tourism pilot under Australia’s Seasonal Worker Programme in 2016, they returned year after year to the same employer for 15 years.

Over that time, they set many goals; one of which was to save enough money to start their own business back home, drawing on the experience they were gaining while working in Australia. During the same period, their island home began to experience an increase in tourism, due to marketing across Asia, highlighting the untouched richness and beauty of the island’s luscious greenery and ocean wildlife.



The ability to access external labor markets varies significantly across the Pacific (Table 6-1). Some Pacific Island countries have open labor market access to the United States. The ‘open access’ countries include the Marshall Islands, the Federated States of Micronesia, and Palau. Others have historically had high levels of labor mobility. Fiji, Samoa and Tonga have become ‘high-mobility’ countries through historical ties as well as bilateral agreements providing limited access to New Zealand. Five countries are the particular focus of this section of the report. The three ‘low-mobility’ Melanesian countries of Papua New Guinea, the Solomon Islands and Vanuatu have amongst the lowest rates of outward migration in the world due to severely restricted external labor market access and a low stock of human capital. The ‘atoll countries’ of Kiribati and Tuvalu have low to moderate levels of labor mobility, and both face high levels of climate risk.

Table 6-1: Basic Labor Mobility and Economic Indicators for Different Pacific Country Groupings

Degree of Mobility	Stock of Emigrants	Resident Population	Emigrants/ Population	Remittances /GDP	GDP per capita (2005 \$US)
Open labor market access					
Marshall Islands	11,841	52,786	22.4%	13.8%	3,045
Micronesia, Fed. Sts.	40,642	103,718	39.2%	9.1%	2,338
Palau	6,855	20,919	32.8%	5.6%	8,731
High mobility					
Fiji	189,571	880,487	21.5%	6.2%	3,828
Samoa	87,949	190,390	46.2%	28.2%	2,668
Tonga	53,247	105,139	50.6%	45.8%	2,502
Low mobility					
PNG	17,464	7,308,864	0.2%	0.2%	1,122
Solomon Islands	1,768	560,685	0.3%	2.8%	1,125
Vanuatu	2,280	253,165	0.9%	5.9%	2,089
Climate-affected atoll countries					
Kiribati	4,324	108,544	4.0%	11.1%	1,109
Tuvalu	1,816	9,876	18.4%	16.2%	2,654

Source World Development Indicators 2015 for GDP per capita, for the most recent year available. Population statistics are taken from the UN Population Division (2015). Migrant stocks in 34 OECD countries taken from the DIOC Database on Immigrants in OECD Countries 2010-13. For more details, see Arslan et al. (2014). Remittances are from the World Bank Migration and Remittance database, FSM is an exception, with remittance data based on an authors’ estimate.

Note Due to data constraints, emigrants are to OECD countries only. Emigrants to the US territories of Guam and CNMI are included. Migrant stocks for Kiribati, PNG, the Solomon Islands and Vanuatu have been adjusted to record only migrants in Australia who claim their ancestry is indigenous to their country of birth. The population used as a denominator in the third column is the resident population only. Remittances are gross not net, and include income from seasonal workers. Figures are for 2013, or for the stock of migrants 2011-2013, depending on the OECD countries concerned.

Pacific migrants go mainly to one of three countries: Australia, New Zealand and the United States.

The report mainly focuses on reforms for Australia and New Zealand because of the strategic importance of the Pacific to them. Moreover, both Australia and New Zealand have introduced multiple preferential pathways for Pacific migrants over the past decade, which give optimism for further reform. We also consider Korea, because of one particular Korean employment scheme which could be of significant benefit to the Pacific if it was extended to the countries of the region.

***Pacific Possible* seeks to understand the perspectives and concerns of both labor-sending and labor-receiving countries, and proposes reforms for both sets of countries.** The analysis places particular emphasis on providing opportunities for low-skilled and medium-skilled migration. A broad range of reforms is proposed, but we are particularly interested in providing labor-mobility opportunities for those beyond the elite of sending countries. This is to maximize the welfare gains of migration. Concerning brain drain, *Pacific Possible* focuses on reforms that will minimize the risks, but also recognize that: (i) migration is natural in small economies where returns to investment (including education) tend to be lower than in economic hubs; (ii) migration can result in brain gain if there are opportunities and incentives for migrants to use experience and skills acquired overseas in their home country; and (iii) migration opportunities tend to result in an increase in the demand for education and skills development.

▷ THE BENEFITS OF LABOR MOBILITY

International migration offers the potential for a ‘triple win’—delivering gains for migrants, sending countries, and receiving countries. Increased international migration for work offers critical opportunities for the Pacific and its people. Given the unique development challenges faced by the PICs, there is now broad consensus that expanding labor mobility is vital for their future. The lack of formal job opportunities, coupled with a youth demographic bulge, mean that unemployment is a pressing problem. Where these countries are unable to bring jobs to the people, the alternative is to bring the people to jobs. For labor-sending countries, remittance flows can be important sources of income and consumption, as well as foreign exchange and investment, often in education and health. More broadly, migration opportunities increase the incentives for families to educate their children, and facilitate knowledge transfer.

Australia and New Zealand would also benefit from greater Pacific labor mobility. Both countries have a deep interest in a stable and prosperous Pacific, interests which are advanced by increased Pacific labor mobility. Aid dependency in the region is high, and reliance on aid alone is an unbalanced strategy. By improving employment prospects and increasing remittance flows, labor mobility helps stabilize otherwise fragile states. Moreover, in marked contrast to aid, migration offers self-selected individuals and their households the chance to change their economic and social circumstances, with the funds generated going directly to households. Migration, much more than aid, requires major changes in the attitudes of those involved.

Encouraging Pacific labor mobility is also important to Australia and New Zealand for domestic reasons. Advanced economies will require high rates of net migration in coming years to address major labor market shortfalls. These are often in sectors—such as construction, health care, and social assistance—where Pacific nationals, with some targeted training, would be well placed to fill the gaps. Working out a Pacific labor-mobility regime would help Australia, in particular, move beyond the current ad hoc and unsatisfactory arrangements for importing unskilled labor (via reliance on international students and backpackers in particular). The evidence suggests that Pacific workers do well in metropolitan settings. In summary, while New Zealand has already gone further down this road than Australia, it is in both countries’ interests, for both domestic and international reasons, to expand Pacific labor mobility. Moreover, the small size of most of these Pacific nations makes this goal a manageable one.

Countries have a range of tools at their disposal to increase migration from the Pacific. They can use their aid budget through ‘aid for migration’ schemes. This can be considered as ‘aid for trade’, a form of aid that is at least, if not more, relevant for many Pacific nations than trade facilitation. Receiving countries can also modify their migration regime to favor citizens of particular countries. It is a myth that these countries run nondiscriminatory migration programs. For example, Australia plays host to hundreds of thousands of backpackers. They are nearly all (95 percent in 2013-14) from developed countries because the relevant backpacker visas for developing countries are capped (typically at very low levels), while those for most developed countries are uncapped.

▷ EXPANDING PROGRAMS FOR TEMPORARY AND PERMANENT MIGRATION

Pacific Possible proposes a range of seasonal (less than 12 months), temporary (one to five years) and permanent labor-mobility schemes. Long-term migration brings the greatest benefits, but temporary migration opportunities are often more plentiful and may provide a route to permanent residence.

Expanding Seasonal Worker Access

Seasonal worker programs are increasingly offering an important pathway for Pacific labor mobility.

More than 12,000 workers from the Pacific arrived in Australia and New Zealand in 2015-16 under the former's Seasonal Worker Programme (SWP) and the latter's Recognised Seasonal Employer (RSE) scheme. New Zealand's RSE has outperformed Australia's SWP, and is still more than twice the size. The real constraint in Australia is the lack of an aggregate labor shortage due to the number of backpackers working in agriculture, as well as the number of illegal workers (the two categories partially overlap). The former may change with proposed revisions to tax treatment for backpackers, whilst the latter is unlikely to change in the absence of additional funding for oversight. The constraint in New Zealand is the cap, which as of 2016 stood at 10,500 (Australia's scheme is uncapped).

A number of reforms are needed to expand Australia's SWP. The second-year visa extension provided for backpackers if they work on a farm for three months was put in place in 2005-06 when Australia was unwilling to introduce a seasonal migration scheme. It leads to direct competition between backpackers and seasonal workers, a competition that the backpackers are winning. In 2014-15, there were some 41,000 second-year backpacker visa applicants, about 90 percent of them based on farm work completed. It is unfortunate that a scheme that benefits the citizens of poor countries is undermined by one that benefits mostly the citizens of the rich.

Abolishing the second-year visa extension for backpackers (or making it available in return for three months of work in any sector) and a crackdown on illegal labor (including by requiring the registration of labor hire companies) would create a more level playing field for Pacific Islanders. Other reforms that would help expand the SWP include: greater publicity; removing the A\$500 employer contribution to the international airfare of returning workers to ease cost concerns; and giving all employers participating in the scheme the primary role in the selection of workers from a sending country labor pool to ensure workers meet their needs.

Expanding Medium-term or Temporary Pacific Labor-Mobility Options (One to Five Years)

Skilled, semi-skilled and low-skilled labor-mobility programs of longer, but still temporary, duration are little utilized by the Pacific, but could become important. *Pacific Possible* examines four programs through which medium-term or temporary labor-mobility opportunities could be expanded for the Pacific: (i) working holiday maker programs; (ii) Korea's Employment Permit System (EPS); (iii) Australia and New Zealand's temporary skill visas; and (iv) a proposed new aged-care program.

Most OECD countries offer working holiday visa programs with unlimited access to young visitors from other OECD countries. As the name of these visas suggests, work is intended to be incidental to travel, however, some OECD countries rely on backpackers to fill low-skilled labor shortages. Australia does this more than any other OECD country, attracting some 249,000 backpackers in 2013, about one-half of all working holiday makers in 22 OECD countries in that year (OECD 2015).

As noted earlier, access to backpacker visas is biased in favor of developed countries. Some developing countries have limited access, and Australia and New Zealand could open their working holiday maker schemes to their Pacific Island neighbors. So far, Australia has signed an agreement (yet to come into effect) with Papua New Guinea (for 100 places), and has entered into discussions with Fiji. If the working holiday visa is to be made relevant to the Pacific, the eligibility requirements should be weakened—for example, a high school certificate should suffice. The minimum requisite level of savings should be reduced, and the requirement for government approval abandoned.

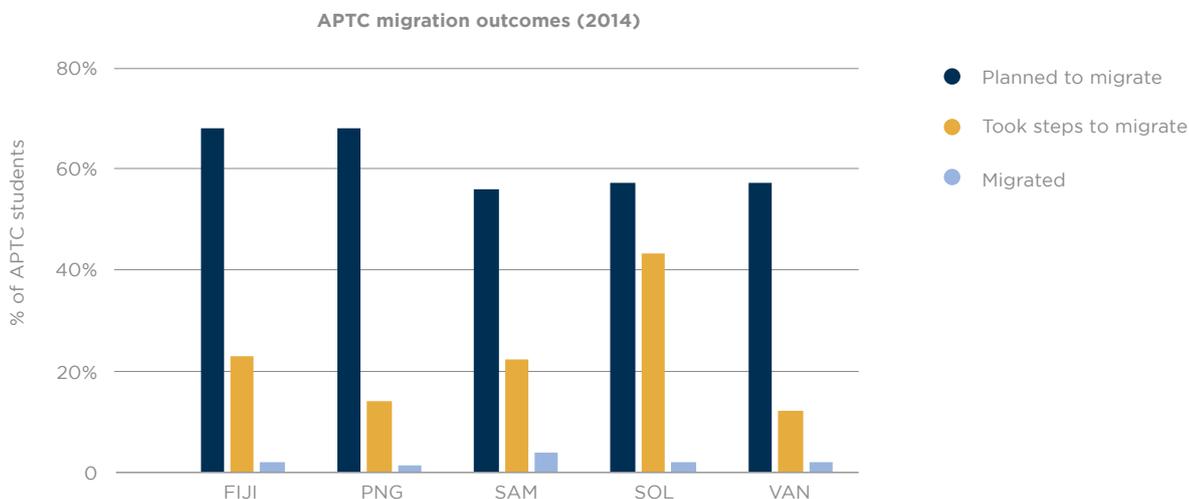
Although Korea's EPS is not open to Pacific countries as of 2016, Timor-Leste was included in the scheme in 2009. This program annually grants up to 55,000 workers from 15 countries across Asia access to three years of low-skilled work with scope for a 22 month extension. Timor-Leste has managed to send almost 2,000 workers to Korea over a six-year period. A survey of the experience of Timorese workers who participated in the scheme came out with generally positive findings. Overall, the returned workers spoke well of their experience abroad, in terms of both amounts earned and skills gained. The PICs

should engage with Korea's Ministry of Employment and Labor which manages the EPS. Given Korea's growing aid interest in the Pacific, it is quite possible that it would respond positively to a request for participation.

As of 2016, there are few Pacific Islanders migrating annually through temporary skilled-migration schemes. From 2010 to 2015, only 2,905 temporary skilled (457) visas were granted to migrants to Australia from the Pacific, less than 1 percent of total arrivals under this visa category over that period. Over the same period, a total of 11,777 New Zealand Essential Skills visas (9 percent of the total) were awarded to Pacific migrants. Pacific workers find it easier to get access to the New Zealand scheme than the equivalent Australian one because the former has no minimum skills threshold, and because the Pacific diaspora in New Zealand is larger. Both visas are expensive, but the New Zealand scheme provides a discount for Pacific Islanders.

Australia has tried—unsuccessfully to date—to increase skilled and semi-skilled labor mobility through the Australia-Pacific Technical College (APTC). This was a potentially innovative 'aid for migration' initiative. Its failure to deliver on the labor-mobility front has undermined the College's viability, with a recent evaluation finding that it had a negative net present value due to the low number of migrant graduates it has so far produced. There is high demand from APTC graduates to migrate, but inappropriate qualifications, high costs and a lack of links with employers in Australia and New Zealand have prevented their aspirations being realized (Figure 6-1).

Figure 6-1: The Australia-Pacific Technical College has Failed to Deliver on its Labor-Mobility Mandate



Source Johanson et al. 2014.

The APTC's redesign presents a new opportunity. Australia has signaled its long-term commitment to APTC with new funding through to June 2018. Several measures are recommended to ensure APTC graduates can access Australia's Temporary Skilled Work and New Zealand's Essential Skills Visa. Implementing these reforms would not only make APTC a viable project, but would also usher in a new era of migration for the medium-skilled from the Pacific to Australia and New Zealand.

- **First, APTC graduates should be made eligible for Australian graduate visas.** This would allow APTC graduates time to complete work experience certification requirements and to find jobs.
- **Second, the maximum duration of stay under the SWP should be increased to one year for certain sectors.** APTC graduates (and others) could work in Australia through the SWP in sectors now covered by the scheme, such as accommodation and tourism in Northern Australia, and a range of agricultural industries including cattle, sheep, grain and mixed enterprises. A more extended work period under the SWP would allow them enough time to get relevant experience and, with an appropriate qualification, find a job and be sponsored by an employer through a 457 visa for a more extended period of work.
- **Third, some of the APTC funding could be used to promote APTC graduates to Australian and New Zealand employers.** This could be done by, for example, inviting employers to visit APTC campuses to meet instructors and students.
- **Fourth, cost constraints need to be addressed.** The aid program could be used to reduce the costs of skill certification, and increase the frequency and ease of certification opportunities.

- **Fifth, APTC needs to focus its training on occupations where there is a feasible pathway from training to migration to specific destination countries.**
- **Sixth, better data collection on employment and migration outcomes would support better achievement of a labor-mobility objective for APTC.**

The aging of the population in OECD countries and the greater longevity of individuals will lead to increasing numbers of people at older ages with a severe disability. It is estimated that the share of the Australian and New Zealand population of those aged 80 and over will nearly double between 2015 and 2040 to 7.4 percent of the population. As a result, there will be increasing shortages of aged-care workers. In Australia, we estimate that the number of aged-care workers (excluding managers) in both residential and community care could increase from 201,600 in 2011 to 532,000 or higher in 2040.

Both Australia and New Zealand lack a reliable system to supply qualified workers who can provide care on a continuous basis to people in their own homes. Home-based continuous care relies mainly on informal caregivers for the elderly, usually partners, who are diminishing in number due to the increased aging of the population. At the same time, the demand for continuous home-based services is increasing as older people prefer to stay in their own homes. Reforms giving the elderly more control over the form of delivery of aged-care services will reinforce this trend.

Canada's program for in-home caregivers for people with high medical needs provides a good model. It allows persons residing in Canada to employ qualified foreign workers in private residences to provide care for elderly persons or persons with a disability. The program offers a permanent residence pathway for migrants who have completed two years of work in a four-year residency stint and has a cap of 2,750 per year. The core elements of the Canadian program are: (i) the minimum educational requirements for employment as a caregiver (for example, postschool qualification in health care of at least six months and good English language ability); (ii) no requirement to live in as a home-based caregiver (since 2014); (iii) agency oversight of the employment contract; and (iv) a prior labor market assessment to ensure that citizens or permanent residents have first opportunity to apply for the work.

Canada's approach could be used as the basis for the design of a similar program for Australia and New Zealand. Limiting the program to Pacific migrants will enable donor funds to be directed to providing Australian and New Zealand-recognized qualifications to potential migrants. It will also enable employers to develop a reliable source of caregivers and to have the primary role in their selection.

Expanding Permanent Migration: Pacific Options

Long-term migration opportunities for the Pacific come through three types of programs: permanent skilled migration, visa lotteries, and open access. The reforms proposed in relation to temporary skilled migration and the APTC above will also lead to more Pacific Islanders migrating under the permanent skilled migration regime. This section outlines proposals relating to visa lotteries and open access.

Through its 'Pacific Category' visas, New Zealand offers 1,750 places for permanent residence each year to citizens of selected PICs. The Samoa Quota (SQ) allows 1,100 Samoans and the Pacific Access Category (PAC) visa allows 250 Fijians, 250 Tongans, 75 I-Kiribati and 75 Tuvaluans to be granted residence in New Zealand each year. The requirements are that: (i) the primary applicant has an offer of an ongoing job that meets a minimum income level; (ii) is in good health; (iii) speaks reasonable English; and (iv) is of good character. The numbers applying for the two visa ballots show that there is a high level of interest in migrating to New Zealand to work.

Overall, the evidence on employment outcomes and incomes earned shows that the PAC visas have been successful. They have enabled a relatively small number of migrants from four Pacific countries to come as families to settle permanently in New Zealand. The minimal requirements such as a prior job offer have generally produced good employment outcomes. Tax records over a period of five years show that most of the principal and secondary applicant PAC migrants are in employment and are earning a basic income after they migrate.

The PAC visas are well designed to avoid 'cherry picking' migrants with the highest qualifications which could cause brain drain from small countries. The use of the ballot to select migrants and putting the onus on those selected to find a job in New Zealand are important features of the program. The process ensures that the sending countries accept that the selection for a small number of places is carried out in a fair and transparent way.

Two reforms would help to improve migrants' employment rates and lift their annual incomes. First, selection requirements could be toughened. Completion of secondary schooling increases the chances

of employment by eight percentage points for men and by ten percentage points for women aged 25-64 years. Completion of secondary school (or at least completion to Year 10) should be a requirement for a successful application. The English test could also be made more stringent, and a numeracy test also imposed. This would provide an incentive for the sending country to improve the quality of its schools. These selection requirements, even if toughened, are ones that are achievable by prospective migrants, for example, by returning to school if needed, or at least ensuring that one's children stay at school. The risk of brain drain is, therefore, minimal; indeed, the tougher requirements could lead to brain gain for the population not migrating.

Providing more support for job brokers would also help to improve employment outcomes. Heavy reliance is placed on the diaspora when it comes to job-hunting. If this diaspora is small and struggling, as some are, the result for new migrants may be an overreliance on a small number of employers, resulting in high levels of risk and vulnerability. Reliance on informal networks needs to be supplemented by more reliance on job brokers with relevant experience and broader geographical reach. Funding for job brokers could be provided by the government of the sending country, and could be based on a fee levied at departure.

With the reforms suggested above, there is a strong case for expanding New Zealand's PAC program and for introducing a similar scheme in Australia. Introducing a 'Pacific window' into its permanent migration regime would help balance Australia's overall immigration regime given the 'OECD window' in the much larger working holiday market visa discussed earlier (significant numbers of backpackers become permanent residents). Introducing a Pacific Category visa scheme for Australia would also have the benefit of helping the country move away from its current ad hoc reliance on students and backpackers to meet unskilled job needs.

Countries provide open access only under very special circumstances. Climate change could be such a circumstance. The case is particularly strong for the low-lying atoll states. While there is still much uncertainty, the Intergovernmental Panel on Climate Change has highlighted the extreme danger that small island countries face, noting their particular vulnerabilities to inundation, shoreline change, and saltwater intrusion into underground aquifers.

Both Kiribati and Tuvalu are actively seeking greater access to temporary and long-term employment overseas, especially for their burgeoning young adult populations. Without migration channels specifically for them, it is highly unlikely that they would be able to increase their rates of outward migration. With weak agricultural sectors, they struggle to compete in the seasonal worker schemes. Their low skill profiles and extreme remoteness place them at a disadvantage in accessing the temporary and permanent skilled pathways.

Current schemes are inadequate and greater access to the Australian and New Zealand labor market is needed. New Zealand's PAC program reserves 75 slots each for Kiribati and Tuvalu. In 2015 Australia established the Pacific Microstates-Northern Australia Work Pilot which provides 250 places (in total) for I-Kiribati, Tuvaluans, and Nauruans to work in Australia for up to two years. Simulations show that migration rates from Tuvalu need to double and for Kiribati increase more than ten-fold just for their populations to stabilize. One intervention which should be considered is the provision of open labor market access by Australia and New Zealand to Kiribati and Tuvalu on grounds of their acute climate change risks.

Open access would likely result in modest outflows. While surveys show that many households feel that migration will be a necessary strategy as a result of sea-level rise, most lack the financial means to migrate. Under the assumption that real income remains stagnant, we estimate that only about 31,000 I-Kiribati and 2,200 Tuvaluans would have the financial means necessary to migrate. If these numbers were to migrate steadily over a 25-year time period, Australia and New Zealand would be looking at an additional average inflow of 1,300 I-Kiribati and Tuvaluans annually, or the equivalent of 0.6 percent of their annual permanent migration program.

Given the open access arrangements between their own two countries, it would make sense for Australia and New Zealand to provide open access to Kiribati and Tuvalu together. The total size of the diaspora in Australia from the two countries combined in 2011 was only 625 migrants. For New Zealand in 2013 it was 2,922 migrants.

One important factor that might make Australia and New Zealand more popular destinations than the United States is the better availability of free health care. Open access could be restricted to those with a certification of good health. To provide incentives for good education, basic educational and prior job requirements could also be imposed. This would effectively result in a program that is a half-way house between a lottery and an open-access scheme: that is, an uncapped, selective, country-specific program.

Pacific Possible also explores what will be required of labor-sending countries, beginning with education and training policies, then marketing, and finally addressing social impacts. A major obstacle sending countries face in increasing migration flows are the low education levels of their populations, even among those employed in the formal sector. The small number of workers with postschool qualifications in the Pacific means that even small losses among this group can have serious consequences. There is already a reliance on foreign workers at medium- and higher-skill levels in many Pacific countries.

Pacific governments need to increase the quantity and lift the quality of skills supply to expand opportunities for access to more than low-skill work overseas. The low postsecondary education level of the Pacific workforce is due in part to limited secondary education access, and poor quality throughout Pacific education systems. Smaller PICs, in particular, are worried that more emigration will result in a 'brain drain' of their skilled workforce. Their concern is that too many of the few with scarce skills and experience will emigrate to high-income countries. The available data on emigration rates shows that these concerns of small island countries are justified.

Pacific governments' concerns about brain drain need to be addressed as part of a national skills investment strategy. The first step for a Pacific government in developing a national skills strategy is to work out what skill sets or qualifications the public and private sectors need. The second is to lift the quantity and quality of supply of young people with the required postschool qualifications to meet both domestic and international requirements. This requires improving educational quality at all levels. Resources need to be allocated to enable potential migrants to attain the required education level or qualifications needed for successful migration. A student loan scheme could also be made available to all students pursuing a postschool qualification—to be repaid only if the graduate emigrates for three years or more, or, more broadly, if incomes exceed a certain level.

Receiving-country policies should also be directed towards reducing brain drain. Any destination country 'aid for migration' program should ensure that it does not exacerbate brain drain. This can be done by training up, either directly or indirectly, fresh intakes of workers either to migrate or to replace those migrating. This is essential for both economic and political reasons.

The PICs should invest in developing marketing strategies for their workers in key receiving countries. Few employers in the main receiving countries are familiar with countries in the Pacific region. Without the volume of workers in-country and strong reputation that some of the regional labor-sending heavyweights have, such as India and the Philippines, the PICs will struggle to gain a foothold with employers. As a result, they will be required to invest in creating demand through effective marketing. Some countries already have marketing plans and strategies in relation to the SWP and RSE, but a broader approach is needed. The most effective marketing is delivered by good service for employers by both workers and sending governments. Pacific governments should prioritize labor-mobility schemes and monitor their progress at the highest levels.

Pacific Islands Trade & Invest (PT&I) could broaden its mandate to include labor mobility. Labor mobility is more important to many Pacific Island economies than most exports. It is anomalous for the Pacific's trade promotion body not to have a labor-mobility remit. PTI could be made responsible for reaching out to neighboring country governments and employers to explore new labor-mobility opportunities for all of the Pacific.

Adverse family and community impacts of labor mobility can be minimized by avoiding long-term family separations, as all the recommendations in this report do. Migrants can bring their families in all the schemes we consider—with the exception of seasonal workers where the duration is short, and backpackers, where the migrants are not expected to have dependents.

In addition, negative family and community impacts can be addressed by sending countries through a variety of measures. These would include: (i) discussing social impacts in predeparture briefings; (ii) improving international communications infrastructure; (iii) strengthening prevention efforts around gender-based violence; (iv) improving migrant family support services in sending countries; and (v) funding formal social protection programs—such as social pensions for the elderly—for groups that are particularly vulnerable as a result of migration. Sending countries should encourage the development of codes of conduct with a publicly funded complaint mechanism.

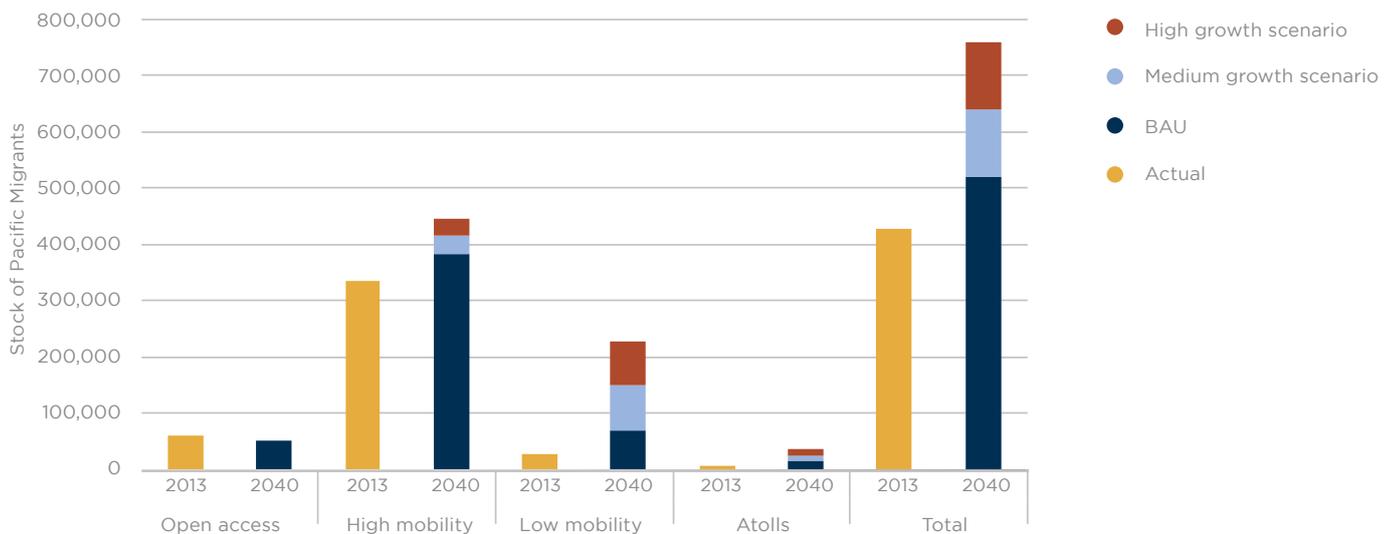
What would happen if the reforms of the previous sections were implemented? *Pacific Possible* illustrates the impacts of the reforms it proposes by a series of projections.

Pacific labor mobility is on the rise, but is not keeping pace with population growth. In the absence of reforms, growth in the number of migrants and seasonal workers is projected to be steady but slow. Our ‘business as usual (BAU)’ projections forecast the stock of Pacific migrants (temporary and permanent, but excluding seasonal workers) to reach 490,000 by 2040—up from the existing 420,000 (2013). The number of seasonal workers is set to increase from about 9,000 in 2013 to reach 29,000 by 2040—even without further reforms. While these trends are in the right direction, they are inadequate. The ratio of Pacific migrant stock to Pacific population would fall from 4.5 percent in 2013 to 3.5 percent in 2040.

With reforms, it would be possible to achieve significantly higher flows and stocks of migrants (Figure 6-2). We consider two scenarios, a medium-growth and a high-growth scenario, based on quantifications of the reforms presented in the report. The difference between them represents the degree of policy effort put in by both sending and receiving countries.

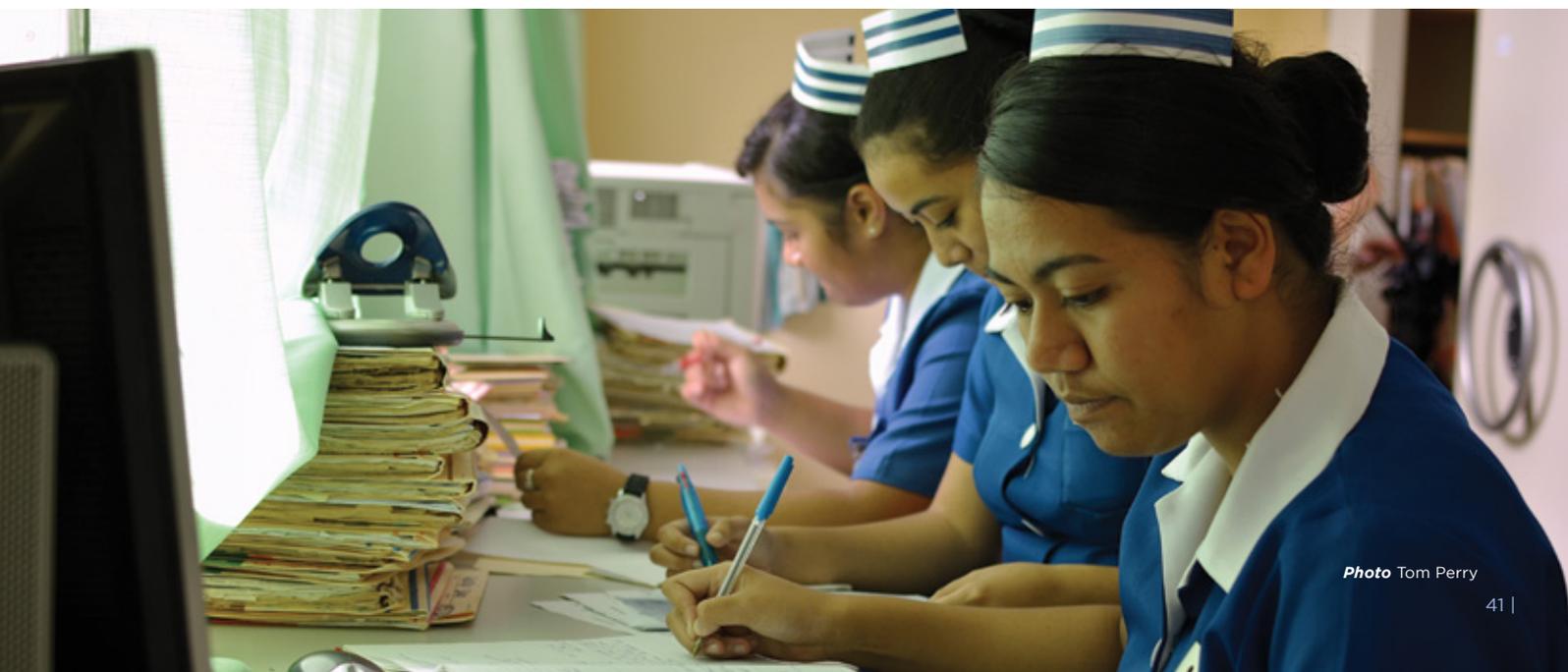
The numbers of migrants and seasonal workers leaving the Pacific every year would be 3.6 and five times higher by 2040 in the medium - and high-growth scenarios than they are as of 2013, and 1.6 to 2.2 times higher than what they would be in 2040 under BAU. The scenarios are indicative only, but both are feasible and, in fact, full implementation of the reforms outlined in this report would achieve an even higher number of labor-mobility opportunities for Pacific Islanders.

Figure 6-2: Stock of Pacific Migrants Increases Significantly With Proposed Reforms*



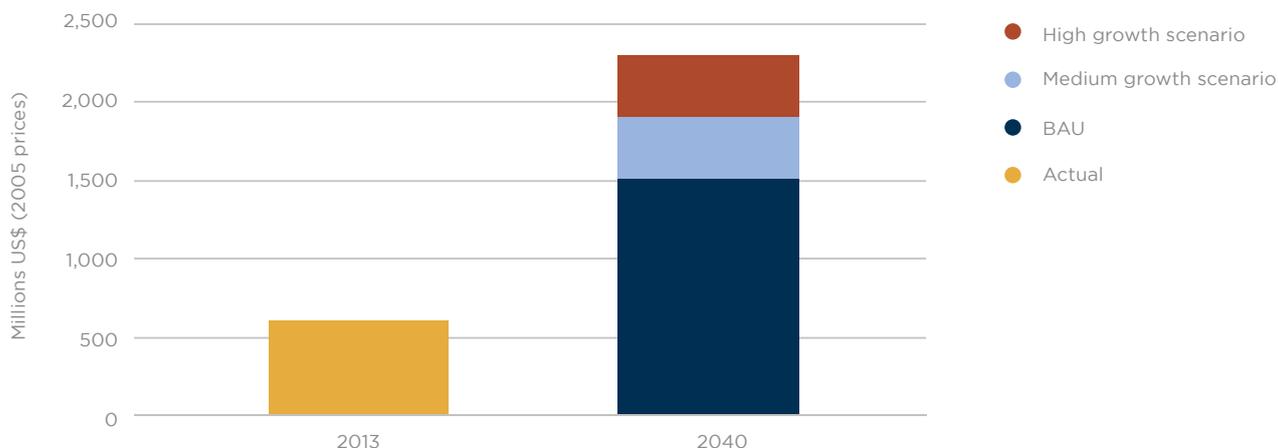
Source World Bank and Development Policy Center 2017.

Note *Figures include seasonal workers.



The labor-mobility gains are targeted at the low-mobility and atoll countries (Figure 6-2). For example, the stock of Papua New Guinea migrants (excluding seasonal workers) increases almost nine-fold under the high-growth scenario (between 2013 and 2040) while the stock of Kiribati migrants increases almost seven-fold.

Figure 6-3: Pacific Remittances and Net Seasonal Worker Income (2013 and 2040)



Source World Bank and Development Policy Center 2017.

The reforms generate an additional 75,000 to 150,000 migrant job opportunities and US\$6.5 to US\$13 billion of net income for the people of the Pacific by 2040 under the medium- and high-growth scenarios respectively, relative to BAU. The income gain (measured in terms of the expected income increases net of opportunity costs) of both seasonal workers and temporary and long-term migrants is about five to 10 times the value of Australia and New Zealand’s aid to the Pacific in 2016 (US\$1.5 billion).

If we add the net income of migrants to the PICs Gross National Income, increased labor mobility results in income growth doubling (or more) for the poorest PICs. In the high-growth scenario, labor-mobility reforms double per capita income growth (between 2013 and 2040) relative to BAU for Papua New Guinea and the Solomon Islands, triple income growth for Vanuatu, and quintuple income growth for Kiribati.

Most of these benefits stay with the migrants, but funds sent home also increase sharply. Even without further reforms, remittances to the PICs (from nonseasonal workers) and net income (from seasonal workers) are forecast to more than double by 2040 (Figure 6-3). As of 2013, they are estimated at US\$590 million (2005 prices). With average incomes rising in the OECD and the migrant stock increasing, they are expected to reach US\$1.5 billion under BAU. The two reform scenarios would generate an additional US\$400 million and US\$800 million, respectively over the BAU forecast. Countries with historical low mobility—PNG, the Solomon Islands and Vanuatu—see a three-fold rise in these funds sent home compared to 2040 under BAU. The two atoll states—Kiribati and Tuvalu—experience a more than doubling of remittances.

The small size of the Pacific makes reforms that are transformative for the region doable for the metropolitan countries. Under the scenarios, Pacific migrants are projected to account for just 1 percent or less of the Australian labor force, and 6-7 percent of the New Zealand labor force by 2040.

There are real benefits not only for the PICs but for destination countries such as Australia and New Zealand in terms of filling labor shortages using labor from the Pacific. The positive experiences compiled in this report show what is possible. By enhancing Pacific labor mobility, Pacific isolation can be overcome.

Additional transformational impact in 2040



Expanding Opportunities for Labor Mobility



20,000
additional non-seasonal
migrants/year



30,000
additional seasonal
workers/year



US\$13b
additional income for
migrants/year



US\$900m
additional remittances
and seasonal workers'
income/year



SPOTLIGHT 2

Labor Mobility: Impacts on Poverty, Gender, and the Environment

<p>Poverty</p>	<p>Poverty impacts tend to depend on the type of opportunity and to vary from country to country. In general, the high cost of travel and low educational attainment can prevent the poorest from taking advantage of labor-mobility schemes. For semi-skilled work (for example, aged care), it is likely that fewer of the poor will be able to access these opportunities. For low-skilled work, however, poverty impacts largely depend on the recruitment model put in place by the various seasonal employment units. For some countries, the model is more conducive to recruitment of poorer applicants, for others it is not. As employers keep hiring from within known networks of communities of first-round or second-round workers, this limits geographical spread of employment opportunities.</p>
<p>Gender</p>	<p>The majority (84 percent) of participants in Pacific seasonal worker schemes are male. While their families benefit from their higher incomes and remittances, women often have to take on additional tasks that the migrant would otherwise do. Analysis of the social impacts of Pacific labor mobility is still in its infancy. Even in cases where the woman is the migrant, she may not be adequately protected from harassment in largely male-dominated living arrangements. The gender impacts, however, are likely to change over time, particularly if labor-mobility opportunities shift from horticulture to tourism/aged care sectors, and from highly seasonal migration to longer-term arrangements. Allowing families to accompany migrants, whenever feasible, would minimize negative social impacts.</p>
<p>Environment</p>	<p>In many Pacific Islands, labor mobility and migration have been important factors in limiting population growth and thus the pressures on environment. Kiribati, which has fewer opportunities for migration than other PICs, has experienced severe environmental degradation due to rapid population growth.</p>

7. Taking Advantage of the ICT Revolution

The Pasifikis – Saia’s Industrial Design Business in 2040

After years of discipline and dedication, Saia has completed his Master’s degree in Industrial Design from the University of the South Pacific in Fiji. While studying, he met his now wife, and they have two young children. Since finishing his Masters, he has also managed to set up his own business, and works remotely from home with clients across the globe. While 25 years ago the only way to earn a good income with a postgraduate qualification would have been to find employment with a large company overseas, he is now able to meet the high demand for his work from the comfort of his home. Not only is he efficient and highly skilled, he also incorporates traditional Pacific design elements, giving his work a creative edge that his competitors cannot offer. He is now earning a great income, which comes from his global client base, stretching from China to Austria and throughout the Middle East. Saia is in a good place, and could not be happier.



In recent years, PICs have improved connectivity by investing in underwater fiber optic cables and reforming their telecommunication sectors, allowing greater competition to improve services and reduce costs. There is still scope for improvement, particularly affordability of services, however, progress in connectivity is tangible across the region. *Pacific Possible* examines whether and how improved connectivity and enhanced use of ICT, coupled with other advances in digital technologies –some of which have not yet reached the Pacific islands–can be expected to translate into accelerated economic growth and job creation and what needs to be done to harvest these “digital dividends.”

With respect to the impact of the ICT revolution on economic growth and employment, we distinguish three broad areas:

- **The ICT sector itself**, comprising mobile network operators, infrastructure service providers, distributors and retailers of ICT services, content and service providers.
- **ICT-related activities**, which include a broad category of economic activities that are either made possible or otherwise enhanced by technologies, particularly the Internet. This ever-expanding range of activities includes, for example: e-commerce (online business transactions), online offshoring and outsourcing (including freelancing), application-based activities (for example, shared economy transactions) and financial technologies (fintech). As the development of the broader digital economy in the Pacific is still at an early stage and, therefore, difficult to quantify effectively, this report focuses primarily on potential opportunities arising from participation of the PICs in online offshoring and outsourcing.
- **Economy-wide impacts of ICT**, capturing the impact of ICT on increasing productivity, enhancing products and services, and facilitating the adoption of new knowledge.

We discuss for each of these three areas their current contribution to growth, employment and government revenue and describe scenarios for their evolution over the next 25 years. This is followed by a brief discussion of necessary complementary investments to fully harness the benefits of ICT, including enhanced skills and the enabling environment for the digital economy. It is important to note upfront that projecting the economic impact of increased ICT penetration in the Pacific is fraught with many uncertainties. This is the result of the fast pace of technological developments, with significant further innovations likely over the next 25 years.

Some of the new technologies that are already commercially available—such as 3-D printing—combined with improved connectivity could open entirely new opportunities for the PICs. Others such as artificial intelligence/machine learning are currently over the horizon, but possibly not for long, and, again with adequate connectivity, could have significant implications for addressing such challenges as institutional capacity constraints and skills shortages. In addition, the relationship between increased ICT penetration and economic growth is contingent on the structure of the economy and a large range of other factors.

▷ THE ICT SECTOR

The ICT revolution has brought rapid growth of the ICT sector, and especially of mobile services, in most PICs. While fixed-line communications were stagnant, the advent of mobile technologies two decades ago has led to a rapidly growing ICT sector in most PICs. This was supported by the liberalization of the telecommunications sector. Until recently, telecommunications were largely state-owned monopolies in most of the PICs, however, an active deregulation policy has been a key driver of increased ICT penetration since 2003. Tonga was among the first PICs to deregulate its telecoms sector in 2003 and most of the other PICs followed suit over the next 15 years. This has led in a few years to a drastic reduction in the price of mobile phone subscription and a rapid expansion of subscribers, resulting in near-universal penetration—except in very remote locations. Markets are now largely competitive and private sector led, although monopolies can still be found in the Marshall Islands, the Federated States of Micronesia, Tuvalu (state-owned), and Nauru (private), while many countries have no more than two operators.

Connectivity at present is delivered through a combination of mobile and fixed networks, with connections to international networks either ensured through satellites or undersea cables. The geographic and physical limitation of fixed networks means that mobile has the best opportunity to drive connectivity and Internet access throughout the Pacific Islands (GSMA 2015).⁸ Most countries have invested or are investing in undersea fiber optic cables as a lower-cost, higher-capacity and more reliable

⁸ The GSMA (“Groupe Speciale Mobile Association”) represents the interests of mobile operators worldwide, uniting nearly 800 operators with more than 250 companies in the broader mobile ecosystem.

long-term option, compared to satellite connections, although satellite pricing models have become increasingly flexible. As most PICs are archipelagos comprising a large number of islands, however, satellite connections will remain an important option to bring telephone and Internet services to the remotest and least-populated islands. Increased Internet penetration has also facilitated the development of new communications service offerings (“over the top services”) including social media platforms.

The PIC11 show large differences with respect to penetration of ICT services. Fiji has the highest unique subscriber penetration rates⁹ for mobile phones (83 percent), followed by Palau (64 percent) and Tonga (58 percent (Table 7-1). In most of the other countries, about one-half of the population has a mobile phone subscription. Only Kiribati (40 percent), PNG (32 percent), and the Federated States of Micronesia (16 percent) still have relatively low penetration rates, which are below the 39 percent reached by Sub-Saharan Africa. About 50 percent of Fiji’s population also has access to the Internet through mobile phones, while for most of the other countries mobile broadband subscriptions are less common.

It is, however, important to note that mobile penetration rates are very dynamic and have been growing rapidly, especially following market liberalization and the introduction of new technologies.

Fixed phone line penetration remains very low for most of the PIC11 and has, in fact, been declining in most countries as more people use mobile phones. The same holds true for fixed broadband subscriptions. While traditional fixed-line copper networks may be increasingly uneconomic to maintain, there is scope for increased deployment of optical fiber access networks to businesses and, prospectively, households in the medium term.

Table 7-1: Status of ICT Services (2016)

Country	Mobile Telephone Unique Subscribers per 100 Inhabitants	Mobile Telephone Unique Subscribers (3G) per 100 Inhabitants	Mobile Telephone Unique Subscribers (>3G) per 100 Inhabitants	Fixed Telephone Subscriptions per 100 Inhabitants	Fixed Broadband Subscriptions per 100 Inhabitants
Fiji	82.7	16.1	32.3	8.1	1.4
Kiribati	40.0	-	-	1.4	0.1
Marshall Islands	48.6	20.9	0.0	4.5	1.9
Micronesia, Fed. Sts.	16.3	7.0	0.0	6.5	3.1
Palau	64.1	10.4	0.0	-	-
PNG	31.5	6.7	8.7	2.0	0.2
Samoa	43.4	4.9	22.3	5.9	1.1
Solomon Islands	47.2	6.9	15.5	1.3	0.2
Tonga	57.9	24.2	1.1	12.4	2.3
Tuvalu	47.8	21.7	0.0	20.2	10.1
Vanuatu	52.8	16.1	7.7	1.8	1.6

Source GSMA database, ITU database.

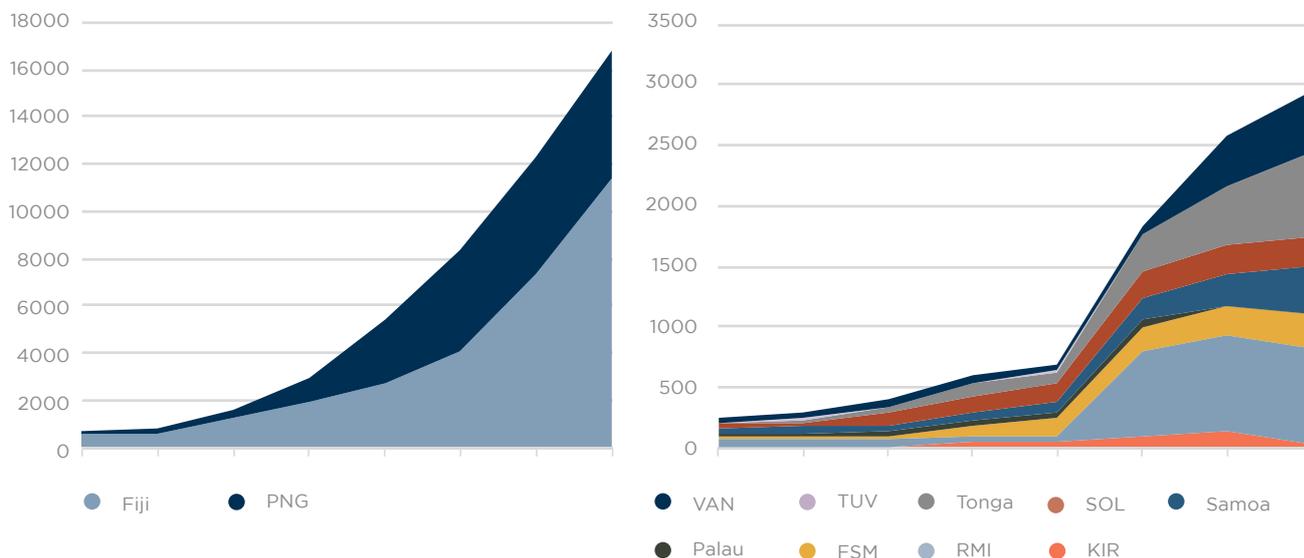
Note Data for fixed telephone subscriptions and fixed broadband subscriptions are for 2015.

⁹ Since individual users of mobile phone services (unique subscribers) often use several SIM cards, mobile penetration rates can either be calculated with respect to connections or unique subscribers. According to GSMA (2015), on average, every subscriber in the Pacific holds 1.5 connections; that is, penetration rates with respect to connections are 1.5 times as high as unique subscriber penetration rates.

Internet bandwidth was highest in Fiji and PNG, at 11,332 Mbps and 5,500 Mbps, respectively, in 2015.

The combined internet bandwidth for the other nine PICs was close to 3,000 Mbps in 2015, but has been growing rapidly in recent years in Samoa, Tonga, the Marshall Islands, and Vanuatu, as these countries got connected by undersea fiber optic cables (Figure 7-1). In the whole PIC area, the profile of broadband technology is projected to be as follows in 2020: 18 percent for 2G (in comparison with 22 percent for the developing world overall), 30 percent for 3G (43 percent), and 52 percent for 4G (35 percent) (GSMA 2015).

Figure 7-1: International Internet Bandwidth (in Mbps)(2007-14)



Source World Development Indicators, World Bank.

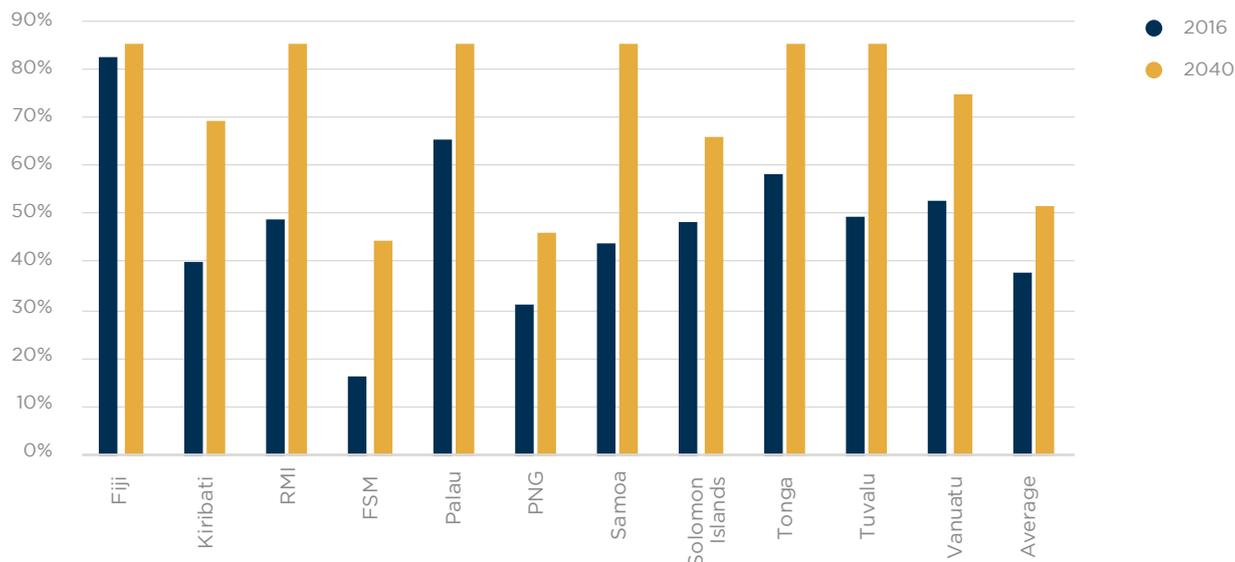
Based on estimates by GSMA (2015), in 2014 the mobile ICT sector contributed about US\$700 million or 3.5 percent to the GDP in the 11 PICs. The bulk of this, about US\$440 million, is contributed by mobile operators. Related industries, including infrastructure and support services, distributors and retailers, content, applications, and other services are estimated to contribute the remaining US\$260 million to GDP. The mobile ICT sector is estimated to provide employment for more than 10,000 people and to generate public revenue of close to US\$200 million in the form of VAT on mobile services, corporation tax, and employee income tax and social security contributions.

Outlook

Over the 2016-40 period, most Pacific Island citizens will be connected to faster, cheaper Internet services. They will use the Internet for many transactions: selling or buying goods, accessing information, transferring money, acquiring skills, and engaging with governments. Pacific Island economies will be based increasingly on knowledge and innovation, including more diversified services sectors, innovation and entrepreneurship, and more skilled and productive workforces.

GSMA (2015) projects that subscriber growth in the PICs will slow to 3.8 percent over the period 2014-20 compared to growth of 12.6 percent over the period 2009-14. This slowdown reflects the fact that some countries have already reached relatively high levels of market penetration and that further growth will require efforts to reach additional customers and, in particular, more remote islands. For our projections, we assume as our BAU scenario subscriber growth during the period 2016-20 of 6 percent for countries with penetration rates below 40 percent in 2016 and 3.8 percent for countries with penetration rates higher than 40 percent in 2016. For the period 2020-40, we assume that the number of unique subscribers grows annually by 3.8 percent for all countries. At these growth rates, the average mobile penetration rate for the PIC11 grows from 36 percent in 2014 to 43 percent in 2020 and 53 percent in 2040. The six countries with the highest penetration rates in 2016—Fiji, Palau, Tonga, Vanuatu, the Marshall Islands, and Samoa—would each be able to reach an 85 percent penetration rate before 2040. All other countries, however, would still not reach a penetration rate of 85 percent by 2040. Two countries—the Federated States of Micronesia, and Papua New Guinea—would still not reach a penetration rate of 50 percent by 2040 (Figure 7-2).

Figure 7-2: Unique Subscriber Penetration Rates (2016 and 2040)(BAU)

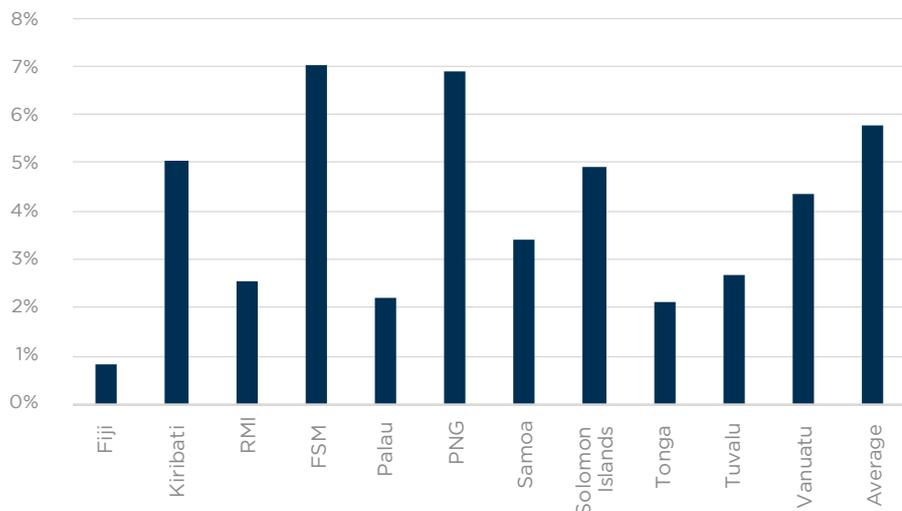


Source World Bank staff calculations.

Given that currently projected growth rates of unique subscribers for some countries would maintain low levels of mobile penetration by 2040, we also examine a scenario where all countries reach a penetration rate of 85 percent—the average penetration rate for European countries in 2015—by 2040 (the opportunity scenario). With a penetration rate of 82 percent, Fiji is the Pacific country that is already quite close to the European average, indicating that an 85 percent target is indeed realistic and achievable. It is, however, also important to note that the dispersion of many PICs across many islands implies that once the main population centers are covered, expanding mobile access to remote regions and islands will entail significant cost and effort.

Figure 7-3 shows the required annual growth rates in unique subscriptions which would be necessary to reach a penetration rate of 85 percent by 2040. The Federated States of Micronesia and Papua New Guinea, who had the lowest mobile penetration rates in 2016, would require annual growth in unique subscribers of more than 6 percent annually until 2040. While such growth rates are well within what other countries have achieved, these countries face particularly severe challenges in terms of geography and affordability for low-income populations. For the other countries, increasing unique subscriber penetration rates to 85 percent seems within reach.

Figure 7-3: Required Annual Growth in Unique Mobile Subscribers to Reach a Penetration Rate of 85 Percent by 2040



Source World Bank staff calculations.

Achieving faster growth under the opportunity scenario would require addressing key remaining connectivity issues:

- Completing market liberalization, enabling additional investment in infrastructure and services in the northern Pacific, particularly in the Federated States of Micronesia and the Marshall Islands;
- Increased and more affordable international bandwidth for Papua New Guinea, Kiribati and Tuvalu (cable/satellite connectivity, as appropriate), requiring mobilization of public and private investment;
- Targeted approaches to connect remote/outer islands, particularly in Kiribati, Tuvalu and the northern Pacific, including Public/Private Partnership investments and, where feasible, mobilization of new technologies;
- Commencement, or continuation of regulatory reforms that focus on expanding broadband Internet access, including, for example, those relating to radio spectrum management; infrastructure sharing and technological convergence (for example, of broadcasting and telecoms); and
- Anticipating a gradual shift towards more regional or subregional telecommunications markets, cross-regional (or subregional) harmonization of legal/regulatory instruments and institutions to stimulate increased investments, provide stable market environments and serve the interests of consumers.

Under the BAU scenario, the contribution of the ICT sector to GDP would increase from an estimated US\$700 million in 2014 to US\$1.8 billion in 2040, employment would increase from about 10,000 to 27,000 jobs, and government revenue from the ICT sector from less than US\$200 million to about US\$500 million. Under the opportunity scenario, a more rapid expansion of the mobile subscriber base could generate nearly US\$1.2 billion in additional revenue, an additional 18,000 jobs, and more than US\$300 million in additional government revenue from the ICT sector (Table 7-2).

Table 7-2: Contribution of the ICT Sector to GDP, Employment, and Government Revenue (2014 and 2040)

Country	ICT Sector Contribution to:								
	GDP (Constant 2014 US\$ millions)			Employment (# of people)			Government Revenue (Constant 2014 US\$ millions)		
	2014	2040 BAU	2040 Opportunity Scenario	2014	2040 BAU	2040 Opportunity Scenario	2014	2040 BAU	2040 Opportunity Scenario
Fiji	117	180	180	1,762	2,703	2,703	32	50	50
Kiribati	3	23	28	51	345	423	1	6	8
Marshall Islands	3	9	9	51	141	141	1	3	3
Micronesia, Fed. Sts.	3	9	17	48	135	257	1	2	5
Palau	2	5	5	30	71	71	1	1	1
PNG	465	1,309	2,425	6,981	19,637	36,371	128	360	667
Samoa	23	38	38	352	571	571	6	10	10
Solomon Islands	55	143	186	820	2,152	2,788	15	39	51
Tonga	8	20	20	116	306	306	2	6	6
Tuvalu	1	2	2	9	28	28	0	1	1
Vanuatu	21	70	80	310	1,051	1,194	6	19	22
ALL	702	1,809	2,990	10,528	27,141	44,854	193	498	822

Source World Bank staff calculations.



Additional transformational impact in 2040

Expansion of Mobile Phone Services



6m
additional mobile
subscribers



17,000
jobs



US\$1.1b
receipts



US\$300m
taxes

ICT-ENABLED ACTIVITIES

Improved ICT connectivity opens new opportunities, including for local development and export of knowledge services. Global Outsourcing Services (GOS) range from relatively low- to mid-skill activities, such as business process outsourcing (BPO, for example, data entry, call centers, software and mobile apps programming) to skill-intensive knowledge process outsourcing (KPO, for example design and research) (Table 7-3).

Table 7-3: Definition and Classification of ITO/BPO/KPO

Classification	Definition and Service Areas	Required Skills Level
IT Outsourcing (ITO)	Outsourcing of IT services; such as software development, remote infrastructure management, custom application development, systems integration, package software implementation and support, IT consulting, embedded systems, project design, plant engineering, and products.	The range of services can require low- to high-skilled personnel.
Business Process Outsourcing (BPO)	Service functions that are information intensive and that are transferred outside a company to a third party. It includes services such as customer relationship management, human resource management, and enterprise resources management supporting the varied business processes in different sectors such as banking, finance, health, or tourism. The types of services provided are broad, and include: <ul style="list-style-type: none"> Voice-based services, such as call centers/helpdesks, and telemarketing. Nonvoice-based services; such as data entry, digitization, graphics rendering, and accounting. 	Mostly falls into the low- to middle-skills range (for example, call centers to complex financial services).
Knowledge Process Outsourcing (KPO)	Encompasses specialist activities that are knowledge intensive, such as research and development (R&D), market intelligence, and legal services, and comprises core information-related business activities that are competitively important or form an integral part of a company's value chain.	Requires advanced analytical and technical skills as well as a high degree of specialist expertise.

Source: Beschorner et al. 2015 based on Bardhan et al. 2013.

Table 7-4: Economic Contribution of the GOS Sector in Selected Countries

Country	Direct Jobs Created	Population (million)	Direct Jobs (% of Population)	Total Industry Revenue (US\$ million)	Average Revenue per Worker (US\$)	GDP (US\$ million)	Contribution to GDP (%)
India	3,100,000	1,252.1	0.3	86,000	27,742	1,876,797	4.6
Philippines	926,000	98.4	0.9	16,000	17,279	272,017	5.9
Mauritius	23,000	1.3	1.8	602	26,180	12,153	5.0
Jamaica	22,000	2.8	0.8	323	14,682	13,327	2.4

Source Beschorner et al. 2015; Board of Investment Mauritius 2017; JAMPRO 2017.

Note Data for India and Philippines are for 2014, data for Mauritius and Jamaica for 2016.

While large players, such as India and the Philippines, have traditionally dominated the global outsourcing market, some small island economies are also competitive and benefitting from this global industry (Table 7-4). Mauritius and Jamaica are recognized among the offshoring leaders in their respective regions. New GOS industry approaches have also emerged in recent years, owing to continual advances in technology and connectivity (Kearney 2014). Fiji already hosts major offshoring operations that employ about 3,000 persons in 2017, including ANZ Bank’s Pacific Operations Centre, Mindpearl, Centrecon and the Packleader Group.

The online outsourcing (OO) approach refers to the performance of tasks conducted over the Internet by workers from anywhere in the world, using online marketplaces or exchanges, and is a particularly promising channel for job creation in the Pacific Islands. Online outsourcing provides individuals and firms the opportunity to contribute to overseas projects and global value chains without having to relocate. Aside from the convenience of being able to work from one’s home base, it also helps to overcome the typical hurdles to overseas employment, including the need for visas and work permits. The global OO industry already has over 48 million registered workers, of which an estimated 10 percent (4.8 million) are active. The OO industry is projected to grow rapidly, from an estimated market size of US\$2.2 billion in 2013 to US\$4.8 billion in 2016 and US\$15 to 25 billion by 2020 (World Bank 2015a).

Outlook

ICT-related opportunities could generate a significant number of jobs and income. Of those countries that have been able to develop a significant GOS industry, Mauritius is the most relevant country for the PICs, as it shares the characteristics of being a small island developing state and remote from most major markets. Mauritius has proactively invested into the development of its GOS sector for more than 20 years, including investments into fiber optic cables to establish the necessary bandwidth for a GOS industry, a supportive regulatory regime, and industry specific incentives. By 2016, the GOS sector in Mauritius comprised 750 companies employing 23,000 professionals and generating about 5 percent of GDP. The contribution of the GOS sectors of the Philippines and India is similar, at 5.9 and 4.6 percent, respectively. The share of population employed by the ICT/BPO sector in Mauritius at 1.8 percent is significantly higher than the share of the population employed by the sector in the Philippines (0.9 percent) and India (0.3 percent) (Table 7-4).

Outsourcing to Fiji – How Does a Company Decide?

Mindpearl is a BPO specialist focusing on international, high-quality contact center operations. Numerous global brands across several industries including aviation, leisure, telecommunications, retail and waste management are supported by the company. Mindpearl chose Suva as its base to offer high-quality, low-cost alternatives for outsourcing, after carrying out an extensive 15 country search, based on: having a highly literate workforce, a neutral accent and a high degree of fluency in English, and the necessary ICT infrastructure. Mindpearl “follows the sun” across the globe with other offices in Brisbane, Barcelona and Cape Town—thus offering 24 hour/seven day a week coverage across the globe. Furthermore, since Fiji is located exactly 12 hours ahead of GMT, it makes it an ideal location for supporting activities in Western Europe and the United States.

ICT Infrastructure. A key part of this infrastructure puzzle includes Fiji’s connectivity through the Southern Cross Cable that connects Fiji to Australia, New Zealand and the United States. Construction of the Southern Cross Cable took over three years and was finished in 2001. Given the dramatic growth in data utilization, however, the network has been constantly upgraded from the initial design of 20Gbps to the current system potential of about 12 Tbps.

Labor and Skills. The decision to locate such a business always rests on the availability of relatively cheap and highly qualified labor. Labor costs in Fiji for such work are about one-fifth of the cost that companies would have to pay in Australia or New Zealand. Other competitors include the Philippines, India and Mauritius. Fiji boasts very high levels of literacy compared with most of its competitors and, perhaps most importantly, is a country where English is taught from a very early age. As a former British colony, Fijians also have a neutral accent which makes it easier for them to be understood in countries such as Australia, New Zealand, England and the United States. This is not true for key competitors such as India and the Philippines, where English is not necessarily the first language.

Incentives. The government has made an effort to make Fiji BPO friendly by offering a range of incentives. These include tax exemptions and deductions, rebates, duty reductions and exemptions, and a simplified registration process for foreign investment projects which is being further strengthened now to allow online registration of firms.

Other Key Factors. Mindpearl’s decision to set up shop in Suva was also because Fiji has a stable and reliable business and regulatory environment, supported by sound macroeconomic policies, modern and enforceable contract laws, well-developed and integrated banking and financial institutions, and the necessary infrastructure to run such a business including electricity, water supply, transportation, and excellent medical facilities.

Source Based on interviews with company staff, and testimonials from Investment Fiji’s website at <http://www.investmentfiji.org.fj/pages.cfm/for-investors/why-invest-in-fiji/testimonials/mindpearl-limited.html> and <http://www.investmentfiji.org.fj/pages.cfm/for-investors/why-invest-in-fiji/testimonials/andrew-miriklis.html>.

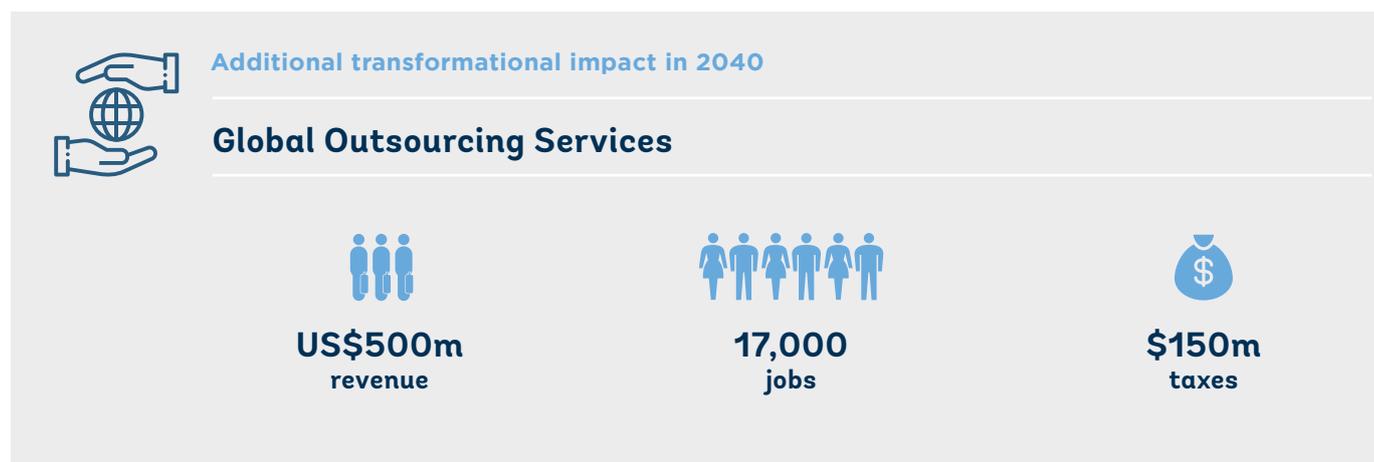
Among the PICs, Fiji, Samoa, and Tonga may have the greatest potential for the development of a significant GOS sector. These countries already have in place the key factors necessary for the development of a GOS sector, including adequate skills, sufficient Internet bandwidth, and an adequate business and regulatory regime. While, in principle, most of the PICs could, and potentially will, develop knowledge export services, they will have to overcome more significant hurdles than Fiji, Samoa, and Tonga. Some of the smaller PICs simply lack the scale to develop an organized GOS sector and the biggest opportunity may be the participation of individuals in OO activities. Several of the PICs also would require very significant investments in enhancing the skills of their labor force and improving the business environment and regulatory regime.

Over the 25-year *Pacific Possible* time horizon, it seems possible for Fiji, Samoa and Tonga to develop their GOS sectors to about the size of the GOS sector in Mauritius with a contribution of 5 percent to GDP and employment opportunities for 1.8 percent of the population. For Fiji, this would imply a growth of the GOS sector to contribute close to US\$400 million to GDP in 2040 and provide employment for about 15,000 Fijians compared to 3,000 jobs in 2017. For Samoa and Tonga, this would mean a GOS sector that contributes US\$65 million and U\$35 million to GDP and provides employment for about 3,000 and 2,000 professionals, respectively (Table 7-5). Since these countries will not be able to compete purely on price with larger competitors such as India and the Philippines, their biggest opportunities are likely to lie in more specialist niche knowledge service exports. The example of Mauritius is again instructive. While in the early days of the industry, most activities were rather low-skill BPO activities such as call centers, in recent years the IT and KPO segments of its industry have seen faster growth than traditional BPO activities (Board of Investment Mauritius 2017).

Table 7-5: Economic Contribution of the GOS Industry by 2040 in Fiji, Samoa, and Tonga

Country	Number of Jobs	Jobs (% of Population)	Gross Value Added (2015, Millions of US\$)	Gross Value Added (2015, Millions of US\$)
Fiji	15,000	1.8	376	5.0
Samoa	3,000	1.8	65	5.0
Tonga	2,000	1.8	35	5.0

Source World Bank staff calculations.



ECONOMY-WIDE PRODUCTIVITY IMPACTS OF ICT

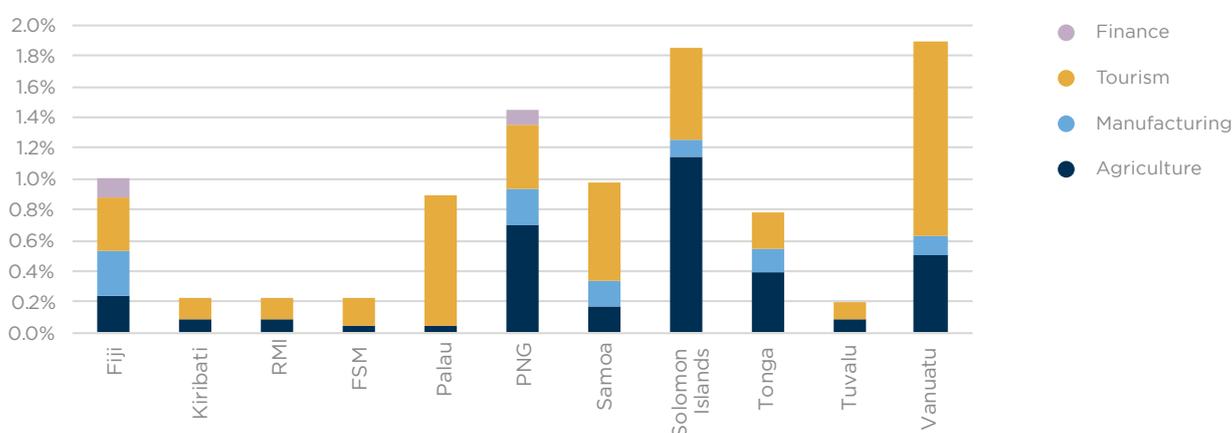
Aside from opening new activities, the digital revolution contributes to increased productivity in many sectors and enhances the quality of existing activities. ICT can help to improve competitiveness across industries, such as finance, trade, and logistics by reducing transaction costs and speeding up processing times. E-governance can improve the efficiency and transparency of public service delivery, enhance the quality of services and, of particular importance for the PIC11, facilitate the provision of services to remote regions and islands (for example, through remote diagnostics in the health sector or access to massive open online courses). To realize these benefits, however, it is important that an expansion of ICT services is accompanied by what the World Development Report on Digital Dividends labels “analog complements.” These include appropriate frameworks to foster competition that drives firms to adopt efficiency gains made possible through ICT, adequate skills, and accountability mechanisms (World Bank 2016i).

ICT also facilitates the acquisition and use of knowledge that is an important pathway to improved productivity and growth. This is particularly relevant for the larger economies in the Pacific, whose economies are often characterized by large productivity gaps compared to other countries. For example, by using ICT farmers can receive real-time information on market prices and conditions, disease outbreaks, and agriculture and fishing-specific weather forecasts (PRIF 2015).

ICT plays a critical role in realizing the opportunities discussed in *Pacific Possible*. For example, improved connectivity allows better marketing of the tourism sector, including to new markets. Availability of Internet services is also an important element in tourists' overall satisfaction with a hotel or destination. ICT also plays an important role in monitoring fishing activities and the adherence to catch limits, and facilitates the matching of employers and employees under labor-mobility schemes. Many activities outside those discussed in *Pacific Possible*—especially in the larger economies with larger and more diversified private sectors—could also draw significant improvements in productivity and access new customers and markets with ICT. A development of major importance is mobile banking. After making its debut in Fiji, it is now spreading to other islands, transforming the conditions of financial transactions.

Samoa, Tonga and the Melanesian countries stand to gain most from greater use of knowledge because of their larger size, more diversified nature of their economies, and relatively large productivity gaps in agriculture. In research carried out for *Pacific Possible*, Duncan (2015) examined the potential increase in economic growth that the 11 PICs could achieve if they moved towards becoming knowledge economies. A greater focus on the acquisition and use of knowledge—be it domestically generated or imported—would allow the PICs to bridge gaps in productivity and performance which often exist in comparison to similar developing countries.

Figure 7-4: Additional Average Annual Real GDP Growth Through ICT-enabled Use of Knowledge (2015-40)



Source Author's calculations based on Duncan 2015.

Productivity increases in agriculture could generate between 0.4 to 1.1 percent more in annual growth for Tonga, Vanuatu, Papua New Guinea, and the Solomon Islands (Figure 7-4). Fiji, Samoa, Tonga, Papua New Guinea, Vanuatu, and the Solomon Islands could also see additional growth in their manufacturing sectors of between 0.1 and 0.3 percent annually. The financial sector in Fiji and Papua New Guinea could generate additional annual growth of around 0.1 percent as the result of increased use of ICT and knowledge. Because of the very small size of their agriculture, manufacturing, and financial sectors, the Micronesian economies and Tuvalu have only a very limited opportunity to generate faster growth in these sectors. ICT and knowledge clearly also play an important role for the development of tourism in the region. These impacts are, however, already captured in our projections for the tourism sector and thus not included in the ICT-related projections.

In total, we estimate that under a BAU scenario, the growth in ICT penetration could trigger productivity gains that amount to about US\$4 billion by 2040 (equivalent to 15 percent of GDP in 2015). Under the opportunity scenario, where all countries reach a mobile penetration rate of 85 percent by 2040, there would be an additional productivity gain of about US\$3 billion (most of it accruing to PNG because of the relatively large size of the economy, large productivity gaps in key sectors, and the large difference between the BAU and opportunity scenarios with regard to projected mobile penetration rates), an additional 250,000 jobs, and an additional US\$700 million in tax revenue.



Additional transformational impact in 2040

Increased Productivity

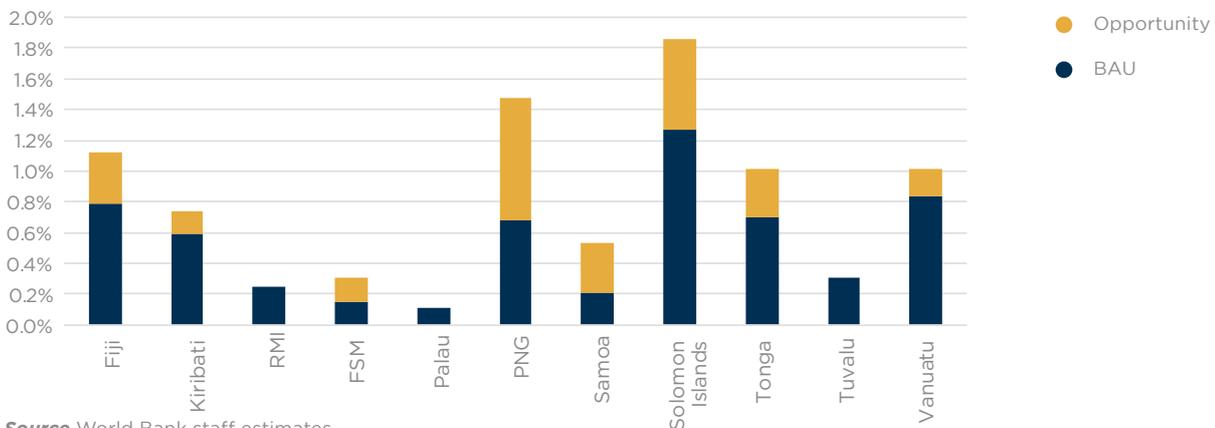
 US\$3.5billion GDP	 250,000 jobs	 \$700m taxes
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Source Author's calculations based on Duncan 2015.

OVERALL GROWTH IMPACT OF ICT IN THE PACIFIC

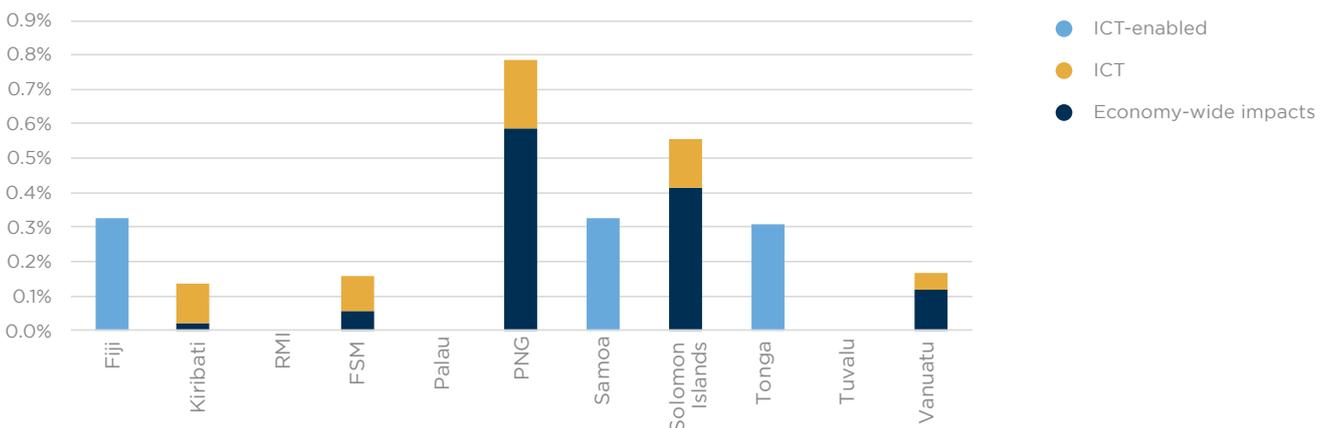
ICT has the potential to be a significant driver of growth in the PICs. The contribution of ICT to growth under the BAU scenario would be highest for the Melanesian countries, Kiribati and Tonga where ICT has the greatest potential to generate growth effects, either because the ICT sector is still relatively small and, therefore, has significant potential to grow, or productivity in key sectors is low with significant potential for productivity increases made possible through greater ICT penetration. We estimate that ICT could contribute between 0.6 and 1.2 percentage points to average annual real GDP growth under the BAU scenario (Figure 7-5). Since, under the BAU scenario, mobile penetration rates would still be significantly below 85 percent by 2040 in the Solomon Islands and Papua New Guinea, additional efforts to reach a penetration rate of 85 percent could and additional 0.8 percentage point increase in real GDP growth for Papua New Guinea and of 0.5 percentage points for the Solomon Islands (Figure 7-6). Taking advantage of opportunities created by the GOS industry could generate additional average annual real GDP growth of around 0.3 percentage points for Fiji, Samoa, and Tonga.

Figure 7-5: Average Annual Real GDP Growth due to ICT (2015-40)



Source World Bank staff estimates.

Figure 7-6: Additional Average Annual Real GDP Growth due to ICT in the Opportunity Scenario (2015-40)



Source World Bank staff estimates.

By 2040, ICT-related impacts are estimated to contribute about US\$5 billion to GDP, generate more than US\$1 billion in government revenue, and provide employment for around 250,000 people under the BAU scenario. Under the opportunity scenario, faster than BAU mobile penetration growth could generate more than US\$5 billion in additional GDP, another US\$1 billion in government revenue, and close to 300,000 additional jobs (Table 7-6). Most of these gains would be accruing to PNG, where the combination of relatively large gaps in mobile penetration and productivity combined with the size of the country offer significant upward potential.

Table 7-6: Additional GDP, Government Revenue, and Employment by 2040 due to ICT

Country	Aggregate Impacts of Growth in ICT by 2040					
	BAU			Opportunity (in addition to BAU)		
	GDP (US\$m)	Government Revenue (US\$m)	Jobs	GDP (US\$m)	Government Revenue (US\$m)	Jobs
Fiji	848	226	28,100	376	100	11,600
Kiribati	22	3	500	5	1	200
RMI	8	1	200	0	0	-
FSM	9	1	200	13	2	300
Palau	6	1	100	0	0	-
PNG	3,384	707	189,000	4,522	945	257,400
Samoa	83	19	2,800	65	15	3,200
Solomon Islands	363	102	24,000	178	50	12,000
Tonga	76	16	2,700	35	7	1,800
Tuvalu	2	0	-	0	0	-
Vanuatu	152	27	7,100	33	6	1,600
Total	4,952	1,103	254,700	5,226	1,125	288,100

Source Author's calculations based on Duncan 2015.

WHAT IS NEEDED TO HARNESS ICT FOR ECONOMIC GROWTH?

Harnessing ICT for economic growth will require sustained investment, by the private and—where additional stimulus is needed—public sectors, in the following foundational elements (Beschoner 2015):

- improved connectivity – ensuring that Pacific Islands enjoy high-speed, low-cost international bandwidth, and that a supportive policy and regulatory environment stimulates additional private investment in broadband access;

- enhanced skills – starting at the primary level, and with educational establishment at levels able to access high-quality and relevant teaching and learning materials to develop the capacity of students to meet the demands of the changing workplace in the Pacific region and beyond, and to stimulate innovation and entrepreneurship locally;
- enabling environment for the digital economy – including legal/regulatory frameworks supporting online transactions and facilitating secure e-commerce; payments and transactional systems;
- connected governments – that can leverage developments in information systems and ICT tools to deliver services to citizens and businesses more efficiently and effectively through a variety of user platforms, particularly mobile devices. This will also help to stimulate markets for Internet-based services in local economies.



SPOTLIGHT 3

ICT: Impacts on Poverty, Gender, and the Environment

Poverty	Digital technologies often require a minimum level of education and skills, which can exclude the poor from participating. Second-round impacts from domestic revenues and spending could be significant, if sufficient scale is attained.
Gender	Digital technologies can empower women economically and socially. Because social norms and time and mobility constraints are often more severe for women than for men, women could benefit greatly from technology. Digital technologies can reduce gender gaps in labor force participation by making work arrangements more flexible, connecting women to work, and generating new opportunities in online work, e-commerce, and the sharing economy.
Environment	ICT has the potential to support strengthened environmental management. For example, ICT can strengthen monitoring, grievance redress and citizenship engagement processes.

8. Capturing Greater Economic Benefits from the Region's Fisheries Resources

The Pasifikis – Eka Works with People Living with a Disability in 2040

After a long day of work, Eka arrives at home, tired but satisfied. She is thankful to have a job she loves. Eka is a social worker with a non-government organization (NGO), working with people with a disability.

She remembers harder times, before the roads were tar-sealed or even made, and is also thankful for the ease of access she now has to her clients. She can visit families as regularly as they need her to, and can also offer to help people with special needs with transport. She transports her clients to school, health centers, and to other dedicated services and facilities run by NGOs, funded by the government. She often tells stories of her travels to her parents, Tafu and Maeva.

Her twin brother Saia, who lives in Fiji, often asks her questions about the improvements to the roads on the island, which lead to interesting discussions. Maeva explains the connection between the revenue from the fishing industry on their island home, and how the government has chosen to use that revenue to build better roads, and much more. Pacific Tuna, one of the most popular tuna brands world-wide, is now globally-recognized for its sustainable fishing practices under the regional fisheries arrangement, which 15 years ago was also joined by the Philippines and Indonesia. Saia does not find this concept hard to believe; everyone knows how well their island is doing financially, thanks to Pacific Tuna.



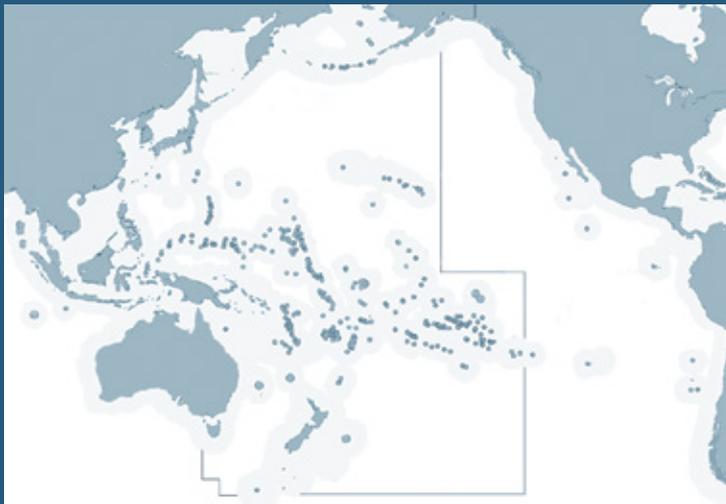
CONTEXT: THE GLOBAL TUNA SUPPLY CHAINS ORIGINATING IN THE WATERS OF PACIFIC ISLAND COUNTRIES

The Western and Central Pacific Ocean (WCPO), a region that includes the PICs and extends south below New Zealand and north to the Bering Sea to cover some 8 percent of the global ocean, is home to stocks of four tuna species that collectively support one of the world's largest and most valuable fisheries (Hampton et al. 1999). This fishery supplies roughly 60 percent of the world's tuna from what are some of the last healthy tuna stocks (Williams and Terawasi 2015). PIC waters alone cover one-half of the WCPO region and supply some 34 percent of the world's tuna catch each year, with an estimated delivered value to processors in the order of US\$3.4 billion in recent years (Pacific Islands Forum Fisheries Agency 2014).

BOX 8-1

The Western and Central Pacific Ocean (WCPO) Region

The WCPO region includes both the national waters of a number of countries as well as areas beyond national jurisdiction, with the western boundary notionally extending to the East Asian seaboard, although it is understood that the region does not include the South China Sea. In the east, the WCPO adjoins, or overlaps, the area of competence of the Inter-American Tropical Tuna Commission. The southern boundary extends to 60 degrees south and the northern boundary extends to Alaska and the Bering Sea (WCPFC 2010).

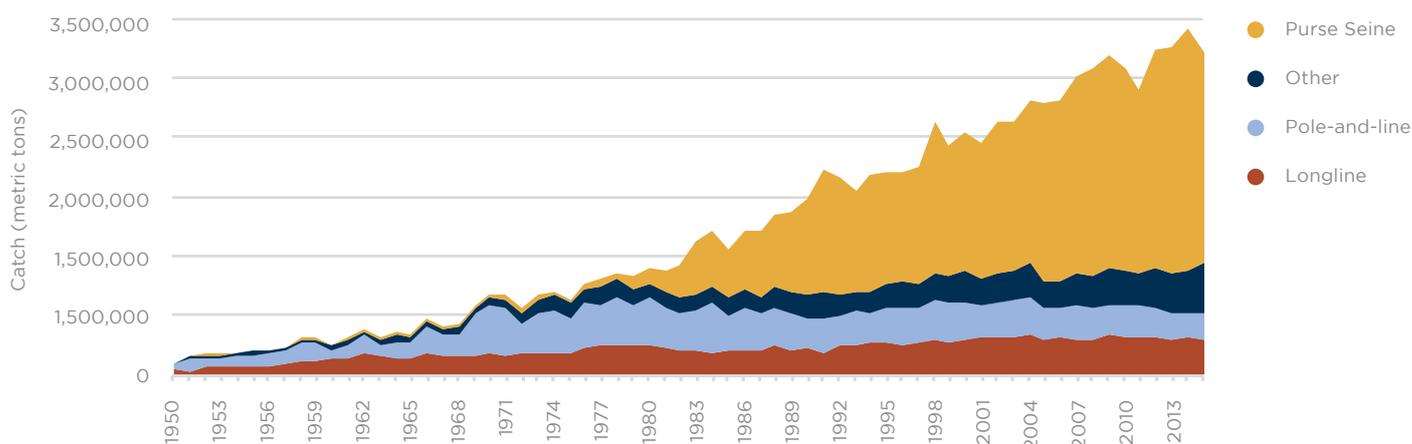


Source World Bank and Nichols Institute 2016.

Note Western and Central Pacific Ocean (area of the Western and Central Pacific Fisheries Commission - WCPFC) inside the grey lines.

The region's tuna catch is generated by four key fisheries—purse seine, longline, pole-and-line, and other (Figure 8-1). These form the basis for increasingly globalized supply chains that provide the majority of benefits to PICs, each of which can be considered as a complex and multilayered system.

Figure 8-1: Total WCPO Tuna Catch (1960-2014)



Source WCPFC Tuna Fishery Yearbook 2015.

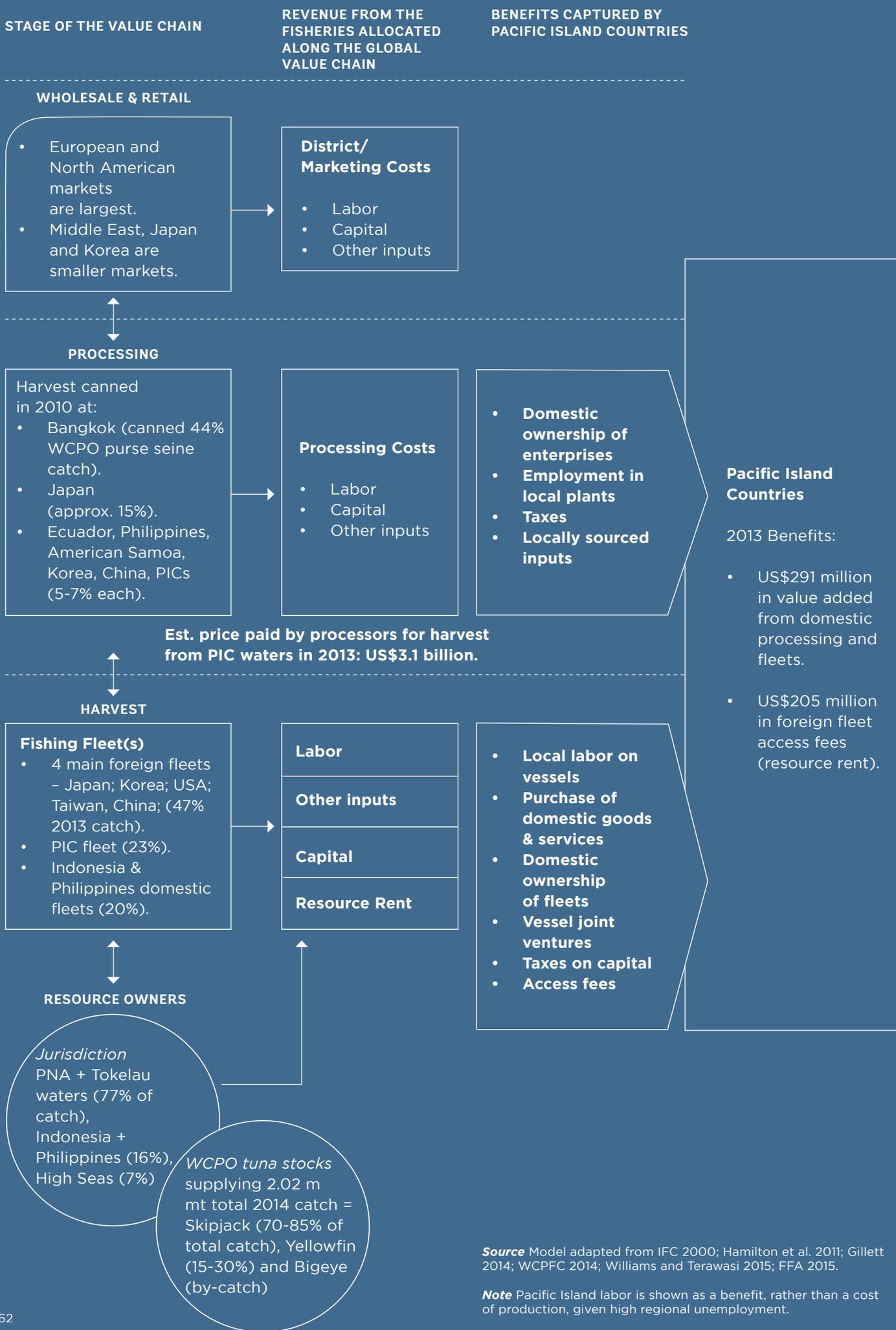
Some of the recent trends in the fisheries include:

- The purse seine fishing 'revolution' and the explosion in these fishing vessels and their catch.** Purse seine fishing to produce canned tuna has grown exponentially in the WCPO since 1980, with 34 vessels catching roughly 100,000 metric tons of tuna that year, increasing to a steady state of some 180 to 220 vessels operating from 1990 to 2006, to 344 vessels catching over 2 million tons in 2014. Fifty-two new purse seine vessels have been built since 2010 and registered to fish in the WCPO. This fleet has grown more efficient over time (notably in the technology used for fish-aggregating devices - FADs) and its composition has changed. While largely a foreign fleet, the number of Pacific Island-based vessels is growing (notably in Papua New Guinea). Combined catches by Indonesian and Philippine vessels more than doubled between 1997 and 2014. Over one-half of all purse seine vessels operating in the region that have been built since 2010 are from China and, during this same time, catches by vessels from Japan, Korea, the United States and Taiwan, China have been relatively constant.
- Stagnation and possibly senescence in the longline fisheries.** Productivity and profitability in the southern albacore longline fishery has declined, even as fishing increased sharply in 2008 with the rise of the PIC albacore fleet, which caught as much as 50 to 60 percent of albacore in 2014, and more recently the rise of the Chinese fleet. Catch rates have decreased steadily since 2009, hitting the lowest level since 2002 in 2011, with only marginal improvements since, even as new (and reportedly subsidized) vessels enter the fishery. Similarly, the trend in catches from the tropical longline fishery (much of which occurs in waters outside the jurisdiction of PICs) supplying sashimi markets has been flat. Over the period from 2003 to 2013, the catch rates for bigeye peaked in 2008 and have generally declined since (in terms of kilograms caught per one hundred hooks on a longline), while yellowfin catch rates consistently declined from 2010 to 2013. In general, these two fisheries have provided relatively little economic benefit for PICs, which have typically captured an estimated 3 percent of the value of the catch delivered to processors, largely via access fees (although locally based longline vessels have provided higher benefits to PICs such as Fiji and Samoa).
- Establishment of a regional management body for the tuna fisheries.** The WCPFC was established in 2004 to promote the conservation and management of WCPO tuna stocks, and includes both PICs and foreign fishing nations, generally taking decisions based on consensus. Given the diversity of actors in the Commission, however, consensus has been elusive in many cases—particularly on issues surrounding the distribution among members of the costs that would be imposed by proposed fish stock conservation measures, and some PIC representatives have expressed frustration when key decisions on conservation and management measures have not been taken. PIC representatives have cited the pace of decision making at the Commission as a rationale for pursuing subregional agreements and governance arrangements, such as the VDS implemented under the Palau Arrangement, and the recent Tokelau Arrangement.

- **A new model of cooperation by a subregional coalition of PICs to manage purse seine fishing access.** The eight PNA countries and Tokelau (Tokelau joined the Vessel Day Scheme or VDS in 2013) established the VDS to limit purse seine fishing access to their waters and allow transferability and greater flexibility in access terms. As a result, access fees are estimated to have increased at least four-fold between 2009 and 2015. An estimated 13 percent of the delivered value of the total purse seine catch was captured by PICs via access fees in 2014. While these countries have generally held the limit on purse seine access through the VDS, throughout the WCPO catch and effort continue to grow. Current information suggests that fishing effort and catch have grown more in the waters outside of the PNA countries, notably in the waters of Indonesia and the Philippines as well as some high-seas pockets in 2014. Following the model of the purse seine VDS, similar arrangements have been introduced for the longline fisheries. In 2015 the same countries began a VDS for the tropical longline fishery and, in late 2014, 10 countries signed the Tokelau Arrangement to implement a similar scheme for access to the southern albacore longline fishery in their waters.
- **Failure of state-led efforts to capture more of the tuna value chains in the Pacific Islands.** Most of the government-led enterprises created in the 1980s or 1990s are no longer operating, but a number of private-led companies are currently processing catch in Papua New Guinea, the Solomon Islands, Fiji and, to a lesser extent, the Marshall Islands. In total, the WCPO tuna fisheries value chains likely employ less than 0.5 percent of the region's current labor force. Less than 10 percent of the WCPO purse seine catch is processed locally, and Bangkok remains the world's largest tuna canner (despite increasing labor costs and several PICs' trade preference with the EU market).
- **Overall, a relatively steady global market for tuna products.** In terms of canned tuna supplied by the purse seine fishery and southern longline fishery, the three main markets in the European Union, United States, and Japan are considered as 'mature' with relatively flat growth trends. The price of skipjack in Bangkok has declined significantly in recent years, attributed to the growth (or 'glut') in supply—largely from increasing catch volumes in the WCPO. The sashimi market supplied by the tropical longline fishery was pioneered by Japan but has since become global with the remainder destined for the United States, Korea, China, the European Union and Taiwan, China.
- **Decline of the WCPO bigeye tuna stock, while fishing on other stocks approaches limits recommended by scientists.** The size of the region's bigeye stock has shown a steady decline since the 1970s, reaching overfished status in the last five years. At the same time, the growth of purse seining has taken a larger share of the bigeye catch, accounting for 41 percent of the WCPO bigeye catch in 2014. The other three WCPO tuna stocks: albacore, skipjack and yellowfin, remain relatively healthy but approaching limits. While these stocks are not currently considered overfished, they are not likely to continue to support the growth in fishing effort and catch seen in the past, according to current scientific assessments.

Fish is one of the world's most traded agricultural commodities (World Bank and FAO 2009; FAO 2014), and WCPO tuna fishery supply chains are no exception. These originate in Pacific Island waters and end with consumers in Europe, Japan or North America (Gillett 2014). As such, for purposes of analyzing the economic benefits they provide, these fisheries should be considered as dynamic systems that include all of the components of the supply chains (Ostrom 1990; Hilborn and Walters 1992; Charles 2001; Lackey 2005; Garcia and Charles 2007), beginning with the finite natural resource stock, that produces a flow of benefits to users along the chain—from resource owners and harvesters to processors (including distribution) and retailers. The key tuna fishery supply chains analyzed in this report are: (i) the purse seine fishery, where a fishing vessel sets a net in a circle around a school of tuna; and (ii) the longline fisheries, where vessels pull long lines with baited hooks attached at intervals. These supply chains can be described as follows in Figures 8-2 and 8-3.

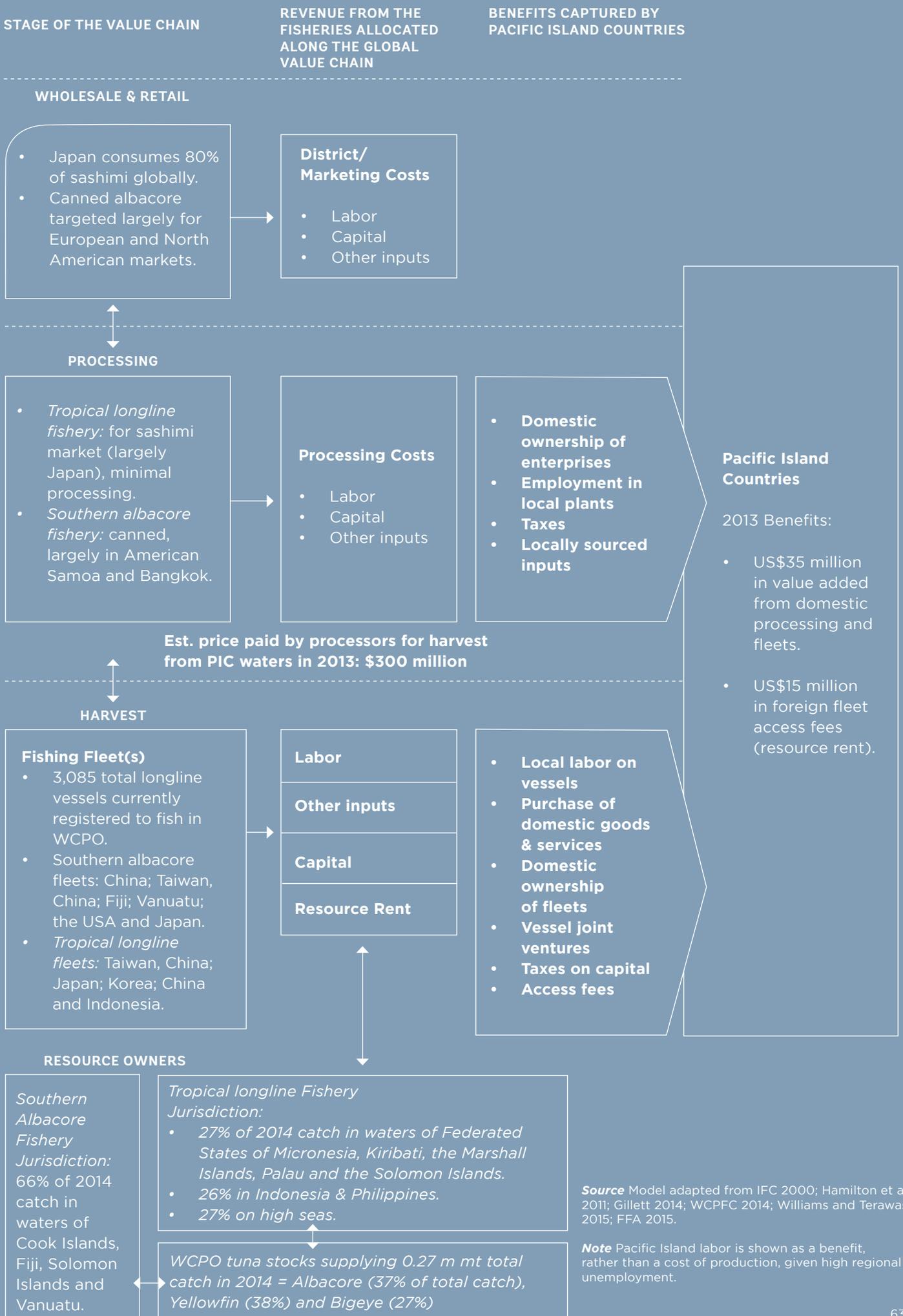
Figure 8-2: Economic Benefits to PICs from WCPO Purse Seine Tuna Fishery Value Chain



Source Model adapted from IFC 2000; Hamilton et al. 2011; Gillett 2014; WCPFC 2014; Williams and Terawasi 2015; FFA 2015.

Note Pacific Island labor is shown as a benefit, rather than a cost of production, given high regional unemployment.

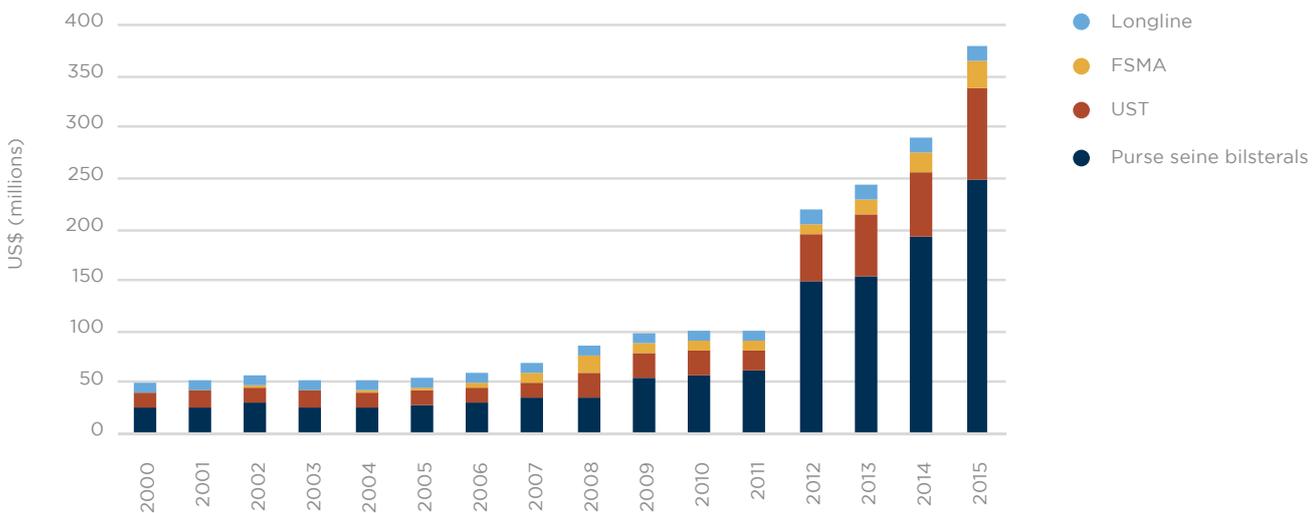
Figure 8-3: Economic Benefits to PICs from WCPO Longline Tuna Fisheries Value Chains



Although originating largely in the waters of PICs, these global tuna fishery supply chains have often provided relatively low benefits for these countries, combined with growing concerns for overexploitation. In the purse seine fishery chain, however, the PIC governments have introduced policy reforms in the last five years that have dramatically increased the benefits captured while enhancing sustainability. As shown in Figure 8-2, some 77 percent of the WCPO purse seine tuna was caught in PIC waters in 2014, and almost 50 percent in the waters of Kiribati and Papua New Guinea alone. As resource owners—that is, having jurisdiction over tuna harvests within these waters—PICs can charge harvesters a rent for access to the fish stocks (World Bank and FAO 2009). The greater the profitability of fishing, the higher the rent is that the harvesters can afford to pay to the resource owners.

Prior to 2008, the level of fees received by PICs was relatively constant at approximately US\$60 million per year, typically less than 10 percent and, in some cases, 5 percent of the value of the fish when sold to processors (Pacific Islands Forum Fisheries Agency 2014). In 2009 the PICs where the vast majority of purse seining takes place—the PNA member countries—agreed to cooperate to establish a new access regime called the VDS. The VDS sets a collective cap on purse seine fishing effort in PNA waters, translates that cap into a common currency (a fishing day by a vessel—that is, vessel days), agrees on a minimum ‘benchmark’ price that countries will charge harvesting units for vessel days (though countries may charge more, in some cases testing auctions), and allocates the cap of vessel days to the countries according to an agreed formula (Havice 2013). The returns to PICs as resource owners, via payment of access fees by (largely foreign) harvesters, have increased four-fold in the years since the introduction of the VDS by the PNA member countries and Tokelau (Figure 8-4). In 2014, this was equivalent to an estimated 13 percent of the value of the catch at sale to processors, while holding the cap on total fishing activity relatively constant (Pacific Islands Forum Fisheries Agency 2014).

Figure 8-4: Value of Access Fees for FFA Members

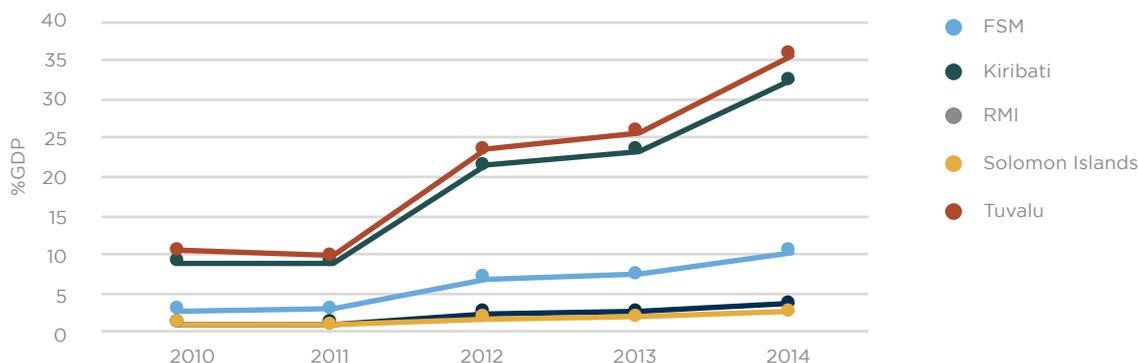


Source FFA 2017.

Note UST: United States Multilateral Fisheries Treaty; FSMA: Federated States of Micronesia Arrangement. FFA members include Australia, Cook Islands, Fiji, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu.

This cooperative scheme by nine PICs to limit purse seine fishing access to their waters and allow transferability and greater flexibility in access terms, has significantly enhanced their ability to charge and capture resource rents in the form of access fees (Figure 8-5). The impact of these rules has been particularly significant for a number of PICs. Access fees contribute to public revenues for the economies of five selected PICs as follows: Tuvalu (equivalent to 36 percent of GDP in 2014), Kiribati (32 percent), the Federated States of Micronesia (10 percent), the Marshall Islands (4 percent) and the Solomon Islands (3 percent). These revenues were collectively equivalent to 8 percent of the aggregate GDP of these five countries in 2014. These fees constitute an even higher proportion of the public revenues and budget in many cases, estimated, for example, to provide 63 percent of public revenues in Kiribati in 2012 (Bell et al. 2015). By contrast, foreign fleet access fees to FFA members from the longline fishery have remained a relatively small US\$10 to US\$15 million (Williams and Terawasi 2015).

Figure 8-5: WCPO Tuna Access Fees from Foreign Fleets (% of GDP) for Selected Countries

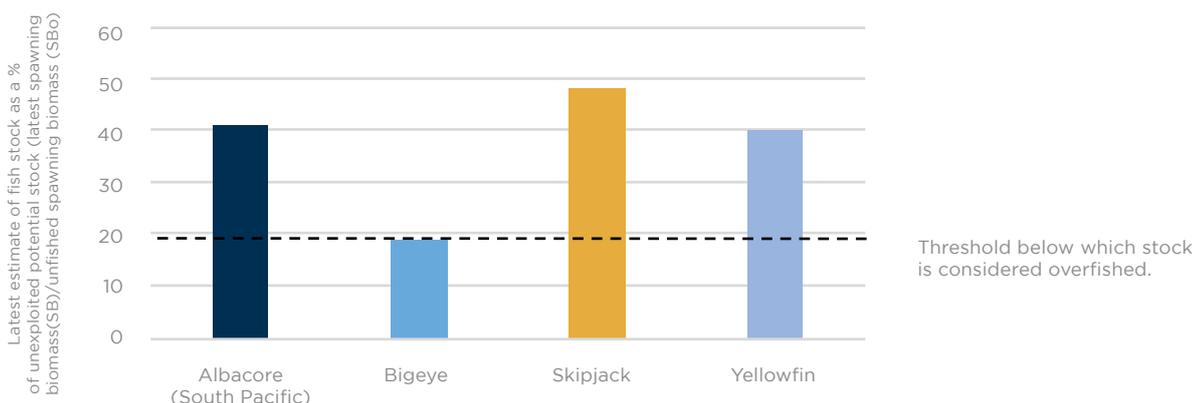


Source GDP at purchaser's price in current US\$, from: <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD>

Note Estimated access fees based on Distribution of Total Revenues according to 2007-09 distribution of moving average of purse seine catch. GDP figures for 2014 are an estimate, taking 2013 values and adding 2 percent.

In terms of sustainability, the VDS sets a cap on fishing activity in line with scientists' recommendations for maintaining a stock that could support the maximum sustainable yield, thereby protecting the region's natural capital asset base. The PNA countries have maintained this cap at a relatively constant level since the introduction of the VDS, however, the key challenge emerging in recent years has been the change in the status of the bigeye stock to overfished. Stock was harvested traditionally by the tropical longline fishery but increasingly by the purse seine fishery (41 percent of bigeye catch in 2014) where juveniles are caught unintentionally in the nets in some cases (Figure 8-6).

Figure 8-6: WCPO 'Tuna Bank': Fish Stocks in the Water



Source Albacore working group 2014; Harley et al. 2014; Harley et al. 2014a; Rice et al. 2014.

Following the model of the purse seine VDS, similar arrangements have recently been introduced by PICs for the longline fisheries in the waters under their jurisdiction. In late 2014, 10 countries signed the Tokelau Arrangement to implement a VDS scheme for access to the southern albacore longline fishery in their waters (Havice et al. 2014) which entered into implementation in 2015. Given the higher number of longline vessels than purse seine vessels, monitoring such arrangements and including observers on vessels will be an operational challenge.

OUTLOOK

Against the backdrop of these trends, a number of key external forces are expected to drive the performance of WCPO tuna fisheries over the next 25 years:

- Climate change.** Modeling conducted to date by the Secretariat of the Pacific Community (SPC) on two of the region's four tuna stocks—skipjack and bigeye—suggests that in 20 years the size of the stock will not be affected by climate change, but the distribution of the stocks may begin to shift towards the central and eastern Pacific, changing the catch rates in the waters of many PICs with potentially significant implications for purse seine by-catch rates of bigeye. The potential redistribution of tuna stocks throughout the WCPO (and beyond) due to climate change will reinforce the need for flexible management systems that can cope with spatial shifts in fishing activity, to avoid the need for countries in the eastern part of the WCPO to continually purchase

purse seine vessel days from countries in the western part, and the importance of maintaining healthy and resilient tuna stock sizes.

- **Markets and the economy.** Globally, the supply of tuna is approaching natural limits with little further increase expected, and is likely to remain highly dependent on the WCPO region. In aggregate, demand for tuna may see a modest increase given flat supply and population growth, although with little change for canned tuna where declining mature markets may be balanced by emerging new ones. A slow increase in price for both canned and fresh tuna may be expected, but the same may also be said for fishing costs as crude oil prices are projected to double in real terms by 2040.
- **Science and technology.** Fishing technology is expected to continue to change in order to enhance efficiency (this is already ongoing in the purse seine fleet, and eventually would be in the longline fleet with the return of economic incentives), as well as product quality. Fisheries monitoring and surveillance technology can be expected to advance to significantly reduce enforcement costs, including expanded satellite tracking of vessels, use of unmanned aircraft systems for patrols and electronic fishing catch and effort monitoring.
- **Demographic change.** The overall population of the PICs is expected to grow by some 50 percent over the next 20 years and to undergo rapid urbanization. In 2040, coastal fisheries production would be expected to remain largely stagnant (as it likely has since at least 2005), with concerns from SPC that a fish food gap could open in some PICs.
- **External governance.** The trade preferences that several PICs currently enjoy with the European Union can be expected to erode in comparison to other producers, further reducing the ability of regional tuna processors to compete in the global marketplace. At the same time, foreign fishing subsidies for tuna fleets can be expected to continue in some form in a number of cases. The WCPFC can be expected to slowly take regulatory measures to conserve bigeye stocks, which would affect PICs.

Given the past trends and the expected direction of key external drivers of change in the WCPO tuna fisheries, *Pacific Possible* proposes a collection of policy decisions or strategies that PICs might take in the coming decades towards a best-case or opportunity scenario in 2040, as defined by increased economic benefits to the countries. There are, of course, infinite pathways that the region might take in the governance and use of tuna resources, and the study does not aim to offer definitive routes, nor predict or project specific outcomes. Rather the intention is to highlight possible opportunities and key policy decisions that may arise in the coming 25 years, and give an indication of the magnitude of potential economic benefits that might be realized as a result.

Key policy decisions or strategies highlighted over the coming decades begin with the Regional Roadmap for Sustainable Pacific Fisheries (that is, the Roadmap) approved by Forum Leaders in September 2015, and build upon opportunities created by measures PICs have taken in recent years (for example, the VDS). Taking the Roadmap as the starting point, key policy decisions or strategies were organized around the four key goals for WCPO tuna fisheries in the Roadmap: (i) sustainability; (ii) value; (iii) employment; and (iv) food security. The policy decisions and strategies building upon these goals were summarized as:

- **Regional cooperation around a shared resource,** with coalitions of PICs entrenched around the three key fishery value chains—purse seine, tropical longline and southern albacore longline—eventually expanded to include key resource owners like Indonesia and the Philippines in the purse seine arrangements (and the former in the tropical longline arrangements), thereby placing most of the world's skipjack tuna stock under one cooperative and robust management scheme—coupled with strong restrictions for fishing on the high seas that are linked to access for national waters;
- **Hard fishing effort and catch limits that maintain the tuna stocks as valuable natural capital assets** in the water that are used sustainably (and help constrain supply and hence increase price), with proactive efforts and upfront investments to rebuild the bigeye stock before further declines (including research and development to reduce by-catch coupled with regulations on fishing gear);
- **Flexible access and eventually output rights for fleets** (including rights with a longer duration, that are auctioned in some cases), that enhance the value of the fisheries without increasing production, and provide a tool for interested PICs to leverage greater foreign investment in processing (trading off access fees for foreign investment in local processing);
- **Significant investment in skills and capacity** to develop the world's top tuna managers as well as to monitor compliance with catch limits and access rights and thereby prevent illegal fishing; and

- **Inclusion of coastal communities in the fisheries** where feasible, through dedicated access and inshore FAD networks, as well as targeted investments to maintain food security with coastal fish supplies stagnating and growing populations.

A key point of emphasis in these strategies is continued and expanded investment in policy delivery capacity. This should notably include regional agencies that support the information base for setting fishing limits and the monitoring of compliance, the secretariats of subregional coalitions setting fishing limits, and the national agencies developing and implementing policy within countries' waters. Expanded staffing, training and partnerships with regional and international organizations could help ensure the delivery capacity is in place, together with dedicated regional programs and activities towards this end.

Adoption and implementation of these policy decisions could yield significant economic benefits to PICs, estimated in real terms in the order of:

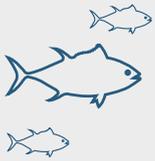
- **Additional and sustainable public revenues from US\$162 to US\$318 million per year (Table 8-1),** after concessions for onshore investment and investments in administration, monitoring and surveillance are subtracted;
- **Increased aggregate local value added for several PICs with processing clusters of US\$88 million per year;¹⁰ and**
- **Some 7,500 to 15,000 additional jobs created in those PICs with processing clusters.**

Table 8-1: Indicative Distribution of Additional Net Economic Benefits from Fisheries in 2040

Country	Additional Public Revenues (US\$ millions)	Additional Contribution to GDP (US\$ millions)	Additional Employment
Fiji	5	—	—
Micronesia, Fed. Sts.	26 - 49	1	—
Kiribati	56 - 105	—	—
Marshall Islands	-1 - +5	15	1,275 - 2,550
Palau	3 - 6	—	—
PNG	32 - 84	57	4,950 - 9,900
Samoa	4	—	—
Solomon Islands	15 - 29	15	1,275 - 2,550
Tonga	2	—	—
Tuvalu	15 - 24	—	—
Vanuatu	5	—	—
Total	162 - 318	88	7,500 - 15,000

Note In terms of benefits from the purse seine fishery, distribution estimated from distribution of the location of catches and indicative only, while distribution of southern albacore revenues based on MRAG 2015.

¹⁰ As onshore processing of fish is unlikely to achieve the same productivity levels as those in major processing centers such as Thailand, continued subsidies (in the form of foregoing revenue from access fees to fisheries) will be necessary, requiring adequate capacity to evaluate tradeoffs and negotiate such arrangements.



Additional transformational impact in 2040

Sustainable Fisheries



15,000
additional jobs



US\$300m
additional public
revenue/year



SPOTLIGHT 4

Oceanic Fisheries: Impacts on Poverty, Gender, and the Environment

Poverty	Mostly indirect impacts through the additional public revenue available for pro-poor government programs. Onshore fish processing activities typically offer jobs that require few qualifications and are thus available to the poor.
Gender	Crews on tuna vessels are typically male with limited job opportunities for Pacific Islanders. The wives of crew members often have to take on additional responsibility during the long absences of seafarers. Other jobs related to the tuna industry, such as surveillance and compliance officers, have some female participation. Activities in the sex trade expose women, inter alia, to abuse and sexually transmitted diseases. Onshore processing activities can provide jobs for women, however, working conditions are often poor (Demmke 2006). Measures that reduce negative impacts on women are thus essential.
Environment	Major risks from overfishing and depletion of fish stocks, unless properly managed. Onshore processing activities can also have severe environmental impacts in the form of pollution, use of scarce land and water, and generation of waste.

9.

A Precautionary Approach to Deep Sea Mining

The Pasifikis – An Argument Runs in the Family in 2040

Tafu and Maeva are now in their fifties. They work part-time, spending their free time caring for family and giving back to their community. Tonight, they have decided to attend a community meeting at their local church hall, where scientists from the island present an update on the seabed-mining pilot. It is an update that happens twice a year, since the pilot launched two years ago.

As usual, discussions are interesting and often quite heated, as people from the village ask questions and share their opinions on seabed mining in the waters of their island. These heated discussions are not always left at the meeting—Tafu and Maeva often continue their debates at home.

Tafu thinks deep sea mining is ideal for the island to make money for their community, and Maeva thinks the money is not worth the potential damage it will have on their ocean. She also argues that the money may not even reach their village.

Tafu tells Maeva that the reason for the delays in revenue is because the government have been very careful in taking on this seabed-mining project, which is why it took 20 years for a license for a seabed mining pilot to even be issued. Things usually take time on the island, Maeva says, but admits that it is comforting to know that the government is proceeding so cautiously. At least they can agree on one thing: that the government has done the right thing by consulting widely and repeatedly with people on the island and issuing a license for a mining pilot only once people were satisfied that there was adequate understanding of the potential impacts of deep sea mining on the ocean and their island based on the scientific work by a regional organization.



Driven by the relatively high grade of deep sea minerals (DSM) including rare earth elements, and technological advances, deep sea mining is emerging as a new industry in the Pacific. Exploration of ocean minerals and resources is increasing globally, requiring regulatory and institutional capacities to catch up. While the potential revenue for countries with DSMs may be sizeable in some cases, the costs and risks involved remain unclear and could be substantial in some cases. Given the uncertainties surrounding deep sea mining, *Pacific Possible* cannot quantify the net economic impact of DSM over the next 25 years, but has set out to undertake a stocktake, highlighting the knowns and unknowns of this growing industry.

▷ CURRENT SITUATION

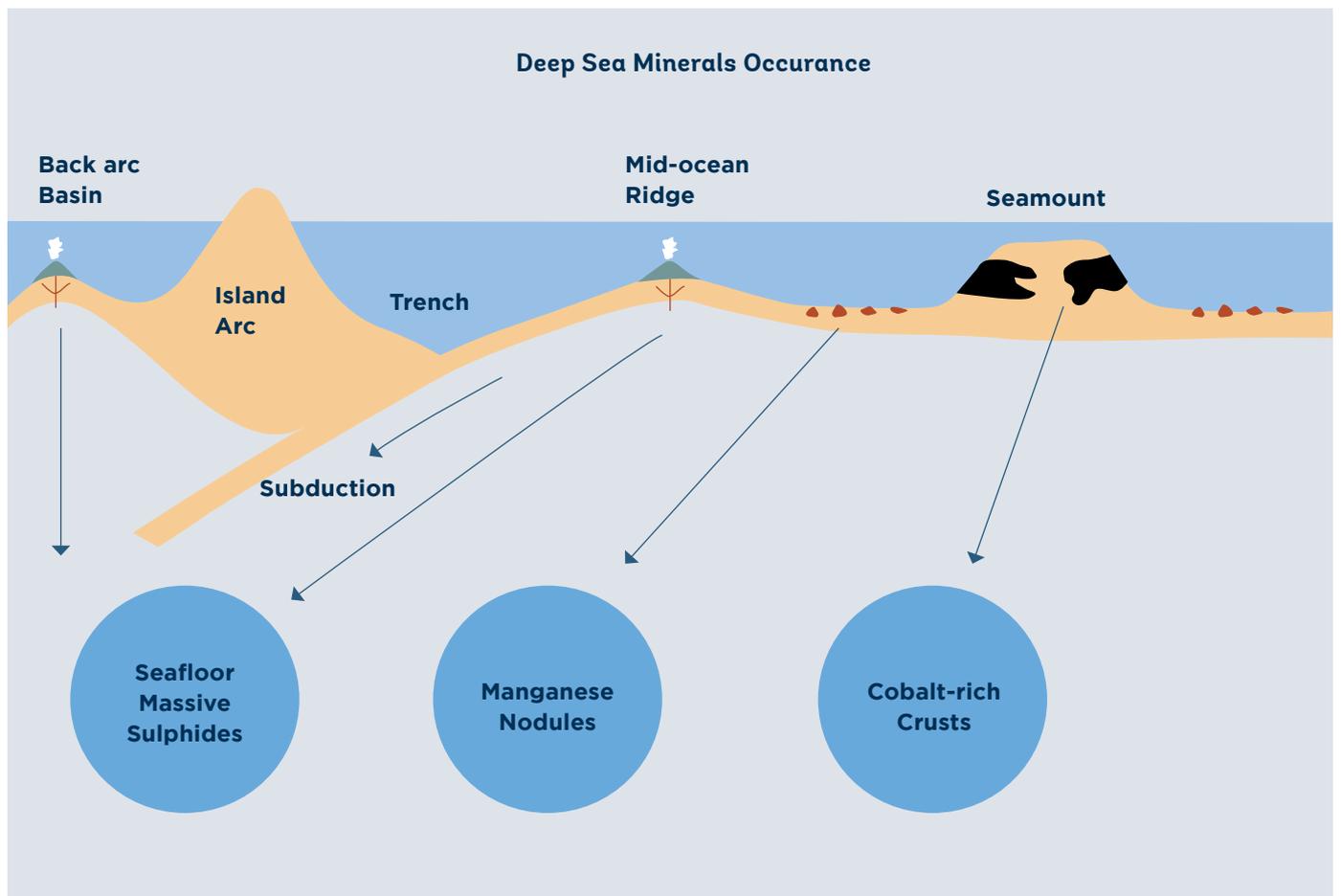
The existence of mineral deposits on the ocean floor has been known since as early as 1870, however, only since the 1970s has exploration of the deeper sea floor indicated that metallic minerals could be spread across large sections of the Pacific region, leading to a very new industry characterized as “deep sea mining.” The reasons for this increased interest in deep sea mining include:

- The long-term decline in the grade of many onshore mineral deposits compared to relatively untouched and high-grade seabed deposits;
- More limited need for fixed capital and infrastructure with capital investment in seabed mining being mobile;
- Terrestrial mines are increasingly constrained by proximity to settlements and communities as well as areas with high environmental value;
- The ability to ship mined materials directly to markets can obviate the need for expensive infrastructure development such as roads, railways and export ports that is often a major cost in terrestrial mining;
- Average seabed mine life is expected to be relatively short, very different from the longer-term terrestrial mine lives which often exceed 35 years. If a series of deposits are mined sequentially, however, the overall seabed “mine life” could be long; and
- The opportunity to recover strategic high-value minerals, like rare earths, as mineral by-products.

To date, three main kinds of DSMs have been identified across the Pacific region:

- **Seafloor massive sulphides (SMS) can be found at depths between 350 to 5,000 meters.** SMS deposits are forming in the deep ocean around submarine volcanic arcs, where hydrothermal vents exhale sulphide-rich mineralizing fluids into the ocean. They contain high concentrations of iron, copper, zinc, gold, silver, manganese, nickel and cobalt. SMS deposits can be found in the EEZ of Fiji, Papua New Guinea, the Solomon Islands, Tonga and Vanuatu.
- **Polymetallic manganese nodules (PMN) most often occur at great depths (4,000–6,000 meters).** These nodules can contain manganese and limited amounts of cobalt, copper, iron, lead, manganese, nickel, zinc, and rare earth elements. They are known to occur in the EEZ of the Cook Islands and Kiribati and, to a lesser extent, in Niue and Tuvalu.
- **Cobalt-rich ferromanganese crusts (CFC) are found in a range of 400–4,000 meters of depth.** They can contain cobalt, nickel, manganese and copper, as well as other minerals including precious metals (platinum) and rare earth elements. They are known to occur in the EEZ of Kiribati, the Marshall Islands, the Federated States of Micronesia, Niue, Palau, Samoa and Tuvalu.

Figure 9-1: Deep Sea Minerals Occurrence



Source European Union and SPC 2017.

▷ OUTLOOK: SOME KNOWNs, MANY UNKNOWNs

Improved technologies and the commodity super-cycle have created strong investor interest in deep sea mining. Many countries have granted exploration permits to try and understand this new resource potential. Globally, over 1.5 million km² of the ocean floor have been granted licenses for exploration.

There are, however, significant challenges to this emerging industry. These include weak regulatory and institutional capacities and patchy traditions of transparency and stakeholder consultation, substantial uncertainties about the economic potential of DSM, and limited understanding of the environmental and social risks associated with DSM mining. This is an unusual situation for governments and industry alike, where the underlying data used to model costs and benefits is limited to scarce observations for which connectivity to the surrounding environment is not well understood. DSM mining is proposed at great depths where regulatory monitoring is exceptionally difficult.

Papua New Guinea Grants First DSM Exploitation License

Nautilus Minerals Inc., headquartered in Canada, is the first company to have been granted an exploitation license in the Pacific for its Solwara 1 project in Papua New Guinea. The project envisages extracting high-grade SMS deposits from an area of 0.11km² at a depth of approximately 1,600 meters around 30 kilometers off the coast of Papua New Guinea in the Bismarck Sea. The project is very close to an existing and active seabed volcano–North Su–with resulting sediment plume activity. Solwara 1 is the first of 12 Nautilus projects in the Bismarck Sea with exploration licenses. Environmental permits were granted in 2009 and a mining lease in 2011. The project will use three large seafloor production tools (large tracked cutting and collecting machines) to mine material that will then be pumped in slurry form to a surface vessel. The most recent resource estimates for the project have it standing at an indicated resource of 1 million tons at 7.2 percent copper, 5 grams/ton of gold, 23 grams/ton of silver and 0.4 percent zinc. In comparison, Ok Tedi, a major terrestrial mine in Papua New Guinea has a resource of 910 million tons but at 0.8 percent copper and 1 gram/ton of gold. Solwara 1's successes and failures have and will continue to shape the wider global DSM industry.

To date, Fiji, Papua New Guinea, the Solomon Islands, Tonga and Vanuatu have granted DSM exploration permits, and the Cook Islands is part-way through a minerals exploration tender process. Papua New Guinea is currently the only country in the Pacific region to have granted a license to mine, through the Solwara 1 Project, an action that reflects Papua New Guinea's greater familiarity with mining and systems for regulatory and contractual oversight.

Commercial mining of SMSs in Papua New Guinea could start as early as 2019 (Nautilus 2016).

Fiji, the Solomon Islands, Tonga, and Vanuatu are at the early exploration stage and commercial operation is expected to start at the earliest in the 2030s (Table 9-1). Mining of CFCs is at the early stage of exploration in the Marshall Islands—with commercial operations to start in the 2040s at the earliest. Mining of manganese nodules in Kiribati and Tuvalu and of CFCs in Kiribati, Tuvalu, the Federated States of Micronesia, and Palau are only at the prospecting stage and it is not expected that commercial mining would start in the next 25 years.

Table 9-1: State of Definition and Earliest Commerciality of DSM

Country	Seafloor Massive Sulphides		Manganese Nodules		Cobalt-rich Crusts	
	Stage of Definition	Earliest Commerciality	Stage of Definition	Earliest Commerciality	Stage of Definition	Earliest Commerciality
Fiji	Early exploration	2030s	None	n.a.	None	n.a.
Kiribati	None	n.a.	Prospecting	—	Prospecting	—
Marshall Islands	None	n.a.	None	n.a.	Early exploration	2040s
Micronesia, Fed. Sts.	None	n.a.	None	n.a.	Prospecting	—
Palau	None	n.a.	None	n.a.	Prospecting	—
PNG	License to mine granted	2019	None	n.a.	None	n.a.
Samoa	None	n.a.	None	n.a.	None	n.a.
Solomon Islands	Early exploration	2030s	None	n.a.	None	n.a.
Tonga	Early exploration	2020s-2030s	None	n.a.	None	n.a.
Tuvalu	None	n.a.	Prospecting	—	Prospecting	—
Vanuatu	Early exploration	2030s	None	n.a.	None	n.a.

Note Prospecting is the early investigation of mineralization, whereas exploration is the more detailed evaluation of the quality and quantity of minerals amenable to mining.

While the potential revenue for countries with DSMs could be sizeable in some cases, the costs and risks involved remain unclear. Sound economic analysis is critical for evaluating trade-offs and different options; it needs to incorporate loss of ecosystem services, including those related to existence, cultural and spiritual values, and take into account cumulative effects of subsequent explorations in the general geographical area.

Core to understanding the economic potential of DSM mining is to first determine the in-situ value of the mineral endowment considering prevailing markets and the technologies available to exploit them.

From this endowment, it is then necessary to deduct the capital and operating costs and risk-adjusted private returns associated with investing in the location, appraisal and exploitation of DSM deposits. Third, there is a need to consider how costs attributable to social and environmental impacts are treated, for purposes of weighing the net private and public benefits of DSM mining, while taking into account the public cost of environmental impacts. Moreover, a high level of uncertainty must be affixed to each of the three factors highlighted above, to better inform the design of regulatory mechanisms through which risks would then be allocated among private and public actors. This entire system of cost accounting and assignment of risks is far from fully developed, and informed decision making, therefore, remains very unclear.

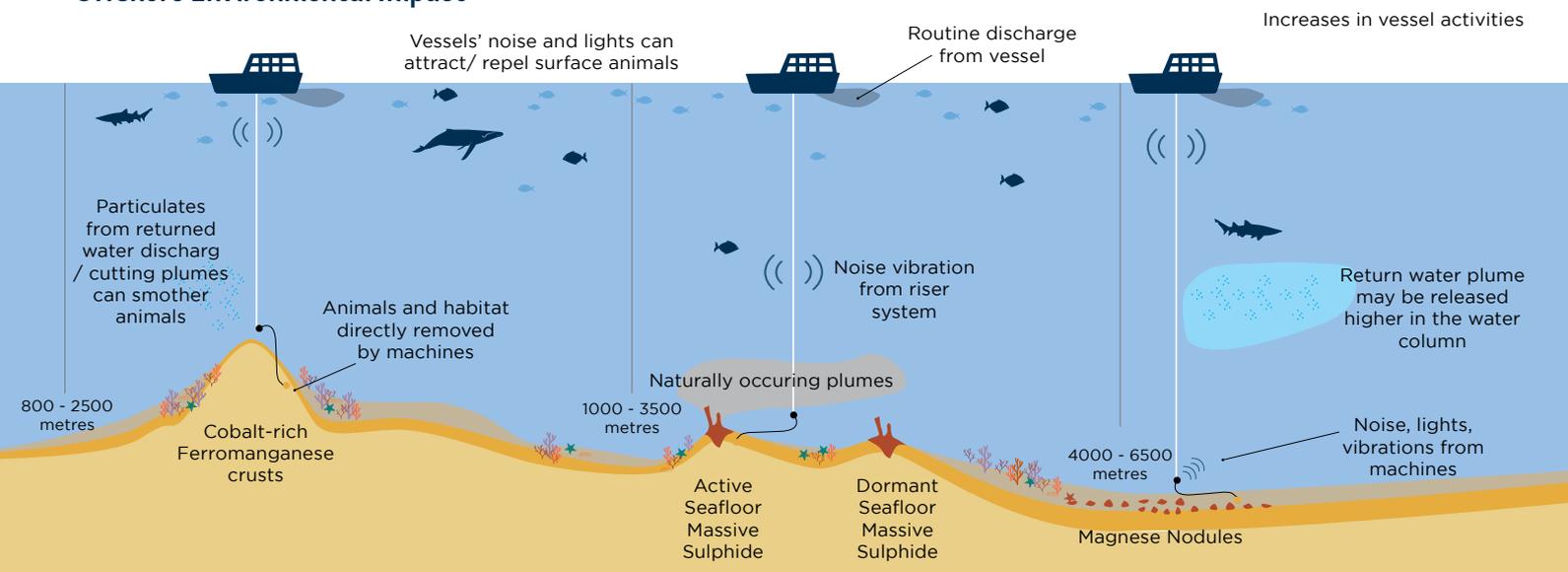
Any cost-benefit analysis of deep sea mining projects—such as the one commissioned by SPC in 2016¹¹—remain highly speculative, given the many unknowns and deep uncertainties about technology, future market conditions, environmental, and social impacts. Additional limitations of the analyses are: (i) their limited and methodologically questionable treatment of potential impacts on marine ecosystem services, including notably the assumption of zero probability for return plume releases, which some stakeholders fear could impact the marine food chain, public health, and livelihoods; and (ii) narrow focus on individual projects, thereby ignoring the cumulative impact of multiple operations in the same area. There is a need for more studies on potential impacts and more valuation studies using advanced methodologies. Moreover, given the deep uncertainty about these impacts, but also, arguably about the technical aspects of the proposed DSM mining projects, the scenario analysis methodology may contribute better to decision making as part of the precautionary approach.

Environmental Risks

Knowledge on the environmental risks of DSM mining is limited at best, because deep sea ecosystems and their links with pelagic and coastal ecosystems are poorly understood and, in the absence of any exploitation to date, there are no real-life data on how mining might influence these ecosystems and the services they provide. Under these circumstances, expectations on the impacts are based on modelling exercises and baseline scientific research carried out during exploration efforts, notably for Solwara 1 in Papua New Guinea, which the Pacific Community under the European Union DSM Project synthesized in general terms for its cost-benefit study.

Of the different stages in DSM mining, which progress from prospecting through to exploration and on to exploitation—should the resource be commercially viable—it is the exploitation stage that is expected to have the most significant and potentially permanent impact on ecosystems. Impacts of exploitation activities on the host PIC environment are expected to be mainly in the marine domain as most processing is envisaged to take place in other countries with established supply-chain integration (Figure 9-2).

Figure 9-2: Impact of Mining Operations of Different DSM Types and Associated Key Sources of Offshore Environmental Impact



Source SPC 2016.

Offshore ecosystem impacts from exploitation would be due to:

- seafloor operations to remove mineralized material;
- operational plume and sediment resuspension at the seafloor by machines;
- returned seawater plume;
- standard vessel operation and discharges; and
- accidental, nonroutine incidents.

¹¹ The cost-benefit analyses carried out for proposed projects in Papua New Guinea (SMS, Solwara 1), Cook Islands (PMN), and the Marshall Islands (CFC) estimated the net present values of social benefits (that is, government revenue minus social costs in the form of unplanned spills and grounding and replacing lost environmental services) at US\$83 million (for a two-year project) and US\$467 million (20-year project), respectively for the SMS and PMN projects. Mining of CFCs in the Marshall Islands, on the other hand, would not generate positive net income to government. In addition to the revenue for government, the mining operations would also generate employment and income in the host countries associated with the procurement of project fuel, spares, consumables, and labor. The mining operation in Papua New Guinea is estimated to generate about 628 jobs with annual incomes of US\$16.3 million. Of the 628 jobs, 222 would be direct employment with the mining operation, while the remaining jobs would be with local suppliers to the mining operation. Local employment and incomes associated with mining in Cook Islands are more modest, estimated to generate about 145 jobs with annual incomes of US\$3.3 million. The study partially estimated the cost of damage to marine ecosystem services, which is an area that will benefit from more research and application of emerging methodologies.

The approximate annual direct footprint of seafloor operations varies significantly between mineral types, ranging from less than 0.4km² in the case of SMS to 100-300km² in the case of CFCs. The indirect impact also varies—ranging from less than 10km² in the case of SMS to 1,500 to 6,000km² in the case of PMN. Reviewers and stakeholders have paid particular attention to potential irreversible impacts on seafloor ecosystems from mineral removal and operational plumes and on the marine food chain, including possibly up to economically significant tuna, from operational, dewatering and, possibly, accidentally released toxic plumes. Disclosure of some critical new studies on some of these topics commissioned by Nautilus, the company promoting Solwara 1, and by the Papua New Guinea government of the independent review of the Environmental Impact Statement, which informed its decision to grant an environmental permit would help answer some of these issues.

Social Risks

Stakeholder concerns are based upon the many unknowns related to DSM mining impacts, recognizing the many social challenges that have resulted from prior experience with terrestrial mining globally and in some of the PICs. The concerns expressed by coastal communities and NGOs may be grouped in five interrelated categories:

- **Potential impact on livelihoods**, especially of vulnerable groups through pollution, limited access to traditional fishing grounds, or reduced tourism;
- **Weak capacity within the governments to ensure strong sector governance**, leaving open the opportunity for inadequate revenue management and local communities not receiving their commensurate share of benefits which include revenues and compensation for damage they may incur from DSM mining projects;
- **Limited employment, local service provision, and other economic opportunities** due to the offshore nature of the mining operations and plans to process the recovered minerals in other countries;
- **Impact on customs and spiritual associations** which reflect the large role that the vast Pacific Ocean plays in the everyday lives of the Pacific Islanders; and
- **Limited ability to express concerns and influence decision making on DSM mining proposals** as legislation may not embed comprehensive public consultations.

▷ THE WAY FORWARD – GOOD GOVERNANCE AND THE PRECAUTIONARY APPROACH

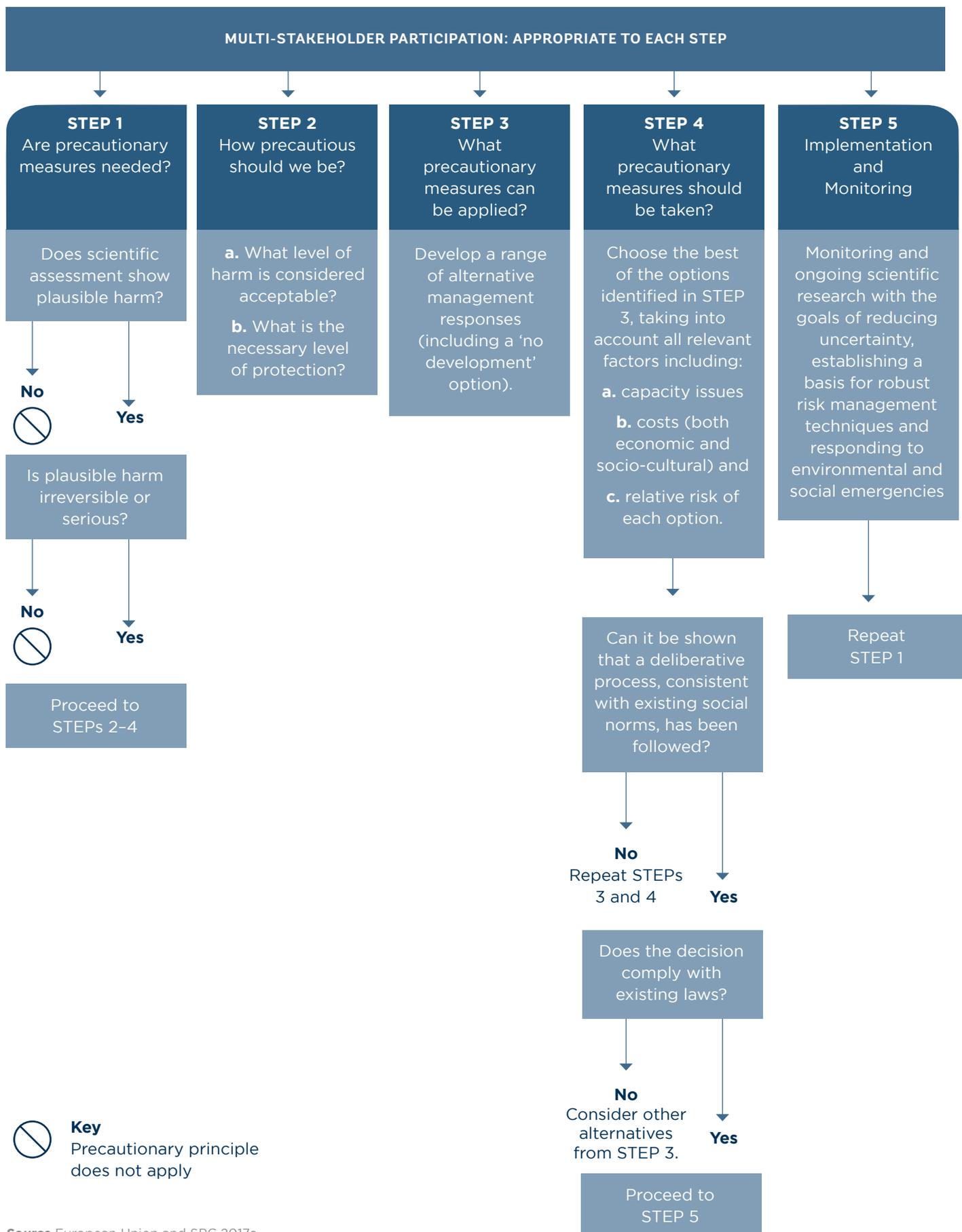
Because DSM mining carries risks of causing irreversible damage to the environment and harm to the public, it is recommended that decision making on DSM exploitation proposals follow the Precautionary Approach. In other words, project proponents should take cost-effective measures to minimize environmental impacts, even when there is no scientific certainty on the level and nature of the risk and the impact.¹²

The SPC has laid out an iterative and continuous process of five steps in applying the Precautionary Approach to DSM mining (Figure 9-3). In this process, if the environmental assessment of a proposed project indicates irreversible damage (Step 1), policy makers are to proceed to determining the level of harm that is acceptable and what level of protection is necessary (Step 2). These questions require extensive stakeholder consultations, analysis of benefits and cost, including of difficult-to-measure potential losses of ecosystem services, and determination of how the benefits and costs would be distributed among the different segments of society. The answers define possible precautionary measures applicable to the project (Step 3). Six options ranging from ‘no development’ to ‘adaptive management’ are available to decision makers. Next, regulators, in consultation with stakeholders and in conformity with existing laws, choose the best option, taking into account such factors as capacity issues, costs, and the relative risk of each option (Step 4). Here again, cost-benefit analysis has an important role to play. Regardless of the options chosen, but especially when the project goes ahead, the monitoring and scientific research continues to reduce uncertainties and risks (Step 5), which leads back to the original question on the existence of plausible harm.

¹² Principle 15 of the 1992 Rio Declaration states: “In order to protect the environment, the Precautionary Approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

Throughout the process, transparency and participation of a range of stakeholders, including potentially affected communities, is considered fundamental. In this process, whenever the activity is to take place in proximity to another of its kind, efforts to evaluate cumulative impacts and possible significant threshold impacts should be undertaken by the proponent.

Figure 9-3: Five Steps for Applying the Precautionary Approach



Source European Union and SPC 2017a.

As in terrestrial mining, public sector governance is paramount in determining the extent to which DSM exploitation is economically, politically, socially, and environmentally viable. Critical elements of strong sector governance include:

- good management to ensure efficient and effective exploitation under strong social and environmental performance;
- good tax design to ensure appropriate government revenue and adequate incentives for investors;
- good revenue administration to ensure revenue is collected; and
- good public expenditure management to ensure volatile and temporary natural resource revenue translates to permanent benefits for the nation and to manage the risk that resource wealth poses to the wider economy.

Despite recent progress, gap¹³ analysis points to significant regulatory and institutional weaknesses at the country level. Good governance and the Precautionary Approach require strong regulations and institutions having the technical capacity to ensure regulatory compliance and associated monitoring and reporting. Under the SPC-EU DSM Project, SPC prepared draft policies, laws and model frameworks to guide the economic, environmental and social regulations; bringing greater alignment of individual country frameworks to other PICs in the region. A number of PICs have either developed, or are in the process of developing, country-specific robust policies and legislation; whereas technical professional capacity available within governing institutions designated to implement these regulations is nonexistent to inadequate in most PICs and partially adequate in others.

Cost and small population sizes will limit most individual PICs' ability to develop adequate capacity to manage DSM mining and regional cooperation would, therefore, help. For any PIC considering deriving economic benefits from DSM mining in its EEZ in a fiscally, environmentally and socially responsible manner following the Precautionary Approach, the cost of regulatory monitoring and enforcement is high. Meeting the demands for specialized expertise and equipment is a significant challenge for most PICs given limited national budgets and prior experience in regulating the mining sector. Recognizing these challenges, PICs have expressed growing interest in formalized regional cooperation to support the regulation of DSM mining, building on the ongoing current collaboration under the auspices of the SPC-EU DSM Project and inspired by the existing regional cooperation in fisheries management.

The PICs currently cooperate with SPC on general regulatory functions, however, PIC governments carry out all specific project-related measures. These include: (i) scoping, reviewing and approving environmental and social assessments; (ii) selecting an appropriate Precautionary Approach option (including possibly 'no development'); (iii) supervising and enforcing the selected option; and (iv) ensuring full regulatory compliance in mining. Given their current capacity limitations and available resources to improve sector governance, most PICs are not, however, in a position to perform most of the project-specific regulatory functions. The SPC has provided technical assistance to national regulators in some areas, specifically in regard to providing technical and legal advice on the pros and cons of each option, while the decision on the appropriate Precautionary Approach option rests with sovereign states.

Two modes of future regional cooperation have been identified, namely one that involves a "regional technical service provider" and another that is based on a "regional regulator". In the former scenario, the regional technical service provider would expand on the SPC's current areas of support. Specifically, it would manage/supervise all technical activities and provide technical advice to the national authorities on regulatory matters, such as choosing the appropriate Precautionary Approach option, or on enforcement decisions in case of transgressions in the chosen option. Decision-making authority on these questions would, however, rest with PIC national governments. In the second scenario, a regional regulatory body would not only provide technical support to regulators, but PIC governments would also delegate to the SPC the authority to make and implement decisions on enforcement matters and lead the process of choosing a Precautionary Approach option. The choice will rest with the PICs and may evolve over time.

While the establishment of a regional body-whether a technical service provider or regulator - would be much more efficient and effective than individual PICs building up regulatory capacity, a critical question concerns the appropriate level and source of funding. It would seem practical and consistent with the 'polluter pays' principle to suggest that the regional body be funded by companies licensed to carry out prospecting and, to a larger degree, by companies licensed for exploration and exploitation. The "taxing" of companies at the exploration stage makes sense, given that a large number of critical regulatory functions—including the social and environmental assessments and decisions on the Precautionary Approach option—take place during the exploration phase.

¹³ A gap analysis compares actual performance with potential or desired performance. If an organization does not make the best use of current resources, or forgoes investment in capital or technology, it may produce or perform below its potential.



Deep Sea Mining: Impacts on Poverty, Gender, and the Environment

Poverty	Mostly indirect impacts on poverty through the additional public revenue available for pro-poor government programs.
Gender	There is currently little available analysis of gender impacts of deep sea mining.
Environment	Knowledge on the environmental risks of DSM mining is limited at best, because deep sea ecosystems and their links with pelagic and coastal ecosystems are poorly understood, and in the absence of any exploitation to date, there are no real-life data on how mining might influence these ecosystems and the services they provide.



PART III

Major Threats to Pacific Livelihoods

While the preceding sections have presented transformational opportunities, these could be wiped out (or significantly eroded) in the Pacific if two significant risks are not managed effectively:

- **Climate change** can intensify the already extremely high disaster-related risks for the region. In addition, continuing sea-level rise and ocean acidification can destroy the foundations of island life. Enhancing the PICs' climate and disaster resilience is essential, but the high costs of mitigation and adaptation require careful strategic choices and options.
- **The NCD crisis** already tragically impacts the lives of many Pacific Islanders. It results in severe human suffering and slows advances in standards of living. Implementing the NCD road map is thus of critical importance to stem the crisis and to pave the way for a healthy and productive population in 2040.

10.

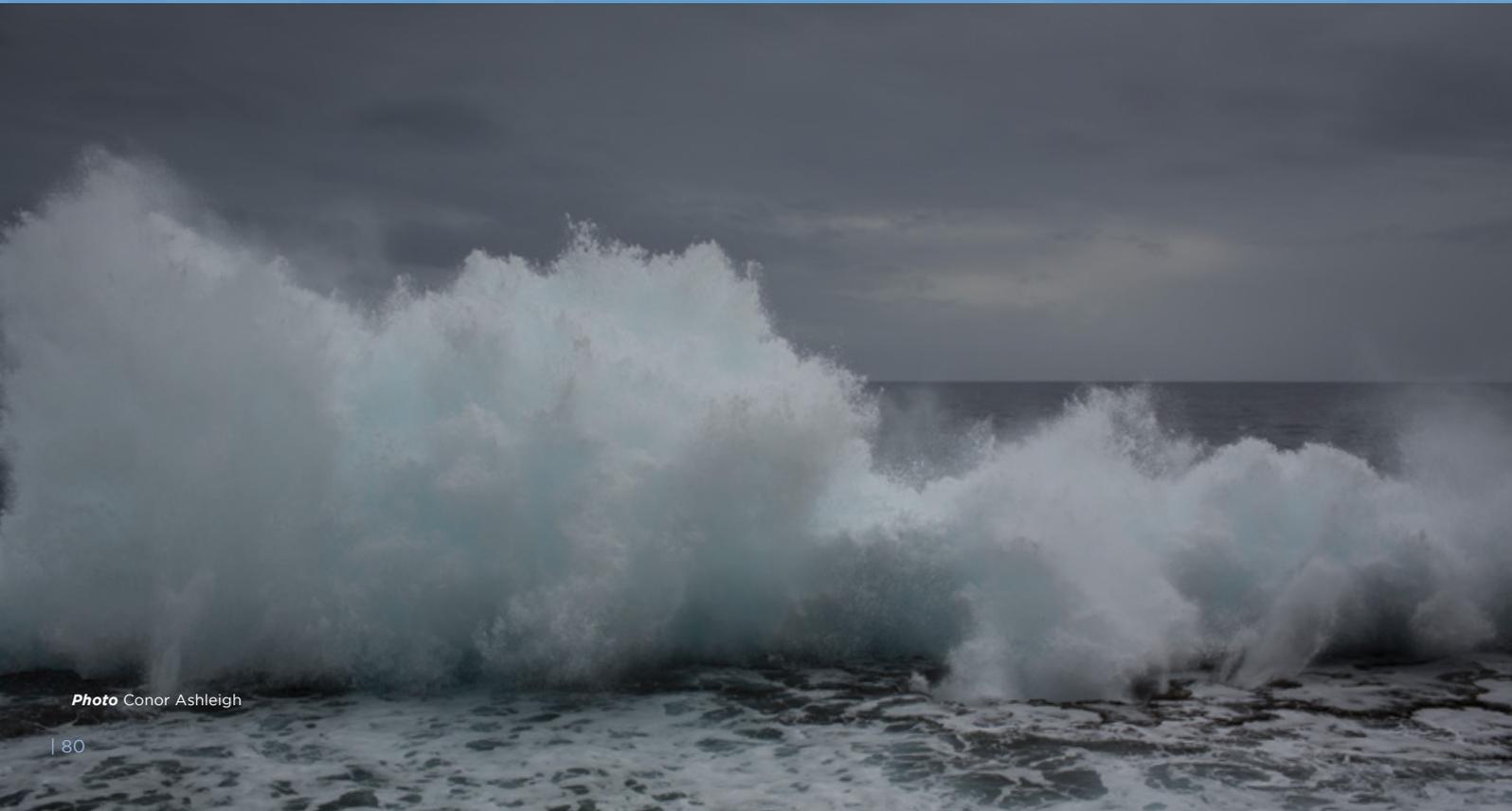
Climate Change and Natural Disasters

The Pasifikis – Tafu’s House Remains Unharmmed by a Tropical Cyclone in 2040

A few weeks after the community meeting, Tafu and Maeva’s island was hit by a severe tropical cyclone. Tafu wakes up nervously the morning after, and opens the shutters of his house. He takes a good look around, to assess the damage the cyclone has left in its wake. As expected, most of the trees and plants have been uprooted. But thankfully, all of the surrounding buildings seem to be intact, leaving anything not firmly tied to the ground in pieces.

This would not have been the case 25 years ago. Today, the island has an early-warning system that works for everyone, and fortunately everyone in Tafu’s family received the warning in time to safely get home. He lets out a sigh of relief as he remembers that the electricity and water will be running again soon, just like it was after the last three cyclones that hit the island. He is comforted knowing that if any of his extended family members or neighbors have damaged homes, cars, or are not able to work due to the cyclone, they will get the help they need—and fast.

Tafu remembers the days when cyclones caused heavy damage to buildings, including schools. In those days, it often took weeks and months to make schools useable again, setting children back in their learning and leaving Tafu idle. Bringing his thoughts back to the present day, he realizes that even though cyclones seem now more intense, they do not cause the same amount of damage as they once did. Relieved, he knows that he and Maeva made the right choice when they decided to rebuild their house 10 years ago, making sure it could withstand Category Five cyclones, according to standard building codes. They were hesitant at first, but eventually agreed with the support and help of government subsidies. Tafu also knows that after a few days, his school will reopen and everyone will be back in school.



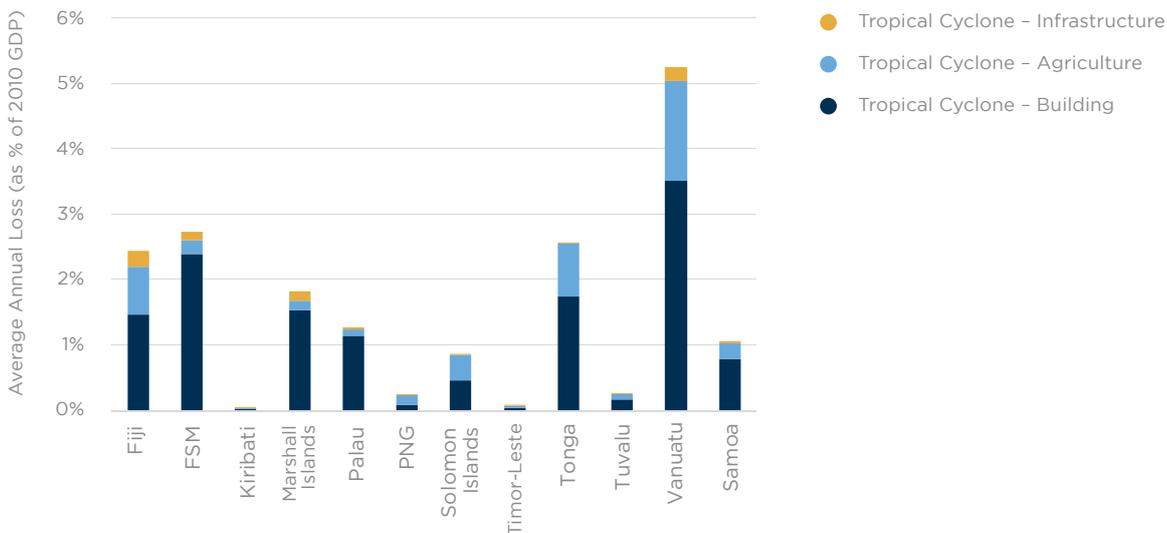
The Pacific region is known to be one of the most prone to natural disasters and climate change in the world. Key reasons are its high exposure to a wide variety of natural hazards (cyclones, droughts, earthquakes, electrical storms, extreme winds, floods, landslides, storm surges, tsunami and volcanic eruptions), geographical remoteness and isolation, and dispersion across a large area in the Pacific Ocean. The region is frequently hit by hazard events.

Between 1950 and 2011, extreme weather-related events in the Pacific Islands region affected approximately 9.2 million people and caused approximately 10,000 deaths and damages of around US\$3.2 billion (EM-DAT 2015). Recent estimates (World Bank, SPC and ADB 2013) show that expected losses due to natural disasters on an annualized basis in the Pacific far exceed those in almost all other countries in the world. The impact of natural disasters is equivalent to an annualized loss of 6.6 percent of GDP in Vanuatu, and 4.3 percent in Tonga.

Natural hazards and climate change affect countries differently. Whereas atoll island nations outside the cyclone belt and seismic zones are more affected by slow-onset events, such as saline intrusions and coastal erosion, rapid-onset disasters are frequent occurrences in the high-volcanic islands. Overall, hydro-meteorological disasters cause the majority of economic loss, whereas geo-hazards are by far the major cause of human loss.

Tropical cyclones have traditionally been the most serious climate hazard for PICs in terms of total damage and loss (Figure 10-1). Vanuatu is the most at risk from cyclone events, and is expected to lose, on average, US\$36.8 million annually.

Figure 10-1: Expected Average Annual Losses Due to Cyclones in Pacific Island Countries



Source PCRAFI Country Risk Profiles (World Bank 2015).

Between 1981 and 2016, there were 32 Category Four and 27 Category Five cyclones. Being struck by a Category Five cyclone has been a 1-in-10 year event for Fiji, Tonga and Samoa and a 1-in-5 year event for the Solomon Islands and Vanuatu. Samoa alone has been struck during that period by seven Category Four or Category Five cyclones with peak wind speeds of greater than 44 meters per second (m/s). Tropical Cyclone (TC) Evan, which struck Samoa in December 2012, caused total damages and losses of approximately US\$210 million (30 percent of GDP), and TC Ian, which struck Tonga in January 2014, resulted in total damages and losses of approximately US\$50 million (11 percent of GDP). In March 2015, TC Pam struck Vanuatu, Tuvalu and Kiribati. In Vanuatu, the cyclone killed 11 people and resulted in an estimated US\$450 million of damages and losses, equivalent to 64 percent of GDP. TC Winston struck Fiji as an extremely destructive Category Five cyclone in February 2016, resulting in the death of at least 42 people and damages and losses that may exceed those seen following TC Pam.

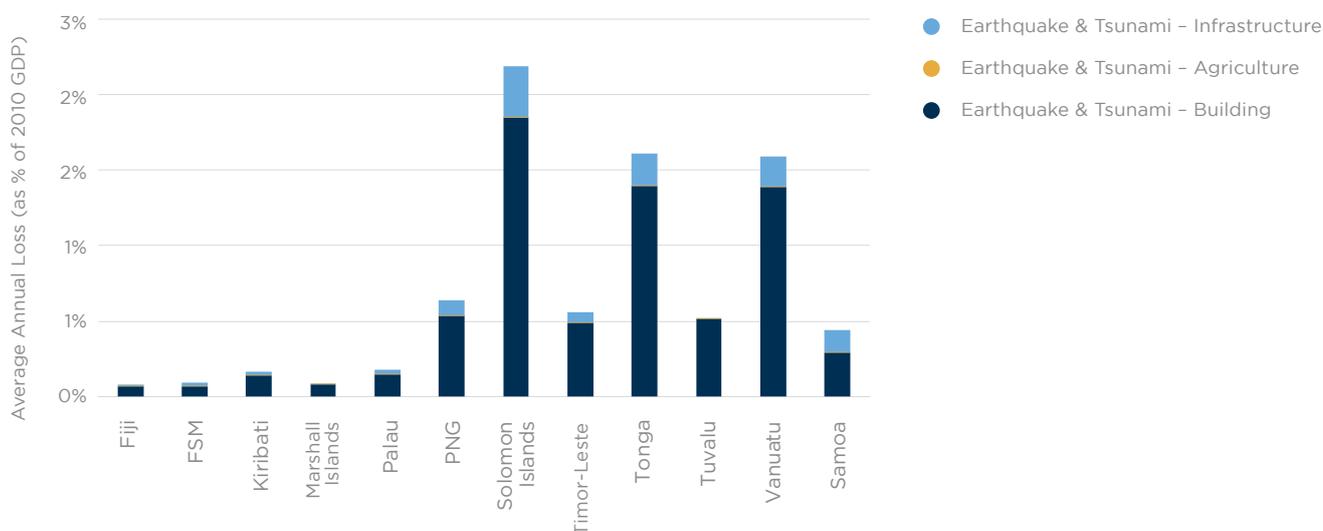
Flood risk (from rainfall not associated with cyclones) is very significant in the region, often causing massive losses. For example, Fiji experienced devastating floods in 2004, 2009, 2012 (twice) and 2014. The 2009 event caused damages and losses of US\$135 million (SOPAC 2009).¹⁴ More recently, flash flooding in the Solomon Islands in 2014 caused damage and loss estimated at US\$108.9 million, equivalent to 9.2 percent of GDP, resulted in the death of 22 people and affected approximately 52,000 people in total. The flooding caused damage to major infrastructure, fully destroying some 675 houses along with the food gardens that many people depend upon for their livelihood.

Droughts are increasingly affecting PICs. Only 56 percent of the population in PICs currently have access to improved water supply (WHO & UNICEF Joint Monitoring Programme 2013). Water sources are vulnerable to the effects of El Niño events, which have the potential for significant water-related impacts for many communities across the region. Both the Federated States of Micronesia and the Marshall Islands have declared a state of emergency due to the 2015-16 El Niño-induced drought, which has resulted in increased distance to water sources for many communities across the region. Previous examples of significant drought in the region include the drought that occurred in Tuvalu in 2011, which led to severe rationing of fresh water supplies in September/October of that year.

Coastal erosion, storm surges and king tides are major hazards affecting the coasts of the PICs. There are up to 30,000 islands located within the Pacific Ocean with a total coastline of over 50,000 km. According to a recent study of 12 PICs, 57 percent of the assessed built infrastructure is located within 500 meters of their coastlines, amounting to a total replacement value of US\$21.9 billion (Kumar and Taylor 2015). Most of the population, urban centers and critical infrastructure are located on the coast and are, therefore, exposed to coastal hazards. For example, in November 1979, December 2008, and March 2014, large extratropical storms caused large swell and flooding throughout Majuro, Marshall Islands. The cost of property damaged during the 1979 event was estimated at US\$26 million and 110 homes were damaged during the March 2014 event (Hess et al. 2015).

Many PICs are situated within the Pacific “Ring of Fire” which aligns with the boundaries of the tectonic plates, making them extremely vulnerable to earthquakes and tsunamis. The Solomon Islands, Tonga, and Vanuatu are the most at risk to earthquakes and tsunamis of all PICs (Figure 10-2). Vanuatu was affected by devastating earthquakes and tsunamis several times in the last few decades. In 1999, a magnitude 7.5 earthquake caused extensive damage to Pentecost Island, leaving more than 10 dead, over 100 injured and millions of dollars in losses. The earthquake generated a large tsunami, including a six-meter wave. In 2002, a magnitude 7.3 earthquake struck near the national capital of Port Vila, causing millions of dollars in damage to buildings and infrastructure. More recently, in 2009, a devastating tsunami struck Samoa following an 8.1 magnitude earthquake, resulting in waves of 14 meters which destroyed over 20 villages and caused 189 fatalities. In 2013, a tsunami struck the Solomon Islands, following an 8.0 magnitude earthquake, destroying homes and killing nine people.

Figure 10-2: Expected Average Annual Losses Due to Earthquakes and Tsunamis in PICs



¹⁴ For Fiji, in EMDAT for example, there are zero damages recorded for the 2004 flood, 43 million US\$ for the 2009, 89 million US\$ for 2012 – but only one event is registered, and there is no record of the flood event in 2014.

Climate change is exacerbating the vulnerabilities of PICs. Tropical cyclones—a major cause of losses and damage for PICs—are expected to increase in intensity, although not necessarily in frequency, over the coming decades. In addition to changing extreme weather events, climate change is adding pressure on fragile island systems via increasing average ocean and land temperatures, changes in the seasonality and duration of rainfall, coastal erosion, saline intrusion and increasing sea level (IPCC 2014 and Australian Bureau of Meteorology and CSIRO 2011).

Climate change may threaten the existence of entire low-lying atoll island nations, such as Kiribati, Tuvalu and the Marshall Islands. These states are only one to three meters above sea level, and thus are threatened by projected sea-level rises of around 60 centimeters or more by 2100. Climate change is already adversely affecting agriculture, fisheries, coastal zones, water resources, health, ecosystems and, therefore, economies of countries and communities. If greenhouse gas emissions are not drastically reduced, continued changes in climate are likely to exacerbate these negative effects (World Bank 2012b).

In addition, the vulnerability of PICs is also increasing due to economic and social changes and the degradation of natural resources. Key drivers include population growth and migration (internal and external), poor coastal development and land-use planning, unplanned urban growth, and water and ecosystem degradation, including pollution of subsurface and coastal waters.

Despite a consensus that PICs will be disproportionately impacted by climate change, assessing the future cost of climate-change impacts in the Pacific Region is challenging. Firstly, there are deep uncertainties on the speed and, sometimes, the direction of climate changes, especially at a local scale. There are large differences in projected changes in rainfall and storm surges between the projections of different climate models that do not seem to be diminishing with time. Given the small size of the PICs and the extensive ocean-dominated areas where they are located, downscaling changes in climate and natural hazards to the country level gives an even wider range of potential changes. For instance, in Kiribati some models project an increase in extreme peak daily rainfall of 53 percent, while others predict an increase of 92 percent, for the same emissions scenarios.

Even if models were perfectly accurate, uncertainty would not disappear because future levels of greenhouse gas emissions, which by nature cannot be forecast, largely determine future climate change. Secondly, climate change impacts will depend on the socioeconomic choices made by countries in future decades. It will be much costlier to adapt to climate change in a society that heavily depends on agriculture production, with high poverty rates, inequalities, and poorly managed infrastructure than in an inclusive society with safety nets and resilient infrastructure. Rapid and inclusive development can mitigate some climate-change impacts by 2030, especially the impacts on the poorest (Hallegatte et al. 2016). Finally, the costs and benefits of adaptation will be determined by the priorities of individual PICs. For instance, the best adaptation strategy will differ if the objective is economic efficiency, or if the objective is to remain below a defined level of risk.

Despite these challenges, it is possible to design resilient development strategies using new decision frameworks. Indeed, many decisions made now concerning development strategies and infrastructure investment in the PICs need to consider climate change. Given the uncertainties around future climate change and associated impacts, infrastructure should be made resilient to possible changes in climate conditions.

This aim implies that policy makers using climate information must change their practices and decision-making frameworks, for instance, by adapting uncertainty-management methods (Hallegatte 2009):

- **Selecting strategies that yield benefits even in the absence of climate change**, and therefore create no or little regret if the climate does not change as expected. Examples of no-regret strategies include reducing leaks in water distribution systems, increasing the standards of new buildings, or increasing the frequency of road maintenance.
- **Favoring reversible and flexible options**, like insurance, early-warning systems or easy-to-retrofit coastal defenses.

- **Buying “safety margins” in new investments** with, for instance, restrictive land-use planning, higher coastal protection defenses or bigger drainage capacity for urban infrastructure and roads.
- **Promoting strategies focused on institutions, policies and behavior change**, including the “institutionalization” of long-term investment planning, multicriteria assessment and use of a range of policy and financial investment instruments.
- **Reducing decision-time horizons**, for instance, in areas that could be flood-prone in the future, building cheaper houses with shorter lifetimes that can be replaced quickly and at lower cost.

Pacific Possible uses these generic methods to provide recommendations for climate-resilient development in the PICs in the following sectors: (i) coastal protection; (ii) flood and water resources management; (iii) protection of infrastructure against changes in temperature and precipitation; (iv) protection of buildings against cyclonic winds; and (v) adaptation in the agriculture sector.

▷ IMPROVING COASTAL PROTECTION

The highest adaptation costs for PICs by 2040 will be coastal protection. To protect PICs from coastal erosion, sea and river flooding, and submergence, three “hard” options are considered by this report: (i) beach nourishment (particularly in areas with high tourism revenue); (ii) sea and river dike construction; and (iii) port upgrades. The level of protection required and the associated cost of these options varies widely between countries and the sea-level rise scenarios, but the costs are always significant (Table 10-1).

The cost associated with the worst case, with a sea-level rise of 126cm by 2100 and increased cyclone intensity, are almost four times those under the best-case scenario, with a sea-level rise of 40cm by 2100. Kiribati, the Marshall Islands, and the Solomon Islands are projected to face the highest cost of adaptation as a share of projected GDP. Under the best-case scenario, these countries would already have to spend between 3 to 4 percent of GDP on coastal protection, while under the worst-case scenario these costs increase to 11 to 13 percent of GDP. Even for the other PICs, however, the projected cost of adaptation (even under the best-case scenario) exceeds, by far, the cost of coastal adaptation reported in other regions—0.8 percent of GDP for Sub-Saharan Africa and less than 0.4 percent in other regions. Those high costs are primarily comprised of expenditure on the construction and maintenance of sea walls (more than 75 percent of the total in most countries). It is important to note that these costs assume that only the principal population centers will be protected, and not the outer islands and less densely populated coastal segments. This means that additional costs will be associated with internal migrations and densification of the population behind coastal protections.

Table 10-1: Range of Adaptation Costs for Coastal Protection by Country (Best Case-Worst Case Scenario)(US\$ millions per year at 2012 International Prices)

Country	2020s	2040s	2040s as % of projected GDP (includes residual damages)
Fiji	71-230	86-329	1-3
Micronesia, Fed. Sts.	6-20	8-28	1-3
Kiribati	13-42	17-54	4-11
Marshall Islands	13-42	16-58	4-13
Palau	2-9	3-11	1-2
Solomon Islands	81-280	97-347	3-11
Tonga	8-28	9-35	1-4
Vanuatu	36-130	42-161	2-8
Samoa	4-15	7-21	0-1

Source World Bank 2016d.

There is little prospect that the high costs of building sea walls could be financed by the countries themselves. Accordingly, the international community will have to assess the trade-off between large initial expenditures on construction that are designed to protect coastal communities for many years into the future versus expenditures and emergency relief and recovery programs when disasters occur. Some countries—for example, the U.K. and France—have abandoned attempts to protect all their coastlines from storm and wave damage; some of the PICs may need to make a similar choice and set priorities in the geographical allocation of expenditures on coastal protection.

To manage the uncertainties around future climate change and shoreline behavior, flexibility should be incorporated into the design of coastal protection interventions. In some situations, hard structural options could be combined with softer nonstructural options (for example, ecosystem-based approaches, beach nourishment) to reduce the cost and mitigate the environmental and social impacts. Ensuring that future population growth is concentrated outside coastal zones and relocation of the existing population may be considered, although the implementation might be challenging due to land scarcity and tenure issues. Another option could be to raise buildings above coastal inundation levels to reduce the need for hard-infrastructure protection. In all cases, strengthening institutional capacity for integrated coastal management is an essential element of responding to climate change.

MANAGING FLOODS AND WATER RESOURCES

Many climate scenarios suggest that total annual precipitation will increase in most PICs because of climate change. This increase will be accompanied by greater variation in rainfall between wet and dry months, with more intense rainfall in the wettest periods of the year. For example, in Fiji while the 1-in-20 year peak rainfall event in 24 hours today is 245 mm, it would be 292 mm in 2050 under the median climate change scenario (Table 10-2). There is also a potential for more severe droughts, especially for the Solomon Islands and Tuvalu and, to a lesser extent, for Fiji, Palau, and the Marshall Islands. Adaptation to climate change should, therefore, involve measures to: (i) increase the capacity to store water that is accumulated in wetter months for use in the drier months; and (ii) manage the run-off caused by more intense periods of rain.

Table 10-2: Changes in Peak 1-in-20 years Rainfall Over a 24 Hour Period by Country in 2050 (mm of Rain Relative to Recent Climate)

Country	No Climate Change	Median Climate Change	Extreme Climate Change
Fiji	245	292	348
Micronesia, Fed. Sts.	63	78	123
Kiribati	145	224	365
Marshall Islands	72	85	125
Palau	197	245	284
Solomon Islands	84	102	119
Tonga	57	68	82
Tuvalu	83	102	127
Vanuatu	189	230	281
Samoa	79	97	116

Source World Bank 2016d.

Investment in increased water storage and rainwater harvesting, especially on islands with limited amounts of land suitable for reservoirs, will be critical. The alternative to investing in more water storage may be reliance upon desalination facilities or other alternative water resources, which (depending on scale) can result in significant capital costs in addition to ongoing operational and maintenance costs.

A combination of initiatives will be required to minimize future flood risk. A key approach should be effective land-use planning for future urban development as, in general, it is cheaper to keep economic assets out of flood-prone areas than to build storm and flood defenses to protect them. As for coastal

protection, however, the implementation of such initiatives may be constrained by land scarcity and tenure issues. Alternatives include any combination of measures to provide protection to assets or accommodation to flood flows.

One option for adapting to climate change would be to increase the existing design standards for flood defenses, drainage infrastructure and buildings to a higher standard of protection. This would cater for any increases in risk due to higher rainfall, without resulting in a lower standard of protection over time due to climate change. Another strategy may be to ensure that the floor levels of all new buildings are raised so that their main thresholds are a meter or more above ground level. This would also benefit PICs that are vulnerable to coastal inundation and sea-level rise.

A “one size fits all” approach to flood risk and drought management will not be appropriate for PICs. The selection of the best combination of interventions for each PIC will require a comprehensive investigation of the costs and benefits of each option, which will be specific to the needs of the beneficiaries. Limited investigations have been conducted in PICs to date, in part due to the lack of quality hydrological data upon which to base investigations.

▷ ADAPTING INFRASTRUCTURE TO CHANGES IN RAINFALL AND TEMPERATURE

Even if coastal protection is provided to protect infrastructure from sea-level rise and storm surges, additional expenses will be required to protect power and telecommunication, water and sewers, urban areas, roads and other transport, hospitals, schools and housing infrastructure from changes in rainfall and temperature. The materials and designs used in building infrastructure, as well as the frequency of maintenance, would need to be altered to maintain the same quality of infrastructure services as in the absence of climate change. For example, in buildings it will be necessary to increase the capacity of ventilation systems to cope with more humidity and higher temperatures, and to strengthen the roofs to withstand higher levels of rain. In urban designs, larger drainage and water storage systems will be required to cope with higher rainfall.

Assuming countries raise construction standards as they become richer (for example, new urban drainage systems are built to withstand a 1-in-20 years event instead of 1-in-10, because the value of the assets that need protection is higher), the cost of protecting infrastructure against changes in rainfall and temperature due to average climate change in 2050 will range from 3 percent to 21 percent of baseline expenditures across the PICs (Table 10-3). Fiji and Vanuatu will have lower adaptation costs, while atoll countries such as the Federated States of Micronesia and Kiribati will have higher costs. Roads account for more than 50 percent of the average costs of adaptation for most PICs and exceed 90 percent of the average costs in the Solomon Islands and Samoa.

Table 10-3: Costs of Protecting Infrastructure Relative to Baseline Expenditures

Country	Average Annual Cost (US\$ millions)*	% of Baseline Expenditure**	% of Baseline GDP
Fiji	20.2	3.0	0.4
Micronesia, Fed. Sts.	13.4	13.0	4.1
Kiribati	18.9	21.0	7.8
Marshall Islands	8.1	11.0	3.7
Palau	4.5	6.3	1.3
Solomon Islands	17.3	8.6	1.2
Tonga	8.4	12.0	1.6
Tuvalu	0.3	5.8	0.6
Vanuatu	7.0	3.9	0.5
Samoa	7.8	7.0	0.8

Source World Bank 2016d.

Note * Average cost of pre-emptive adaptation for all infrastructure assets by country for 2011-50; 20-year planning horizon; US\$ millions per year at 2010 international prices with no discounting. ** Baseline infrastructure expenditure is the estimated “normal” level of infrastructure of a country defined as a function of GDP per capita, population, and a range of physical and climatic conditions, including improvements over time in the quality, redundancy and maintenance levels as a function of income growth.

For most types of infrastructure (for example, health and schools' infrastructure, housing, water supply and sewers) the lowest-regret option is to adapt now to future climate changes. The lowest-regret strategy often entails planning ahead for only one or two decades. For example, for infrastructure that generally has a short life-span (such as houses), decision makers and engineers should not be asked to design houses with a view to extend their lifetime beyond 20 years. It is cheaper to build infrastructure that can withstand the climate conditions of the next 10 to 20 years than building infrastructure that can withstand both current climate and the climate that will be experienced in 30 years. For many types of infrastructure, the pre-emptive strategy is fully justified as the marginal cost is low (for example, ICT, health and schools, water and sewers).

Due to the high cost of comprehensively protecting infrastructure against the worst-case scenario and the high uncertainty surrounding future changes in rainfall, the optimum solution for roads will be a combination of pre-emptive measures and strengthening preparedness. The lowest-regret option for many PICs appears to be a mix of: (i) relatively low-cost adaptation measures (first and foremost proper maintenance, but also increasing the slope of pavements and/or the capacity of the drainage systems to reflect changes in future expected runoff or water flow); and (ii) be reactive to climate change impacts which would involve rebuilding those sections of the roads if and when they are damaged.

This assumes, however, that governments will have the financial and technical resources to react quickly in case of disasters to repair damaged roads promptly whereas, if those conditions are not met, the costs of being reactive may be largely underestimated. A possible cost-effective solution for managing future changes in climate and minimizing the economic costs associated with a road failure could be to focus on nonengineering measures such as realignment, environmental management (increased vegetation land cover, and preservation of mangroves) and land-use planning, and on strengthening preparedness, and maintaining accessibility to essential infrastructure such as schools and hospitals following a disaster event by increasing the redundancy of the road network, thus making sure there are alternatives, even if the main road is damaged.

The results provided within this report are indicative, but adaptation strategies need to be designed on a case-by-case basis. For instance, in some places it may make sense to adapt roads to climate change by installing higher drainage capacity and elevating the road, while in other places increasing redundancy in the road network can be a more cost-effective solution. The best solution will depend on the local context and, in particular, on the acceptable level of service failure.

▷ PROTECTING BUILDINGS AGAINST CYCLONIC WINDS

In addition to adapting buildings to withstand sea-level rise, increased flooding and changes in temperature, it may also be necessary to protect them against stronger cyclonic winds. The intensity of tropical cyclones is likely to increase.

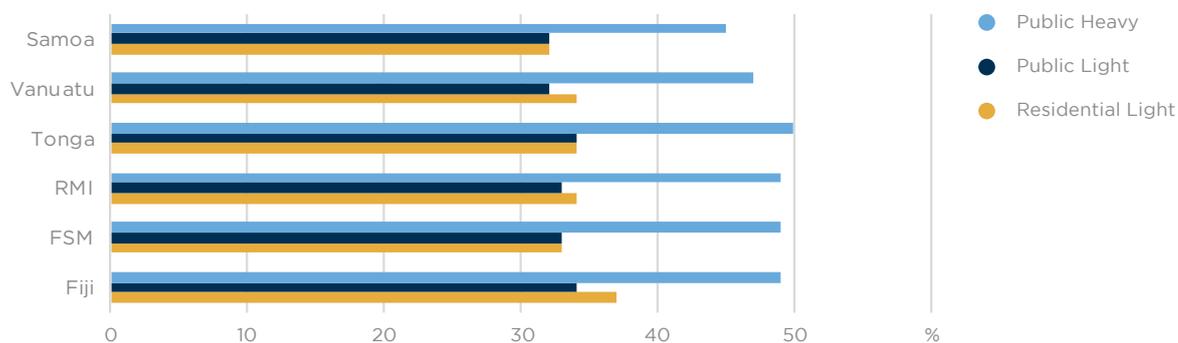
Ensuring that new buildings can withstand at least 1-in-50 year cyclone wind speeds should be a high priority for policy makers. The changes required to ensure that structures are more robust to cyclones will usually involve small additional costs and modest adjustments to designs when the buildings are constructed. The successful implementation of higher building standards will, however, require actions to improve compliance with the new code, including investment in training of engineers and contractors, strengthening of the design and construction permitting process, and provision of enforcement resources.

Reconstruction efforts should seek to ensure that buildings—especially public buildings—should incorporate the code improvements necessary to ensure greater resilience to the current and future distribution of cyclone risks. The benefits of greater wind resistance will increase because of climate change over the life of the buildings that are either replaced or reconstructed during the recovery from these storms.

For existing buildings, cyclone wind retrofitting options can decrease expected losses by 35-50 percent (Figure 10-3). Such investments are not always justified, however, when the costs of heavy retrofitting to meet higher standards that would resist increased wind speeds are high relative to the benefits in terms of loss reduction. It is, therefore, necessary to prioritize the countries and the buildings for which retrofitting would be appropriate to ensure cost-efficiency. For instance, light retrofitting will be more cost-efficient in countries that face higher cyclone risks—notably Vanuatu, Fiji, the Marshall Islands, Tonga and Samoa—where retrofitting public buildings (for example, schools and hospitals) appears to be economically justified.

The heavy retrofitting of public buildings becomes a viable policy option when factoring in their role as evacuation shelters during cyclones. Benefits, including avoidance of potential loss of life or injuries and the loss of the services provided by buildings, should be considered in future analyses. For housing stock, retrofitting is shown to be too expensive in many countries and, therefore, early replacement of the buildings in combination with upgraded construction standards may be a better strategy.

Figure 10-3: Loss Reduction Due to Cyclone Wind Retrofitting Options



Source World Bank 2016d.

ADAPTING THE AGRICULTURE SECTOR

As the climate changes, increased temperatures and higher risk of seasonal droughts are likely to decrease crop productivity (Table 10-4) and negatively affect livestock in PICs. For example, papaya is sensitive to temperature increase during flower production and higher temperatures result in lower productivity. As Table 10-4 shows, there is a large degree of uncertainty with respect to the impact of climate change on crop yields, with the worst-case scenario for most crops depicting significant negative impacts, while the best-case scenario often shows positive impacts. In addition, there is also significant variation among impacts across countries. Although increases in carbon dioxide concentrations could act as a “fertilizer” for some crops in the short-term (for example, rice, sugarcane and sweet potato), the crop yields of cassava, maize, and taro seem to be more likely to decrease than to increase by 2050. Livestock may also be negatively impacted due to increased risk of heat stress.

Table 10-4: Relative Changes in Crop Yields (%) Under Climate Change in 2050 Relative to 2000

Country	Cassava		Maize		Rice		Sugarcane		Sweet Potato		Taro	
	Worst case	Best case	Worst case	Best case	Worst case	Best case						
Fiji	-36.5	-8.8	-7.0	1.0	-11.0	3.5	-8.3	2.8	-13.4	2.0	-17.5	1.1
PNG	-30.8	17.7	-3.8	9.0	-7.5	11.7	-3.6	3.4	-10.9	-1.2	-13.0	3.6
Solomon Islands	-27.8	-17.9	-16.5	-0.3	-16.2	5.9	-12.9	0.9	-15	1.5	-18.6	-4.7

Source Rosegrant et al. 2013, in ADB 2013.

Although some countries may experience negative impacts of 1-3 percent of GDP by 2050, the impact on GDP could be neutral overall for the Pacific region, however, by 2100 the impact could be a 5 percent decrease in Pacific GDP as all crop yields decrease (ADB 2013). These impacts are likely to be underestimated given that they do not consider interaction effects with other biophysical processes, such as salinity intrusion or the incidence of pests and diseases.

Adaptation to climate change in agriculture in PICs needs to be based on both low-cost no-regret options and, perhaps, more expensive long-term solutions. Simple low-cost options that both improve productivity and increase resilience to climate change include mulching and multiple cropping, and improved farmer education. Longer-term solutions should build agriculture systems that can be resilient to multiple changes, such as short periods of floods or droughts, saline intrusion, extremes of temperature, erosion, altered patterns of pests and diseases and changes in growing seasons.

As agro-ecological conditions change, farmer re-education will be vital—preferably promoted through farmer-to-farmer exchanges. Other solutions are likely to incorporate more substantial and sustained investments, such as the development of new climate-smart crop varieties at the regional or national level, higher design standards for agricultural assets (such as storage sheds and livestock shelters) to help reduce storm damage, or insurance mechanisms to address residual risks that require considerable government involvement, including consideration of premium subsidies and product development and loss assessment.

▷ THE OPTION OF PLANNED RETREAT: THE SPECIAL CASE OF ATOLL ISLANDS

The atoll nations of Kiribati, the Marshall Islands, and Tuvalu are particularly vulnerable to sea-level rise and storm surges. As their highest point of elevation is only a few meters above sea level, in the absence of adaptation, sea-level rise will reduce the habitable surface over time and may lead to a dislocation of the island. For example, for Majuro Atoll in the Marshall Islands, a 50cm rise in sea level may mean the disappearance of 80 percent of its land area (ADB 2013). Other sources suggest a more modest loss of land. For example, in Tuvalu’s Fongafale Island (Funafuti), sea-level rise by 2040 will lead to the loss of about 5.8-10 percent of Fongafale’s land area, which will be permanently flooded by a sea-level rise of 62cm. For the atoll countries overall, sea-level rise may result in a 15-20 percent direct loss of habitable land in this century alone, thereby significantly increasing population density, increasing flood risks, and reducing the amount of land available for agriculture and rainwater storage. The risk of storm surges for atoll nations increases with sea-level rise and the deterioration of coral reefs.

The cost of managing the risk of sea-level rise on atoll nations is likely to be significant. In Kiribati, for example, the cost of coastal adaptation could be between 4 and 11 percent of Kiribati’s GDP in the 2040s, which is one-third of government revenue. It is unlikely that the Government of Kiribati could afford to allocate one-third of its annual budget to coastal protection for the next few decades, and indeed, some people in Kiribati believe it may already be too late to save their nation from the effects of climate change.

If the international community cannot allocate an estimated US\$10 to US\$50 million a year per atoll nation to protect them against sea-level rise, or if the costs of adaptation are much higher than expected, other options will need to be considered. Former President Anote Tong of Kiribati has spoken of the need to ensure “migration with dignity” for the country’s population. While the Government of Tuvalu (2012) specifically mentions migration as a possible climate-change outcome, survey data shows that the vast majority of Tuvaluans do not view this as a major reason for concern and are not, as yet, preparing to migrate due to climate change (Mortreux and Barnett 2009). The decision to plan for a relocation of the population, or part of the population, to another country is a difficult one to make, given the uncertainties surrounding the speed and strength of climate change and sea-level rise.

Mechanisms such as increased labor-market access to Australia and New Zealand for citizens of the atolls are a smart way to create an outlet for the increasing pressures on livelihoods because of climate change. It would allow for gradual migration from the atoll nations and be less costly and preferable to a last-minute abandonment that would require a significant level of emergency assistance and be difficult to manage. It would also be conducive to the establishment of a greater diaspora of I-Kiribati and Tuvaluans who can then make it easier to absorb climate refugees later. Such an approach would need to be carefully planned and available resources would need to be used to maintain acceptable living conditions on the atolls for the coming decades only (and for a declining number of people), as the population progressively takes advantage of opportunities for relocation.

It makes a lot of sense to start considering the gradual-migration option as a long-term solution to climate-change impacts in atoll countries, using an integrated approach that involves all stakeholders and carefully examines the threats that climate change poses to life in the atoll nations. The costs of maintaining acceptable living conditions on the atoll islands in the face of climate change would also need to be factored in. There are political, social and economic sensitivities that would need to be carefully considered and addressed if this option is adopted (Wyett 2013). The section on labor mobility discusses in more detail proposals for open labor-market access for low-lying atoll states threatened by climate change.

The findings and recommendations should be used carefully and considered in accordance with the local contexts. Resilient development in PICs under tight budget constraints will require a compromise between hard protection options (such as sea walls, building retrofitting, and desalination plants, which are very expensive in Pacific Islands given the cost of importing materials) and softer options (such as rehabilitation or protection of mangroves and wetlands, early-warning systems, social protection and rainwater harvesting). It will also require prioritization between investments in coastal protection, flood protection, water supply, or resilient infrastructure.

The trade-offs and synergies between multiple objectives in different sectors will need to be identified. For instance, water desalination requires more energy (therefore opportunities for alternative energy sources such as solar energy should be sought), changes to climate-resistant crops can affect water demand by the agricultural sector, and land-use patterns can affect the exposure of the population to extreme events. Integrated design and assessment of adaptation across multiple sectors should be supported.



SPOTLIGHT 6

Climate and Disaster Resilience: Impacts on Poverty, Gender, and the Environment

<p>Poverty</p>	<p>Natural disasters and climate change have a disproportionate impact on the poor. They typically lack the resources to invest in disaster-resilient housing and are often located in areas with high exposure to natural hazards. When disaster strikes, the lack of resources also often forces the poor to adopt coping strategies that have permanent negative effects, such as taking children out of school, selling productive assets, or reducing food intake.</p>
<p>Gender</p>	<p>Women are disproportionately vulnerable to the effects of natural disasters and climate change where their socioeconomic status is not equal to those of men, and where they have less voice and influence than men in shaping policies, as is the case in the PICs. Women face greater barriers to influence, participate in, and benefit from disaster-risk reduction, recovery, and climate change mitigation and adaptation efforts. Women and girls tend to have less access to, or control over, assets, including the resources necessary to cope with and respond to hazardous events (access to information, access to employment opportunities, education, health, and economic assets). Research has shown that women and girls are also more likely to be exposed to gender-based violence and trauma when such events happen as they often lose their homes, face a reduction in economic activities, and an increased workload.</p>
<p>Environment</p>	<p>Degradation of ecosystems (for example, mangrove forests and coral reefs) and expanded settlement in risk-prone areas are key drivers of disaster risks. Massive environmental impacts are a characteristic of climate change and natural disasters. Examples include the environmental devastation brought by cyclones, salinization of land due to sea-level rise, and coral bleaching due to ocean acidification.</p>

11.

The Noncommunicable Diseases Crisis

The Pasifikis – Healthy Living in 2040

Tafu and Maeva have invited their children home for dinner tonight for their favorite dish: fish in fresh coconut milk, with fresh vegetables. Saia is visiting with his family from Fiji, and his twin sister Eka and their older sister Tiera will be joining them too. These days, their family favorite is not such a treat, as locally caught fish is more affordable—but for tonight's meal, Tafu has caught the fish himself.

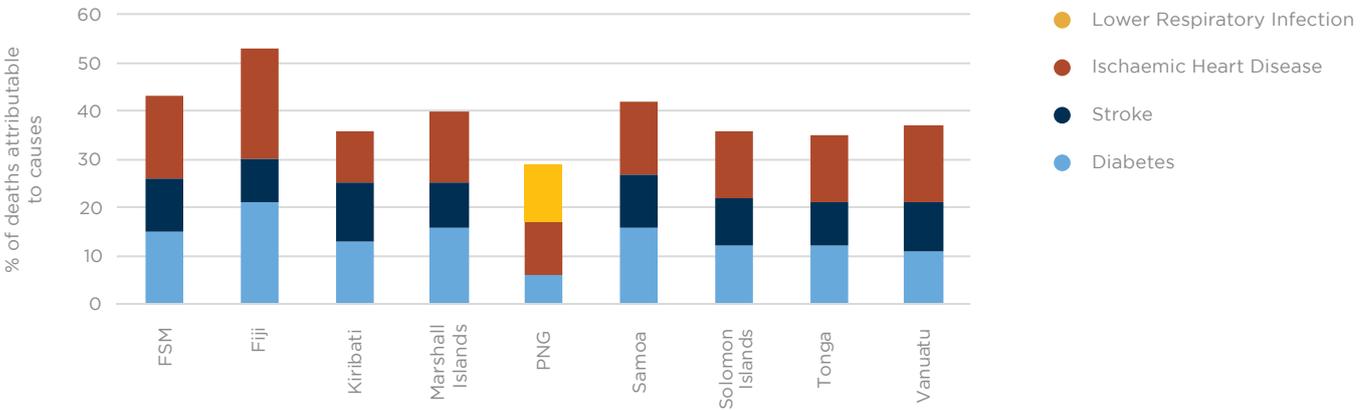
Tafu tries to encourage his children to lead healthy lifestyles, and so does Maeva. His children and grandchildren know he leads by example; he gave up smoking over 20 years ago, and his children remember how heavily he once smoked. Not only has it improved his health, they have saved a huge amount of money too.

Tafu tells his grandchildren stories of friends and relatives who lived exciting and interesting lives, which were sadly cut short because of NCDs like diabetes or heart disease. They tell him their own stories about healthy living, from what they have learnt during school excursions to the local health center. They encourage him to attend free classes on healthy living, which might help with his weight. The whole family roars with laughter, and Tafu thanks his grandchildren for their innocent weight loss suggestion.



NCDs are now the leading cause of death in most countries in the Pacific, ranging from an estimated 60 percent of deaths in the Solomon Islands to 80 percent of deaths in Fiji due to the four leading NCDs alone (Figure 11-1)(WHO 2014). NCDs are also an important driver of premature (< age 70 years) deaths in most of the Pacific, with rates measurably higher than lower-middle-income global averages (WHO 2011).

Figure 11-1: Share of Deaths Attributable to the Four Leading Noncommunicable Diseases (2013)

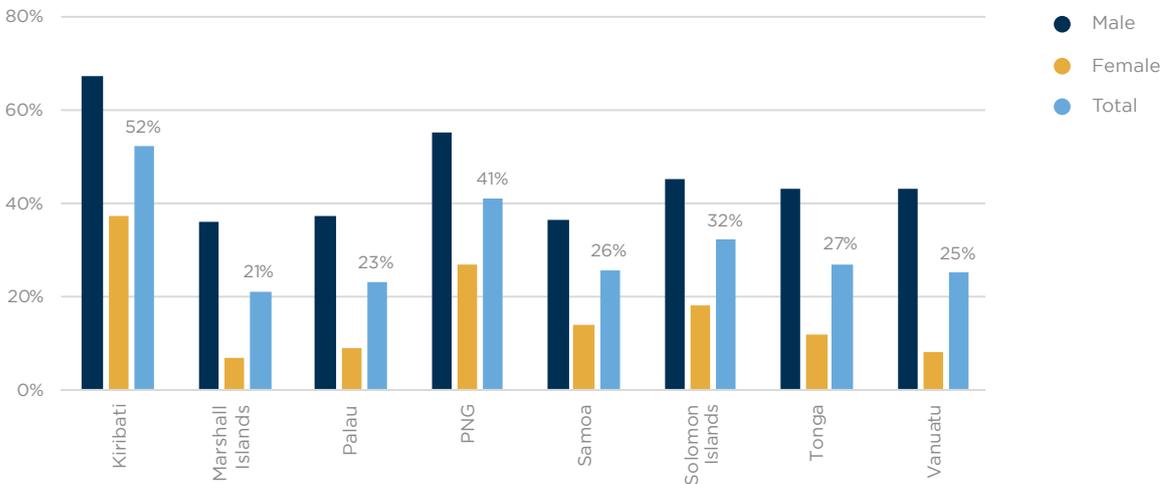


Source GBD 2015.

Behavioral-risk factors, including tobacco use, insufficient physical activity, and unhealthy diets, are responsible for most deaths due to NCDs.¹⁵ Unhealthy diets (for example, sweetened beverages, trans-fats, and sodium) are the greatest risk factor for cardiovascular diseases and diabetes-induced deaths. Low physical activity imposes significant risk of death caused by cardiovascular diseases, diabetes, and cancer. Tobacco use is the most significant behavioral risk factor of chronic respiratory disease (CRD) and cancer.

Prevalence of tobacco consumption in the Pacific is much higher than the global average of 21 percent (Figure 11-2). In 2012, adult males in Kiribati and Papua New Guinea had the third and fifth highest rates of smoking in the world with prevalence rates of 67 percent and 55 percent respectively (Ng et al. 2014). Tobacco consumption among males in Tonga, the Solomon Islands, and Vanuatu is also quite high; 43 percent, 45 percent, and 43 percent respectively.

Figure 11-2: Prevalence of Tobacco Consumption in the Pacific

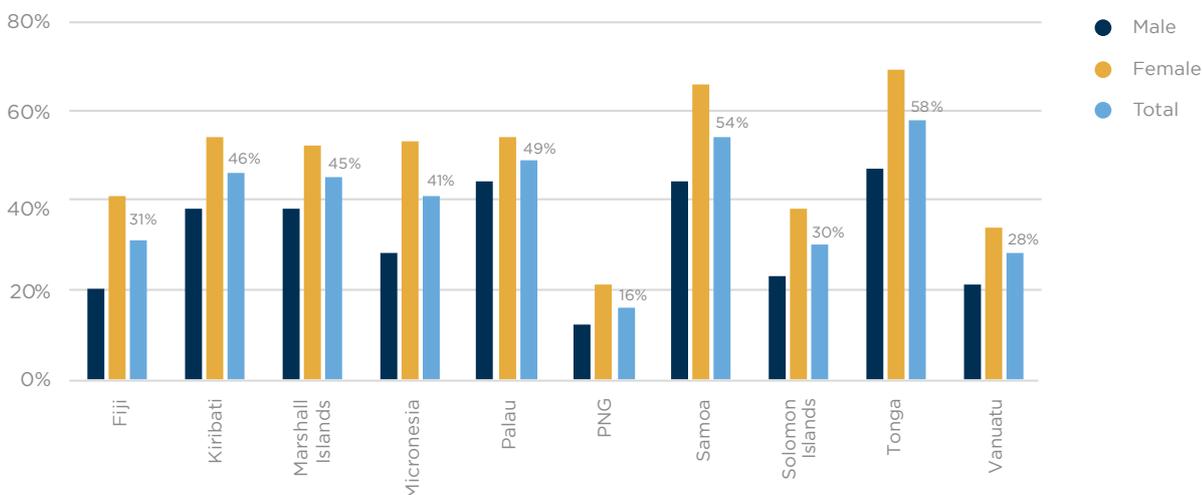


Source WHO 2014.

¹⁵ These risk factors are not mutually exclusive such that an NCD death may be attributable to multiple risk factors.

The top seven most obese countries in the world are in the Pacific. Over one-fourth of the adult population in most PICs is clinically obese (Body Mass Index equal to or greater than 30). Tonga and Samoa have the highest obesity rates at 58 percent and 54 percent respectively. This is much higher than the 13 percent global average. School-age obesity and overweight percentages are also high in many countries (Anderson 2013).

Figure 11-3: Prevalence of Obesity in the Pacific



Source WHO 2014.
 Note Data is not available for Tuvalu.

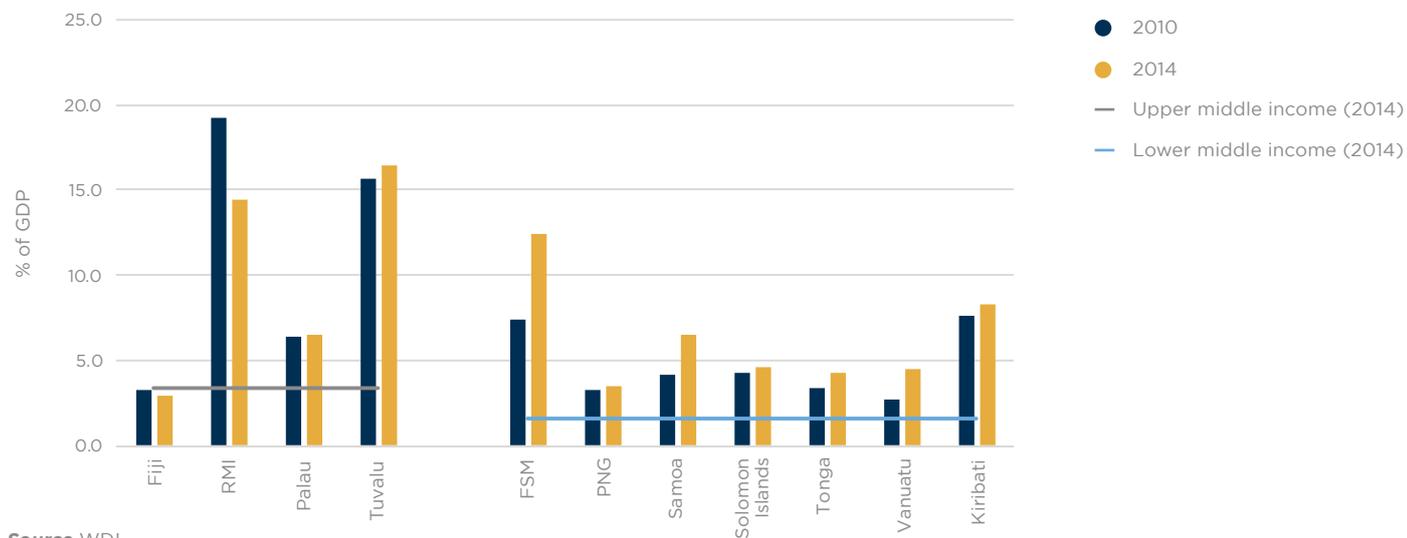
Other trends and risk factors also point to a substantial worsening of the situation.

More than 70 percent of women have insufficient physical activity in the Federated States of Micronesia and the Marshall Islands; and over 30 percent of adult men and women in Vanuatu suffer hypertension (Kessaram et al. 2015). While rates of physical inactivity and alcohol consumption have decreased in both Samoa and Tonga over the last 10 years, rates of obesity have barely changed in Tonga and have increased in Samoa (WHO 2014a).

The high prevalence of NCDs contributes significantly to already high and still rising public expenditure on health in the PICs, raising questions about long-term financial sustainability.

NCDs are a major driver of overseas medical referrals: a significant and often fast-growing component of government health expenditure that benefits only a small fraction of the population. PICs, especially those with small populations, understandably do not have the facilities and specialized personnel to treat more complicated cases of cancer, heart disease, diabetes or other diseases. Tuvalu's public expenditure on health in 2014 represented 16.4 percent of its GDP, a level that is almost five times the global average for upper-middle-income countries. Except for Fiji, governments of all the PIC11 countries spend a greater share of GDP on health than the global average for their income group (Figure 11-4).

Figure 11-4: Public Health Expenditure as a Percentage of GDP (2010 and 2014)



Source WDI.

The number of people affected by NCDs is projected to rise substantially in the Pacific in the coming decades. This projected increase is driven by a combination of the high level of NCD risk factors prevalent in the Pacific and demographic trends. Several PICs have high rates of population growth, which adds to public health needs. In addition, the share of those aged 60 years and older has begun to increase and is expected to grow very rapidly in the coming years. Since NCDs disproportionately affect this age group, the incidence of these diseases can be expected to accelerate in the future.

The global evidence increasingly shows that NCDs result in long-term macroeconomic impacts on labor supply, capital accumulation, and GDP growth (Abegunde et al. 2006; Abegunde and Stanciole 2006; Daar et al. 2007; Mayer-Foulkes 2011; Nikolic, Stanciole, and Zaydman 2011; Suhrcke and Urban 2010). NCDs directly affect the labor force through the premature death of workers, or disability as the result of stroke or diabetic-related blindness and amputation. NCDs also affect the quality of the labor force through a variety of channels including absenteeism, comorbidity including mental health issues, and disability. Premature death and disability caused by NCDs can also have indirect and longer-term effects as well. If young children are taken out of school to look after a relative with diabetic blindness, then the possibility of the next generation improving their own living standards is compromised. There are particularly adverse long-term social effects if young girls are taken out of school to look after sick relatives (Hill and King 1995).

NCDs affect the savings potential and capital accumulation of individuals due to direct out-of-pocket (OOP) spending on health, which could otherwise be invested in productive assets for households.

This is a particular problem in Asia where OOP expenditures are high, and can lead to impoverishment. OOP expenditure is much less of a problem in the Pacific where government health expenditure absorbs most of the burden. Pacific Island governments are increasingly aware that rapidly rising public expenditure on NCDs has a high opportunity cost in terms of resources that could have been allocated elsewhere, on both health and nonhealth investment—such as rural roads and electricity generation.

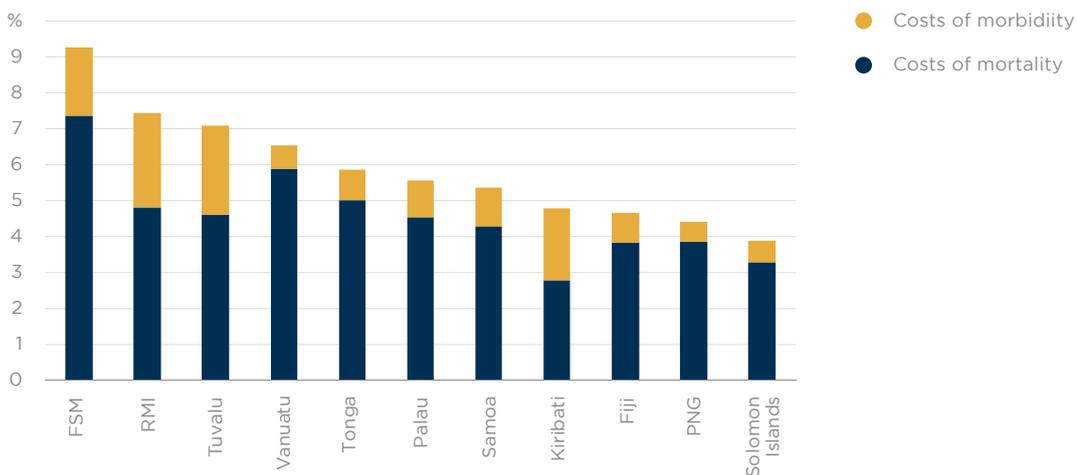
Pacific Possible presents new estimates of the economic cost of NCDs. We estimate the economic cost by using, respectively, a “value-of-lost-output” approach for NCDs’ *mortality* and a “cost-of-illness” approach for NCDs’ *morbidity*.¹⁶ The cost of illness includes both the loss of income and the medical treatment cost. Premature death due to NCDs impacts on the size of the labor force and thus lowers production. It is important to note that our estimates do not capture the immense human suffering caused by NCDs, not only for the afflicted person but also for family members and the wider community.

NCD mortality will potentially reduce the labor force by 9 percent to 30 percent across the 11 countries by 2040. Cardiovascular disease is projected to have the greatest impact, causing an especially high amount of lost labor in Fiji and Micronesia. It should be noted that this is the estimated overall potential labor loss to the labor force, not the actual employed labor force. Higher employment levels will, therefore, be associated with greater potential economic loss. In other words, the actual economic loss may be less if there is high unemployment or underemployment. There will, however, inevitably be large social losses with every premature death which is not counted in the model—such as the premature death of parents that result in orphans.

The economic burden of NCDs is projected to increase significantly by 2040, reducing GDP by up to 9 percent in the Federated States of Micronesia (Figure 11-5). The economic burden of the four major types of NCDs globally (cardiovascular diseases, chronic respiratory diseases, diabetes, and cancer) is estimated to already be significantly higher in the PICs than elsewhere. Globally, NCDs are estimated to reduce GDP by around 3 percent, while the corresponding figure for middle-income countries is 5 percent. Based on current trends, our projections indicate that GDP could be between 5 and 9 percent less if the NCD crisis continues unabated.

¹⁶ While the methods are not all encompassing of the total economic burden that NCDs pose, they provide a lower bound estimate of the severity of the problem that the Pacific nations face. The approach uses similar methods as Bloom et al. (2011) to estimate the global economic cost of the NCDs, which was presented in the World Economic Forum in 2011.

Figure 11-5: Projected Economic Burden of NCDs as a Proportion of 2040 Baseline GDP



Source Staff calculation.

Cardiovascular disease is projected to account for the greatest mortality burden in the Pacific Islands, followed by diabetes by 2040. Cardiovascular disease is projected to account for 43 percent of lost economic output in the 11 Pacific countries, compared with 51 percent globally. On the other hand, diabetes contributes a greater economic burden in the Pacific than the global average—nearly one-quarter (24 percent) of lost economic output, on average, compared to the global share of just 6 percent. Of the 11 countries analyzed, Fiji is projected to suffer the highest cardiovascular burden at roughly 60 percent in 2040.

The economic burden due to diabetes is highest among Polynesian countries, particularly in Tuvalu. Melanesian countries are currently experiencing a lower economic burden from morbidity due to diabetes, but the burden is projected to rise quickly. In 2040, Vanuatu is projected to suffer the highest diabetes burden at roughly 38 percent, even higher than the burden from cardiovascular disease. The cost of diabetes is already quite high in most Micronesian countries and will continue to rise.

Melanesian countries face a double burden of disease. The prevalence of NCDs is rapidly increasing, particularly in urban areas. This burden is likely to be further affected by the high stunting rates for children aged under 5, particularly in Papua New Guinea. Research has shown that stunted children are more prone to developing NCDs in adulthood (Jinabhai, Taylor, and Sullivan 2005; Martins and Sawaya 2006; Sawaya et al. 2003). The steep slope of the burden curve, over the analysis time period, indicates the severity of the problem if no action is taken to reduce diabetes morbidity.

In summary, four results stand out in terms of projected economic costs of NCD mortality analyses in the Pacific. First, the economic burden of NCDs is greater than expected for middle-income countries; second, although cardiovascular disease is the biggest contributor to the mortality burden in the Pacific, diabetes plays a far greater role in the Pacific countries compared to the global average; third, the economic burden is increasing with time, especially as incomes rise; and fourth, in the absence of these four NCDs, the labor force could be at least 9 percent, and up to 30 percent, larger across the 11 Pacific countries.

▷ RESPONDING TO THE NCD CRISIS: PREVENTION IS POSSIBLE AND ACHIEVABLE, BUT URGENT ACTION IS REQUIRED

Multiple factors inside—and beyond—the health sector are driving the rise in NCDs, therefore, a multisectoral approach to prevention is essential. Continued and intensified leadership from the health sector in promoting population-wide tobacco control and scaling up the Package of Essential NCD (PEN) Interventions and targeting key populations at high risk in particular is, therefore, essential. Pharmaceutical and similar treatments have a vital role to play in preventing and treating NCDs, however, ‘medicalizing’ the NCD response through drugs and medical interventions alone is inadequate. The social determinants of health need to be addressed. Changes in lifestyle provide a simple, low-cost and effective way to combat NCDs while saving scarce health resources: tobacco

control is a key public health intervention. Stakeholder analysis identifies numerous areas where multisector approaches are needed. Development partners also have an interest in supporting a multisector approach through their investments in infrastructure, other sectors, and trade policies.

Priorities for curbing NCDs presented in the NCD Roadmap report include the following five areas (Secretariat of the Pacific Community 2014):

- i. Strengthen tobacco control by an incremental increase in excise duties to at least 70 percent of the retail price of cigarettes over the medium term (and before 2020 if the Tobacco Free Pacific is to be achieved);
- ii. Consider a tax increase for alcohol products as a way of reducing harmful alcohol consumption;
- iii. Consider policies such as targeted preventive measures, taxes, and better regulation to reduce consumption of local and imported food and drink products that are high in sugar, salt, and fat content as they are directly linked to obesity, diabetes, heart disease, and other NCDs in the Pacific;
- iv. Improve the efficiency and impact of the existing health budget by reallocating scarce health resources to targeted primary and secondary prevention measures for cardiovascular disease and diabetes, including through the PEN Interventions; and
- v. Strengthen the evidence base to enable better investment planning and program effectiveness, thereby ensuring that interventions work as intended and provide value for money.

▷ CONCLUSION

It is clear why Pacific Island leaders have formally declared NCDs a “crisis” in the region. NCDs affect the overall development process and prospects. As this report shows, all countries in the Pacific are dealing with the challenges of communicable diseases, reproductive health, and rapid population growth. In addition, PICs are experiencing a rapid rise in the incidence of NCDs—in many countries at rates that are among the highest in the world.

Unfortunately, the capacity to respond to these growing challenges is constrained because of the already high absolute and relative levels of government expenditure on health. Given generally low or at least volatile economic growth, and limited capacity to increase tax revenue from a nascent private sector, governments have increasingly limited scope to allocate more resources for health in a way that is financially sustainable. The NCD Roadmap has a suite of evidence-based, feasible, affordable, cost-effective and, in some cases, cost-saving interventions specifically designed for the Pacific Islands. The recommendations involve key programs from the Ministry of Health, a wide range of other multisectoral ministries, and stakeholders. PICs that successfully pursue measures to prevent and control NCDs will be able to bend the cost curve of NCD treatment and generate broader budgetary and macroeconomic benefits.



NCDs: Impacts on Poverty, Gender, and the Environment

Poverty	<p>The burden from NCDs disproportionately affects low-income groups. Although acquisition of NCDs is more likely among the wealthy in a low- or middle-income country, the poor are less prepared to manage the disease. The poor thus suffer from an NCD trap. A vicious cycle exists where poverty—in the form of lower education, employment, and economic deprivation—leads to higher prevalence and more severe NCDs, and in turn results in economic impacts on individuals and households. The economic impacts such as increased health expenditure, which accounts for a greater proportion of income for the poor, job loss, and reduced productivity, tend to entrench poverty status. In the Pacific context, the relatively poor also increasingly prefer and rely on cheap calorie-dense processed foods that contribute to NCDs.</p>
Gender	<p>In the Pacific, women are more prone to diabetes than men, while men have a greater risk of acquiring cardiovascular disease. Women often are the primary caregivers for family members suffering from NCDs. Designated caregivers often must interrupt their education or withdraw from the workforce.</p>
Environment	<p>NCDs are likely to have limited direct impacts on the environment, however, some of the factors contributing to NCDs, such as tobacco consumption, can contribute to pollution.</p>



Photo Tom Perry

PART IV

Pacific 2040

What is possible in 2040? This part of the report highlights what is possible in the Pacific countries in terms of higher incomes, employment, and government revenue, if the right investments are made and the right policy decisions are taken. In addition to measures that are specific to capturing a particular opportunity or to minimize the impact of key risks, there are also a few cross-cutting issues that are likely to have a fundamental impact on what 2040 will look like.

12.

A More Prosperous Pacific in 2040

The Pasifikis – Celebrating in 2040

Tafu and Maeva are proud to celebrate their 30th wedding anniversary and everyone has been invited. With three adult children, several grandchildren and many adopted nieces and nephews who have passed through their home while studying in high school, Tafu and Maeva are proud of what they have achieved as a couple.

A lot has changed over the last 25 years, but most of those changes have meant a better life for themselves and their family. Their relatives, neighbors and friends across the island are in a better financial position than they were all those years ago, thanks to a growing tourism sector, better connectivity, and an increase in income from the fisheries sector. As predicted by scientists, cyclones have become harsher, but at least now Tafu and Maeva's community is better prepared, more resilient and people are able to get back on their feet faster. Today, they also look around to see healthier food options, and healthier people. Aside from the three suckling pigs for the occasion, every other dish on the menu for their anniversary celebration is fresh, locally-grown or caught, and delicious. There is no canned meat, lamb flap or sugary soft drink in sight.

They are proud of how far they have come—not just as a couple—but as a family, a community and as an island country. They have support all around them, which is not unusual for anyone living on the island these days. Best of all, they know their parents, especially Tafu's mother Mere, would be proud. Despite all these changes, especially the rise in technology—they are more devoted than ever to continuing her beloved cultural traditions, and the traditions of their Pacific forefathers.



This section seeks to aggregate the findings of the research on the individual opportunities and threats to answer the question as to what improvements in the standards of living in the Pacific Islands are possible by 2040. This is by no means an easy task given the many uncertainties and unknowns involved in making projections. It is difficult to project developments for the group of Pacific Islands and it is even more difficult to make projections for individual countries. Numerical estimates of per capita incomes, employment, and government revenues for individual countries are intended to provide a sense of the order of magnitude of what may be achievable if the right policy choices and investments are made. Although the methodologies employed sometimes generate what looks like precise estimates, it is important to keep in mind the large uncertainty surrounding any assessment of what may be achievable over a 25-year horizon.

An analogy with disaster risk management may be helpful. We are able to predict with some confidence that, over the 25-year period, the Pacific region will be hit by many tropical cyclones, however, it is much more difficult to predict which countries will be hit and what the damage will be. Damage and losses incurred over the 25-year period will also significantly depend on countries' investments in disaster preparedness. The situation with respect to the opportunities discussed in the report is similar. For example, we can say with some confidence that with increasing prosperity and a growing middle class in China, we will see a significantly increased number of tourists from China in the Pacific. But it is much more difficult to project the total number of additional tourists, or which countries have the potential to realize the biggest increases in tourist arrivals, and the actual outcomes over the next 25 years will very much depend on Pacific Island countries putting in place the right policies and investments to attract more tourists.

This section is organized as follows. We start by summarizing the economic impacts of each of the five growth opportunities examined by *Pacific Possible*. This is followed by a discussion of their aggregate impact on economic growth, per capita incomes, employment, and government revenue. The section concludes with a summary of the main threats to improved livelihoods in the Pacific.

▷ OPPORTUNITIES

With an additional 1 million in arrivals to the region within reach by 2040, tourism will provide, for many countries, the main opportunity to accelerate growth and generate employment. Capturing a larger share of the growing Chinese outbound tourism market, increasing the number of luxury resorts, developing long-term stay offers for retirees, and basing cruise ships in the Pacific could increase the number of tourists visiting the Pacific by about 1 million, generate additional spending of more than US\$1.6 billion, and create more than 110,000 additional jobs by 2040. Vanuatu, Samoa, and Palau are well positioned to be the biggest beneficiaries of the projected increase in arrivals to the region. Over the period to 2040, this could yield an additional increase in per capita incomes of 20-30 percent for these countries, relative to the business as usual scenario. Fiji and Tonga could garner an additional increase in per capita incomes of about 10 percent.

Improved Internet access and connectivity could translate into additional income of more than US\$4 billion by 2040. In recent years, the PICs have liberalized their telecommunication markets and invested heavily in fiber optic cable connections. This creates the basis for significant increases in mobile and Internet penetration over the next 25 years. Improved connectivity and ICT penetration will result in a growing contribution of the ICT sector to the economy; enhance productivity and the quality and attractiveness of existing activities; and create new market opportunities (for example, BPO). The larger PICs, especially Fiji and Papua New Guinea are most likely to benefit from ICT-related opportunities, provided they develop an adequately skilled workforce and a conducive business environment. We estimate that expanding connectivity and use of ICT could lead to additional per capita income growth of around 20 percent in PNG, 7-10 percent in Fiji and the Solomon Islands, and around 5 percent in Samoa and Tonga.

Fisheries could generate more than US\$300 million in additional revenue by 2040 and significantly boost incomes in Kiribati, Tuvalu, and the Federated States of Micronesia. Regional processing clusters and vessel support hubs could generate an additional US\$80 million in value added and create between 7,500 and 15,000 new jobs. Over the period to 2040, fisheries opportunities could translate into an additional increase in per capita incomes of between 50 and 60 percent for Kiribati and Tuvalu and 20 percent for the Federated States of Micronesia.

Expanded labor-mobility opportunities will remain central to creating employment and income-earning opportunities and could translate into an additional 40,000 to 80,000 jobs for Pacific workers. Additional labor-mobility opportunities would generate benefits for the labor-receiving and labor-sending

countries as well as for the migrants themselves. *Pacific Possible* estimates that Australia-New Zealand Atoll Access Agreements, a Pacific Access Category visa scheme for Australia, Pacific caregiver programs, and entry into new labor markets such as Canada and Korea could generate an additional net-income of about US\$13 billion for about 240,000 additional permanent migrants by 2040, with workers from Fiji, Papua New Guinea, Samoa, and Tonga likely to capture the lion's share. The impact on the labor-sending countries is a combination of the economic stimulus generated by remittances and the incomes earned by seasonal workers as well as the slower population growth due to migration. We estimate that these measures could support an additional increase in per capita incomes of close to 50 percent for Kiribati, around 20 percent for Tuvalu, Vanuatu, and Tonga, and around 10 percent for Samoa and the Solomon Islands by 2040.

No commercial deep sea mining operation is up and running and there remain significant uncertainties around the resource potential, technology, and environmental and social impacts. *Pacific Possible* undertook a stocktake of current activities and knowledge in this area. Potential significant mineral resources include SMS in the waters of Fiji, Papua New Guinea, the Solomon Islands, Tonga and Vanuatu, PMN in the waters of Kiribati and, to a lesser extent, in Tuvalu, and CFCs in Kiribati, the Marshall Islands, the Federated States of Micronesia, Palau, Samoa and Tuvalu. Several countries have granted deep sea mining exploration permits and Papua New Guinea is the only country to have granted a permit to exploit.

Given the many unknowns and risks of deep sea mining, *Pacific Possible* recommends the application of the Precautionary Approach which requires continuous updating of information, monitoring and stakeholder consultations. The high institutional and technical capacity demands of this process leads *Pacific Possible* to recommend collaboration around a regional technical advisory body. *Pacific Possible* also recommends that investments be made to close knowledge gaps around deep sea mining to allow for greater evidence-based decision making.

▷ OVERALL IMPACT ON ECONOMIC GROWTH, INCOMES, EMPLOYMENT, AND GOVERNMENT REVENUE

We now present estimates of the combined impact of these opportunities on economic growth, incomes, employment, and government revenue in each of the 11 countries. To put the subsequent discussion into perspective, we show how annual growth rates of per capita incomes translate into changes in per capita incomes over the 25-year horizon (Table 12-1). With average annual growth of 1 percent per year, incomes would only increase by 28 percent, however, with a growth rate of 3 percent, incomes would more than double and a growth rate of 5 percent would more than triple incomes.

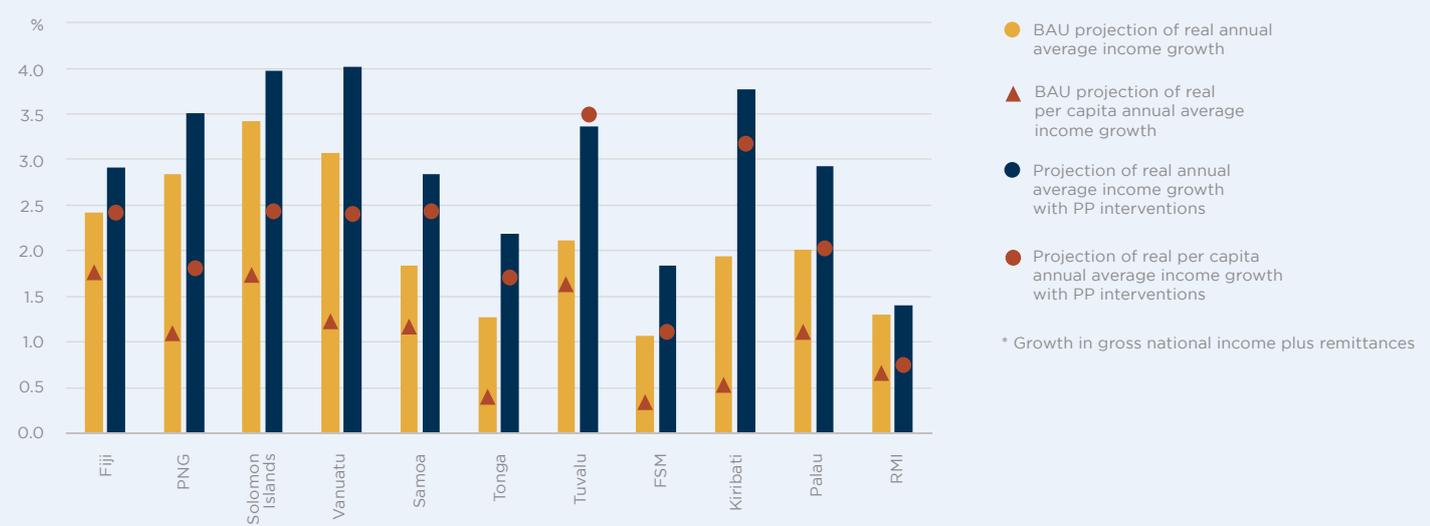
Table 12-1: With Annual Growth of 3 Percent, Per Capita Incomes will Double in 25 Years

Average annual growth of per capita income	1%	2%	3%	4%	5%
Resulting increase in per capita incomes over 25 year period	28%	64%	109%	167%	239%

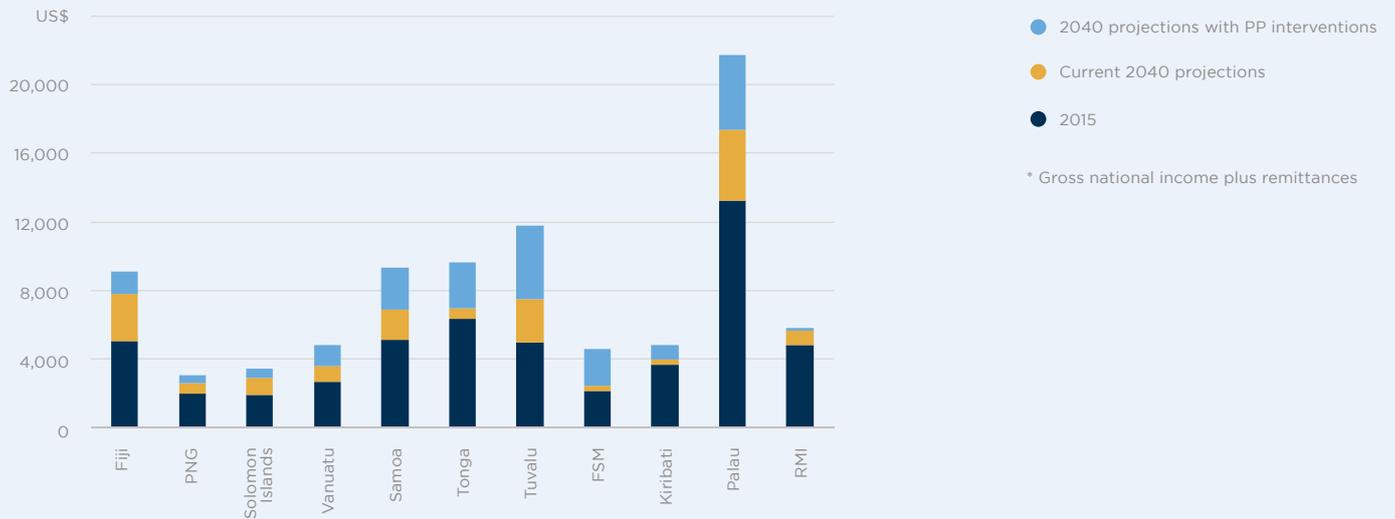


Figure 12-1: Opportunities for Higher Growth and Incomes by 2040

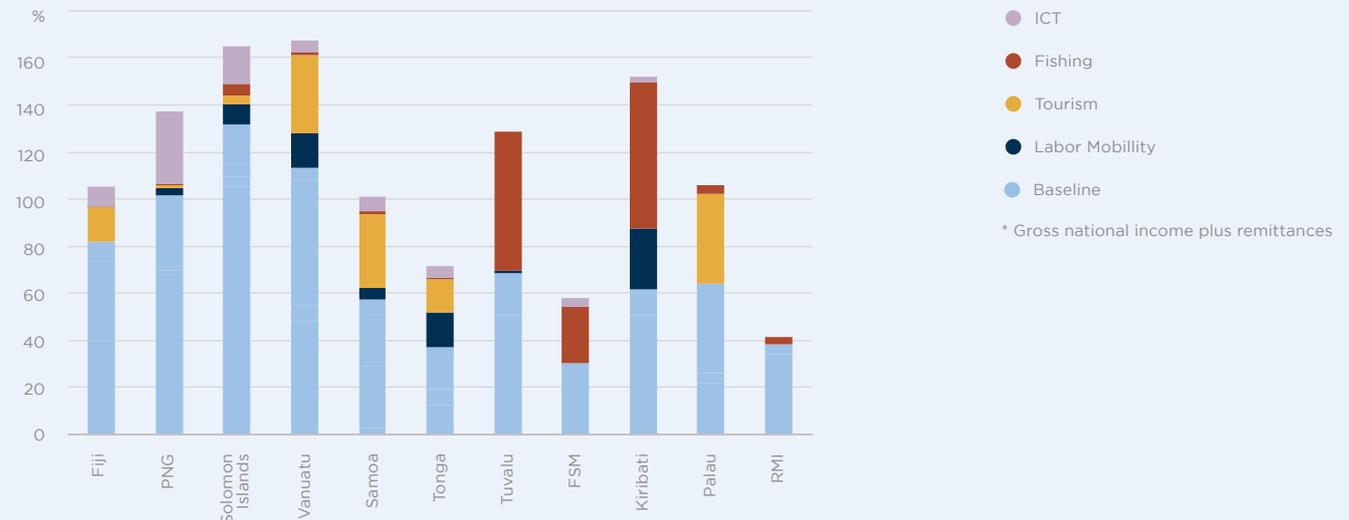
Real Annual Average Income Growth*
2015 to 2040



Income per Capita* - Opportunity Scenarios
2015 to 2040, 2015 US dollars

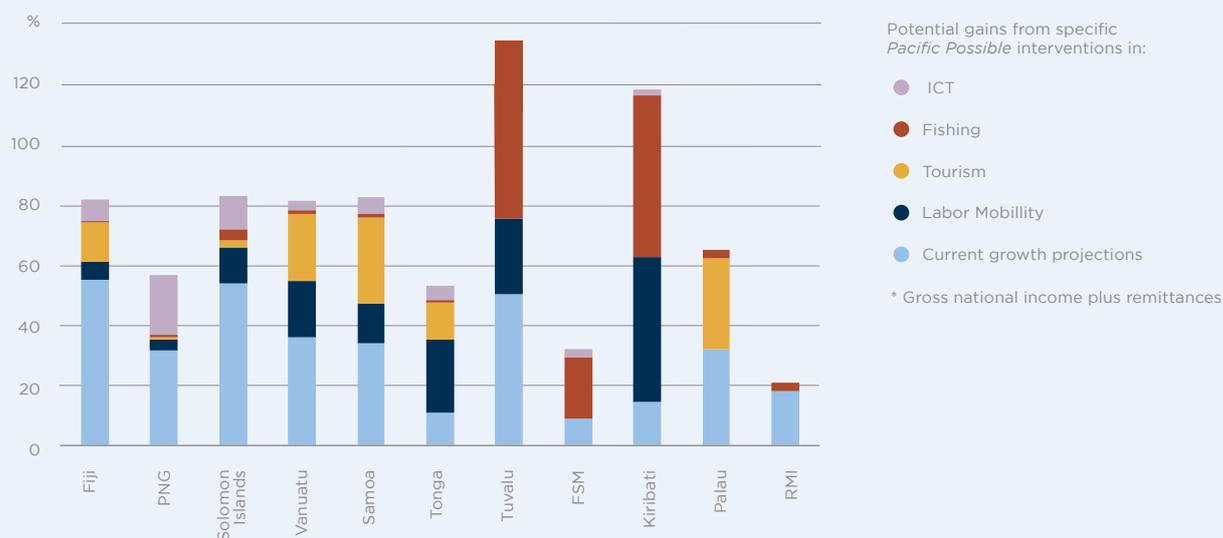


Growth in Real Income* - Opportunity Scenarios
2015 to 2040



Growth in Real Income per Capita* - Opportunity Scenarios

2015 to 2040

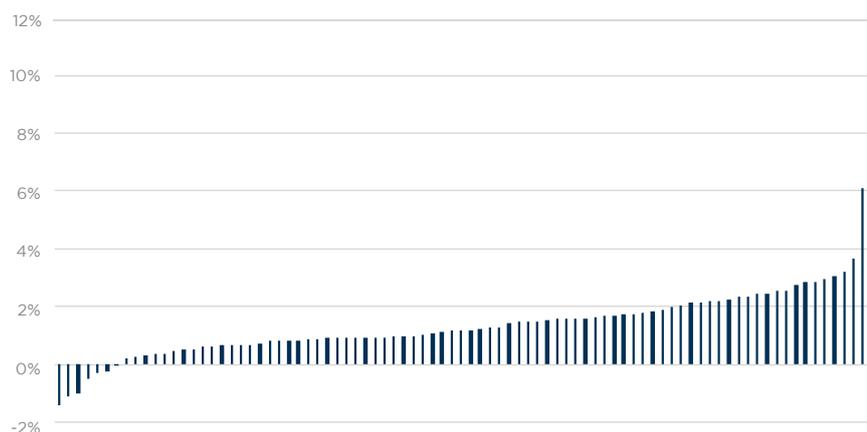


Exploiting the opportunities analyzed in *Pacific Possible* can boost the annual average growth rate of real per capita income for most countries by between 0.6 to 1.3 percentage points. BAU long-term growth projections of per capita incomes for the PICs range from 0.3 percent for the Federated States of Micronesia to 1.8 percent for Fiji. Under the best-case scenario where all opportunities are fully exploited, growth rates could be in the range of 0.8 percent for the Marshall Islands to close to more than 3 percent for Tuvalu and Kiribati.

Such increases in annual growth rates translate over the 25-year period into per capita incomes that by 2040 would be between 15 and 40 percent higher than what current BAU projections suggest. For Vanuatu, Samoa, and Palau, tourism would be the main driver of higher growth. Fisheries could support higher growth for the Federated States of Micronesia, Kiribati, and Tuvalu, with labor mobility potentially also making a significant contribution to economic growth for the latter two countries. Fiji, Samoa and Tonga could use multiple opportunities to achieve higher growth, including tourism, labor mobility, and ICT-related opportunities.

The potential increases in per capita GNI above and beyond the BAU projections are highest for Kiribati and Tuvalu, while for the Marshall Islands we project only modest gains. For Kiribati and Tuvalu, rising revenue from fisheries and income from greater access to labor-mobility opportunities combined with slowed down population growth due to migration could lead to an additional increase in per capita incomes of between 80 and 100 percent over the period to 2040. Papua New Guinea and the Solomon Islands could also harness significant gains from the opportunities discussed in *Pacific Possible*. In comparison to the size of these economies, however, the potential gains from the opportunities discussed in *Pacific Possible* are relatively modest and the potential opportunities and drivers of growth are likely to be wider. The discussion of these wider opportunities is beyond the scope of *Pacific Possible*. The Marshall Islands is the only country examined by *Pacific Possible* where we do not show any significant growth opportunities, even though the set of likely drivers of growth does not extend much beyond those discussed by *Pacific Possible*. One issue not fully explored by *Pacific Possible*, however, are potential gains from making better use of this labor market access through better education and skills development that would allow migrants to access higher-paying jobs.

Figure 12-2: Average Annual Growth Rate of Real per capita GNI for Selected Countries (1990-2014)

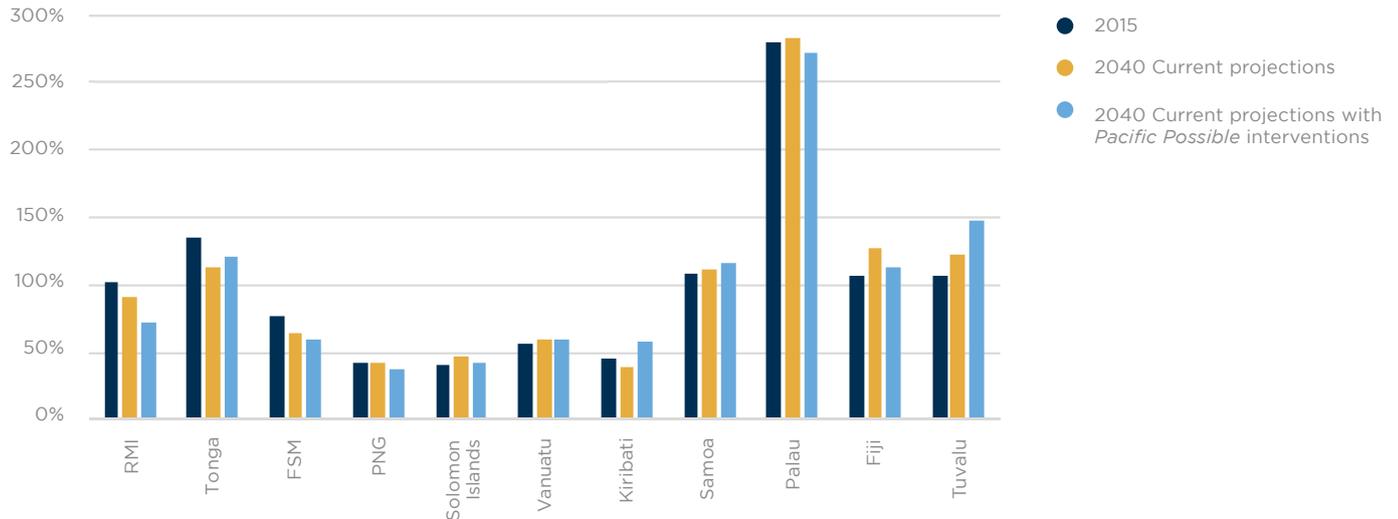


Source World Development Indicators, World Bank.

Such higher growth rates push countries closer to, or above, the median long-term growth rate of 1.8 percent (Australia) for a sample of 83 countries for which data is available (Figure 12-2). Historically, growth of per capita incomes in the PIC11 has been at the lower end of the spectrum of growth rates achieved globally. By taking full advantage of existing opportunities, growth rates of the PIC11 could be more in line with the average growth rates achieved globally. It is, however, important to note that while fully exploiting these opportunities will require tremendous efforts by the PIC11, they still could not expect to achieve sustained high growth rates at levels that were achieved by several East-Asian economies based on a manufacturing-based export strategy. As indicated at the beginning of the report, pursuit of such a strategy is not feasible for small island economies due to economic geography constraints.

Figure 12-3: Differences in per capita Incomes across Countries Remain Significant

GNI (plus remittances) per capita as a percentage of average GNI (plus remittances) per capita for the PIC11



Source World Bank staff estimates.



Pacific Possible opportunities will not lead to a reduction in income differences across countries. The average per capita income across the 11 countries is projected to increase from around US\$4,700 in 2015 to about US\$6,200 in 2040 (based on current projections) and to US\$8,000 under the opportunity scenario. Five countries (Palau, Fiji, Samoa, Tonga, and Tuvalu) could have per capita incomes of more than US\$8,000 in 2040 and another four countries (the Federated States of Micronesia, Vanuatu, Kiribati, and the Marshall Islands) could have incomes of at least US\$4,000. Only Papua New Guinea and the Solomon Islands would still have per capita incomes of less than US\$4,000 in 2040. Figure 12-3 shows per capita incomes for individual countries as a percentage of the average per capita income for all 11 countries. The graph suggests that there is little convergence in incomes over the *Pacific Possible* time horizon. Per capita incomes in the poorest countries in 2015—the Solomon Islands, Papua New Guinea, Kiribati, Vanuatu—continue to be only around 50 percent or less of the average incomes for the group of 11 countries by 2040 under both the BAU and the opportunity scenarios. Below average growth for the Marshall Islands, and the Federated States of Micronesia implies that their per capita incomes drop quite significantly in relation to the average regional per capita income. Tuvalu stands out as the country that could achieve the biggest relative gains in per capita incomes driven by fisheries revenue and labor mobility opportunities.

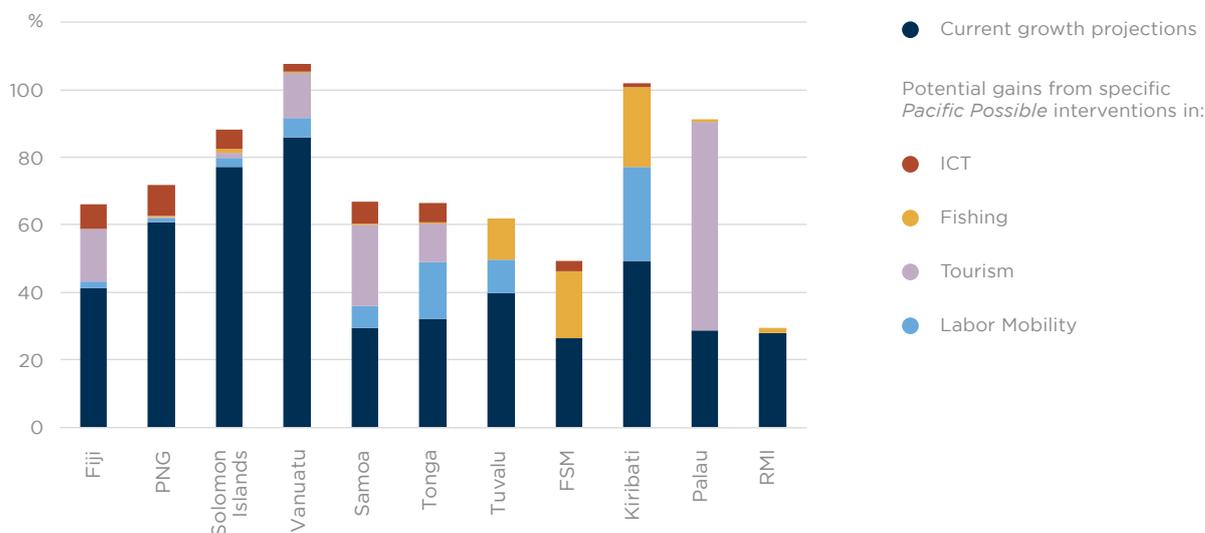
Remaining large inequalities across countries point towards the need for specific measures for the poorest countries that could help to reduce the large disparities. Such measures could range from development assistance that targets the poorer countries in particular, increased efforts to enable these countries to participate in labor-mobility schemes, as well as enhanced opportunities for trade and investment.

Tourism, labor-mobility, and ICT-related opportunities can boost job growth in the Pacific. The opportunities and threats discussed in *Pacific Possible* have direct and indirect impacts on employment in the PICs. Tourism and ICT-related opportunities would create up to 400,000 additional new jobs. The enhancements of labor-mobility schemes discussed in this report could create up to 240,000 opportunities for permanent migration and thus reduce pressures in domestic labor markets. Employment opportunities in fisheries are more limited, with up to 15,000 jobs largely in onshore processing of fish, but also opportunities for employment on ships.

While climate change and natural disasters have a negative impact on the PICs overall, implementation of climate adaptation measures would not only help protect jobs, but also create new jobs primarily in the construction sector. For all the opportunities and threats discussed, there will also be increased demand for highly specialized technical and managerial skills. While, at present, many of these skills are imported, with adequate investments in education and training it will be possible to fill many of these positions locally.

Figure 12-4: Tourism, Labor Mobility and ICT Help Create Jobs by 2040

Employment Growth - Opportunity Scenarios
2015 to 2040



Source World Bank staff estimates.

Inadequate funding of public service delivery is a major challenge for many PICs. Tax revenue mobilization (measured as the ratio of domestic tax revenue to GDP) in the PICs is generally similar to revenue mobilization in countries at similar stages of development. The PICs' geography (remoteness, small size, geographic dispersion, exposure to natural disasters and external economic shocks) implies, however, that the cost of public service delivery and public expenditure is significantly higher than in other countries.

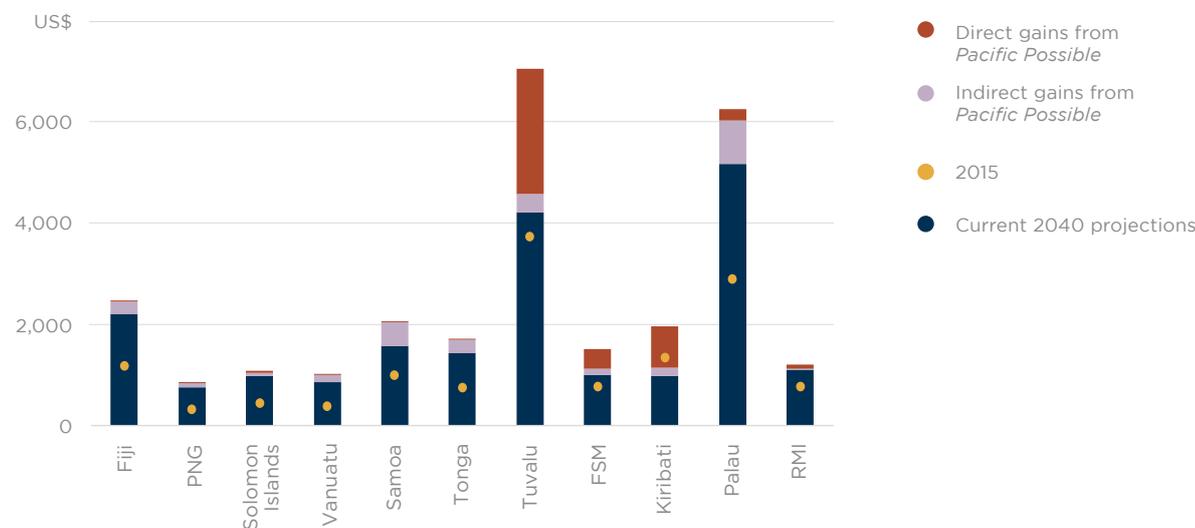
At present, official development assistance as well as various sources of nontax revenue help to augment domestic revenue. These nontax revenue sources range from access fees to their fishing grounds, license fees for use of their Internet domain names (.fm, .tv), and philatelic sales, to income from sovereign wealth and trust funds. Nevertheless, most PICs find it difficult to fully fund an adequate level of service delivery and, over the long term, many PICs aspire to reduce their dependence on aid and volatile nontax revenue sources.

Fisheries, tourism, and ICT-related activities can significantly boost government revenue. Under the PNA, fisheries revenue from access fees has increased over the five years to 2014 to around US\$400 million, generating large fiscal surpluses in Kiribati, Tuvalu and the Federated States of Micronesia. *Pacific Possible* projects that, by 2040, access fees from fisheries could increase by between US\$160 to US\$320 million without an increase in catch levels or threats to the sustainability of the fisheries stock (direct gains). Accelerated growth of the tourism and ICT-based sectors would help to broaden the tax base and thus increase resources available to governments (indirect gains). As a result, for most of the PIC11, per capita revenue is projected to double between 2015 and 2040 (Figure 12-5). Only the Federated States of Micronesia, the Marshall Islands, and Kiribati are likely to see more moderate improvements in per capita revenue. Improvements in tax policy and administration will remain important to ensure efficient and equitable tax systems.

Figure 12-5: Per capita Revenue can Double for Many Countries by 2040

Domestic Revenues per Capita – Opportunity Scenarios

2015 and 2040, 2015 US Dollars



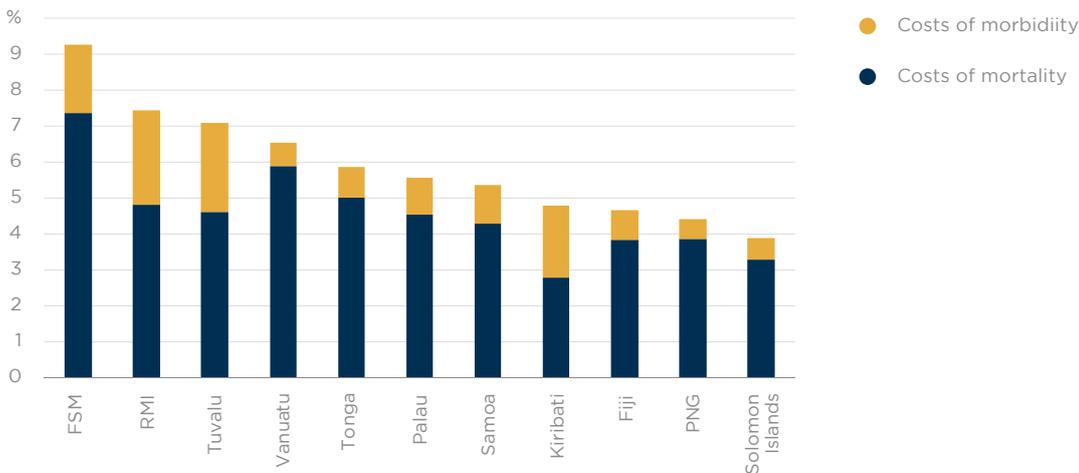
Source World Bank staff estimates.

Development assistance will remain important for PICs to be able to deliver an adequate level of public services. *Pacific Possible* assesses the resource requirements that would enable the PICs to achieve human development outcomes and infrastructure levels comparable to the average for small developing states. Even with increased revenue levels projected under the opportunity scenario, adequate funding of public services will remain difficult in the North Pacific countries, Papua New Guinea, the Solomon Islands, and Vanuatu (Appendix 2). Our projections of the cost of adaptation to climate change are in addition to spending needs required to improve human development and infrastructure. International climate finance is, therefore, critical if climate financing needs are not to crowd out human development and infrastructure funding.

Noncommunicable Diseases

The economic burden of NCDs in the Pacific is already high compared with other middle-income countries, and is increasing over time, especially as incomes rise. Without measures such as strengthening tobacco controls and increasing excise duties; reducing consumption of unhealthy foods through targeted preventive measures, taxes, and better regulation; improving the efficiency and impact of the health budget; and strengthening the evidence base on NCDs, countries could lose between 3 and 10 percent of GDP by 2040. It is particularly concerning that some of the countries with rather modest growth prospects—such as the Federated States of Micronesia, the Marshall Islands, and Tonga—have relatively high projected economic losses from NCDs. Unless strong measures towards the control of the NCD crisis are taken, these countries face a high risk of standards of living being little improved or, even worse, falling.

Figure 12-6: Projected Economic Burden of NCDs as a Proportion of 2040 Baseline GDP



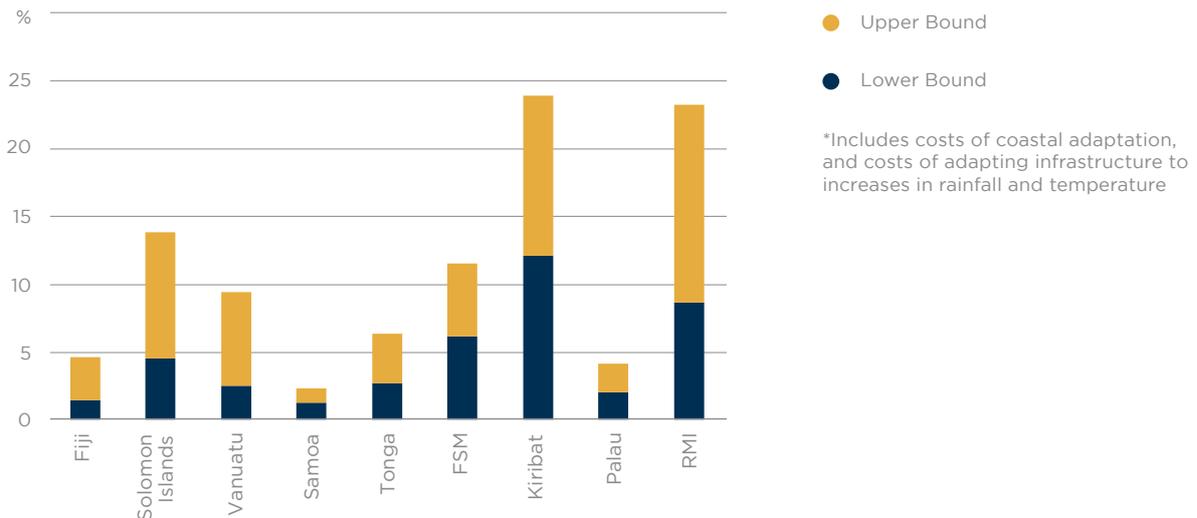
Source Staff calculation.

Climate and Disaster Resilience

Economic costs of natural disasters are already high for most PICs—on average between 0.5 to 6.6 percent of GDP is lost annually—and climate change will increase vulnerabilities. There are, however, deep uncertainties around the speed and intensity of climate change. Annual costs of coastal adaptation and adaptation of infrastructure to changes in rainfall and temperature alone are estimated to range from US\$400 million to US\$1.2 billion by 2040, with the size of the range driven by the variability between climate scenarios used for the analysis, including regarding changes in temperature and rainfall as well as low and high estimates of likely sea-level rise. It is important to note that these costs reflect additional adaptation requirements due to projected climate-change impacts over the next 25 years on top of what is currently required to adapt to current weather conditions.

Although no detailed estimates of current climate-adaptation expenditure exist, it is broadly recognized that there is an adaptation gap—with adaptation spending significantly below requirements. Considering the high uncertainty about the evolution of climate-change impacts for specific PICs and the prospect that available resources are likely to be significantly less than what full adaptation would require, *Pacific Possible* describes a range of strategies for choosing appropriate climate-adaptation approaches. Regarding the economic impact of climate change, it is important to differentiate between the direct economic impact of climate change, which is significantly negative (ADB 2013), and the impact of climate-adaptation measures that, depending on the source of financing, could have a positive impact on incomes and employment. While additional revenue from harnessing the *Pacific Possible* opportunities will allow countries to increase their contribution to climate-adaptation measures, effective international climate finance will remain central to the PICs’ ability to deal with climate change.

Figure 12-7: Annual Cost of Coastal and Infrastructure Adaptation* (% of Currently Projected 2040 GDP)



Source World Bank staff estimates

Note Includes costs of coastal adaptation, and costs of adapting infrastructure to increases in rainfall and temperature. Estimates are not available for Papua New Guinea and Tuvalu.

To deal with the high cost of climate-change adaptation, effective international climate finance will be of critical importance for the PICs. Commitments made by more than 190 countries at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) to keep global warming “well below 2°C” and to fund climate adaptation and mitigation measures are considered to represent significant progress. Oxfam (2016) notes, however, “Pacific Governments understandably remain concerned about the adequacy, predictability, and accessibility of climate finance.”

Capacity-thin PICs are confronted with a variety of funding channels with generally complex procedures and requirements, which makes it difficult to quickly access funding. UNEP (2016) projects a significant gap between climate-adaptation needs and available finance that is likely to increase significantly until 2050. While, at present, global financing needs exceed available finance by an order of two to three, by 2050 the estimated cost of climate adaptation is projected to be six to ten times the amount of available finance. Considering our partial estimates of the cost of climate adaptation by 2040, the adaptation gap for the PICs is likely to be even larger than the global adaptation gap. Urgent measures to enhance climate finance at the regional level and to take measures towards climate-change mitigation is, therefore, critical.

13. How Can It Be Achieved?

In addition to specific recommendations for each of the opportunities discussed, *Pacific Possible* highlights five cross-cutting issues that are central to capturing opportunities and managing threats:

- Focusing policies and investments.
- Investing in people.
- Promoting regional cooperation to unlock economic opportunities.
- Ensuring sustainability and sound environmental management.
- Addressing the special challenges of low-lying atoll nations.



Focusing Policies and Investments

The combination of extremely thin capacity in the public sector, limited financial resources, high cost of production and service delivery, and scarce political capital require that PICs choose very carefully which reforms to pursue and which investments to make. This implies that countries identify very clearly the most promising growth opportunities and what is needed to capture available opportunities. Too often, scarce capacity is drawn in too many different directions. The capacity constraints also often imply that when a new reform is being pursued, reform efforts in another area are being crowded out.

Because of thin capacity, implementation of reforms often requires technical assistance from development partners, who then play an important role in determining which reforms can move forward and which ones are put on hold. Recently proposed approaches for more appropriate public financial management reform processes easily apply more broadly to reform processes in the Pacific (World Bank Group et al. 2016):

- Consolidating progress towards better-prioritized reform plans.
- Strengthening of donor coordination and alignment.
- Ensuring that implementation approaches reflect Pacific realities.
- Deepening country-specific knowledge.
- Adopting coordination mechanisms to support good practice.

Although capturing economic opportunities can result in accelerated economic growth, volatility of growth is likely to remain high or to even increase due to the undiversified nature of sources of growth and exposure to external shocks and will require careful management. Migration patterns of tuna can result in significant year-to-year variation in fisheries revenue for individual countries; tourist arrivals are subject to economic conditions in the source markets and vulnerable to natural disasters in the destination countries; labor-mobility benefits are not only vulnerable to economic conditions, but also to policy changes in labor-receiving countries; and damages and losses due to natural disasters are likely to increase over the *Pacific Possible* horizon.

Managing economic volatility will require measures at the sectoral levels as well as at the macroeconomic level. At the sectoral level, examples of such measures are moving from an annual sale of vessel days to multiyear arrangements or enhancing climate and disaster resilience. At the macroeconomic level, a range of instruments are available (World Bank 2016g). They include strengthening fiscal buffers through appropriate revenue and expenditure management, trust funds and sovereign wealth funds, or insurance mechanisms such as the PCRAFI scheme. The significant increase in fisheries revenue in recent years has given rise to significant budget surpluses in countries such as Kiribati, the Federated States of Micronesia, and Tuvalu. The expanded fiscal headroom provides countries with a new opportunity to reassess priority spending needs and the allocation of resources over time.

Strengthened public expenditure and aid management will be essential to using resources effectively and efficiently, both with respect to public spending necessary to unlock economic opportunities, as well as to ensure that higher revenue is effectively used to increase standards of living. With respect to transformational economic opportunities, tourism development will require, in most cases, well-targeted infrastructure enhancements, be it improved air and sea connectivity, development of new tourism sites, or water and sanitation. Well-sequenced and prioritized tourism sector strategies will need to be linked to medium-term expenditure plans and governments' overall fiscal strategies to be able to make tangible progress. Similarly, NCD and climate-related public expenditures should also be adequately reflected.

Improving standards of living will require, for most countries, increased per-capita expenditure on health, education, and infrastructure. Fully exploiting economic opportunities will result in significant increases in per-capita government revenue (Figure 12-5) which will allow most countries to achieve significant improvements in broader measures of human development such as the human development index. Some countries—especially countries in the North Pacific and the Melanesian countries (except for Fiji) will, however, need to undertake additional measures to reach human development outcomes that are similar to the average for small states. Such measures would include increasing the efficiency of public spending, complemented by efforts to increase domestic revenue (Appendix 2).

Selected financial sector reforms targeting improved access to credit, de-risking, and the cost of sending remittances will be particularly important for growth of the tourism sector and drawing the full benefits from labor mobility. The financial sectors of most of the PICs are small. Weak financial sector regulation and supervision puts them at heightened risk of being cut off from the international financial

system in the context of global de-risking. After “9/11”, there has been a tightening of international anti-money-laundering/counter-terrorism financing (AML/CTF) rules that impose significantly heightened compliance requirements on the PICs. This affects incoming remittances, donor funding, imports and outgoing transactions as well as some niche activities that are important for some of the PICs such as offshore financial centers (Nauru, Palau, Samoa, Vanuatu) and registration of ships (the Marshall Islands).

While all of the PICs are affected by global de-risking, Vanuatu, the Marshall Islands, Nauru and Tuvalu already have lost correspondent bank relationships or are under threat of losing access. The increase in the cost of sending remittances—combined with closures of Money or Value Transfer Services’ bank accounts including in Samoa, the Solomon Islands, and Tonga—reduces the benefits from expanded labor mobility. Strengthening financial sector regulation to be able to meet AML/CTF requirements is, therefore, critical for the PICs.

Improvements in the business environment should have a priority focus on facilitating activities in the tourism sector. Considering the thin capacity in most PICs, it is important that reform efforts are clearly prioritized through a dialogue between governments, tourism sector stakeholders, and potential investors. Given the small size of the tourism sector in most PICs (in absolute terms, even though in relation to the size of their economy they may be large), harmonized business regulations that make it easier for tourism operators to operate in multiple countries may increase the attractiveness of the region for international investors. Such international investors would not only bring resources and know-how to the region, but could also play an important role in market development, knowledge transfer, and capacity building.

Investment incentives can be costly and their effectiveness in attracting investment may be limited. As in many other regions, fiscal and financial incentives seem to be an important tool for PICs that seek to attract investment. PT&I, the region’s largest trade-promotion organization, notes on its website (2017) that “Great tax incentives and hardworking people make the Pacific Islands perfect for investment.” Discounts under the VDS are a particular incentive found in some of the PICs, and are used to incentivize onshore activities.

Global evidence suggests, however, that the effectiveness of incentives in attracting investments may be limited and, at best, only influence investment decisions at the margins (Echandi 2015). Other factors such as political and macroeconomic stability or quality of infrastructure seem to be the primary drivers of investment decisions. As the geography of the PICs raises cost of production and limits their international competitiveness for many activities, there is also the risk that investment incentives provided for a limited time to attract new investment may turn into permanent subsidies to retain activities that would not be competitive without such subsidies. In addition, there is also a risk that if PICs compete against each other using tax incentives, this may lead to a suboptimal situation for the entire region. Because of these issues, the case for investment incentives should be very carefully studied whenever they are considered. In addition, it is also of critical importance to assess the lifetime cost of any incentives considered.

Investing in People

Realizing the opportunities will rely critically on the availability of adequate skills and education at all levels. Broad-based job opportunities through labor mobility, tourism, and the knowledge economy will require improved basic education and market-responsive skills development. In addition to a broad-based strengthening of the skills base, there is the potential to further develop world-class, high-end managerial and technical skills in areas such as deep sea mining, fisheries, and tourism management. With respect to labor mobility, appropriate policies in labor-sending countries can help ensure positive impacts on the domestic skill base by broadening opportunities for education and skills development, but also by putting in place measures that would make it easier to draw on the diaspora and harness its skills and experience for the benefit of the domestic economy.

Promoting Regional Cooperation to Unlock Economic Opportunities

Pacific Possible highlights the importance of regional cooperation to unlock economic opportunities. The dramatic increase in revenue from fisheries under the PNA is a clear example of how cooperation among PICs can help unlock economic opportunities. Collaboration between labor-sending and labor-receiving countries is another example of a collaborative arrangement that brings significant benefits to all parties involved. Further strengthening collaboration in these two areas holds significant potential for further enhancing these benefits. Regional cooperation will also be essential, however, to support the growth of the Pacific tourism industry and for deep sea mining.

For tuna fisheries, additional benefits could be generated by improvements to the VDS and by broadening membership, in particular to other major resource owners in the Western Pacific, namely the Philippines and Indonesia. A particular challenge is to develop a joint approach to avoid a disproportionate increase in fishing in the high seas to avoid the VDS cost for fishing in countries' EEZ. This will require common advocacy for adequate governance of fishing in the high seas that would prevent unsustainable exploitation of fish stocks. In addition, agreements where the sale of vessel days is contingent on the purchaser agreeing to limit fishing effort in the adjacent high seas also require a common approach to be effective.

In the area of labor mobility, *Pacific Possible* argues for expanding existing and developing new programs for seasonal employment schemes and permanent migration between the PICs and Australia and New Zealand. In addition, intensifying and developing programs between the PICs and other partners, including Korea, and the United States could further help expand opportunities for the PICs.

With regard to deep sea mining, collaboration on establishing minimum terms and conditions for operators will be important to avoid a lowering or deterioration of regulatory standards. This would involve many aspects of regulation of deep sea mining operations, notably including environmental standards, the licensing regime, and taxation of operations. Given that regulating DSM operations requires very specialized and expensive expertise, there is also a strong case for pooling these functions. Short of a pooling arrangement, a strengthening of regional technical assistance platforms such as SPC and the Pacific Financial Technical Assistance Center would be desirable.

Effective collaboration in the tourism sector is essential, but also very challenging as, at present, the tourism offerings across the PICs are fairly undifferentiated and countries compete for the same tourists. Without effective collaboration and coordination, there is the risk of public overinvestment: if countries seek to gain competitive advantages from heavy investment (including tax concessions) in the tourism sector, the aggregate investment could significantly exceed what is economically justified based on the total projected arrivals to the region. Joint marketing of the region through the SPTO is clearly also an important area of collaboration as are multicountry visas that would allow tourists to visit several PICs without the hassle or expense of acquiring separate visas.

Much of the previous focus on the economic benefits of regionalism was to overcome the challenges for effective and efficient public service delivery in small and remote island states by sharing fixed costs amongst multiple countries. PICs face tough constraints in maintaining the full complement of government services and services needed to support development, both in terms of shortages of fiscal resources and of skilled and specialized labor required in each country. Integration is key to mitigating these problems.

Pooling the provision of services across small PICs addresses problems of cost and capacity simultaneously. It allows various institutions or facilities to service a larger number of people, thereby reducing the fixed cost per person served. It also creates opportunities for the pooling and concentration of regional capacity, with specialists from various fields able to come together to achieve a critical mass in the delivery of certain functions and create greater opportunities for PICs to make the best use of locally available skills or technical assistance provided by donors. A specialist regulatory authority that serves only a single country is likely to impose higher costs and have more limited access to necessary skills than a regulatory authority that serves multiple jurisdictions. If that regulatory function is shared, or provided, with ongoing technical assistance from a nearby large country, capacity constraints can be avoided altogether.

To date, however, high hopes for regional solutions have translated into only very limited success. A review of the experiences of regional pooling initiatives (Dornan and Newton Cain 2014) showed that few of these initiatives succeeding in delivering against their original objectives. Although there are gains in principle from sharing services, well-known problems with voluntary coordination mean that many ideas have made limited inroads because of an inability to agree on the parameters and resolve differences between members. Hezel (2014) very graphically depicts the situation of the PICs as “Pacific Island nations are lined up in a circle facing outwards, their backs to one another.” This describes a situation where trade and investment among PICs is very small and they all face the same constraints in addressing their development challenges.

PICs are competing for resources from the outside, be it aid, access to labor-mobility opportunities, or tourists. The PNA on regional fisheries is one of the few successful regional collaboration efforts that does not rely on outside assistance. Other regional coordination successes in the Pacific, such as the University of the South Pacific, the Pacific Regional Audit Initiative, and PT&I rely to a significant extent

on outside support. Close examination of proposals for regional arrangements for public service delivery may also reveal that the potential benefits are more limited than often assumed and that there may still be significant scope for efficiency gains through national level reforms (Box 13-1).

BOX 13-1

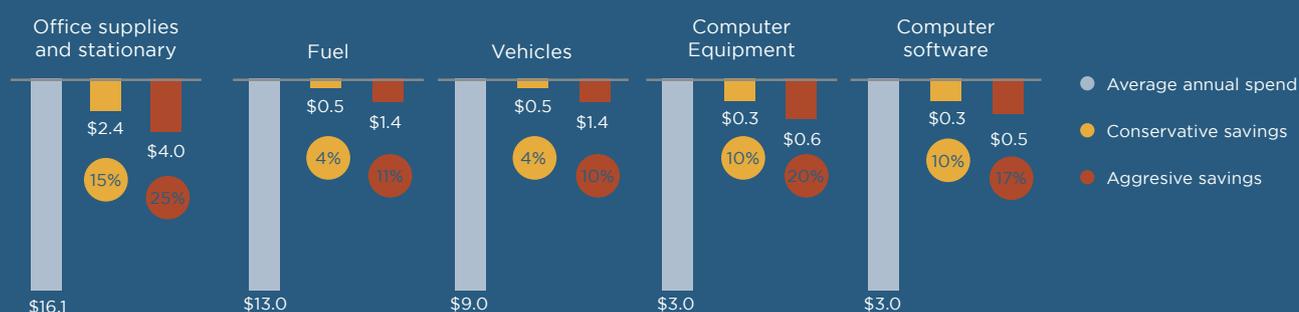
Pooled Procurement: Potential Savings From Pooled Arrangements May Be Limited

Pooling public sector procurement among the PICs promises to generate greater efficiency and cost savings through better use of scarce human resources and increased market power. Initiatives include the UNICEF Vaccines Initiatives, bulk procurement of essential medicines, the Fiji bulk procurement of pharmaceuticals for Kiribati and Tuvalu, and the Pacific Petroleum Project. According to Dornan and Newton Cain (2014) the success of these initiatives is at best mixed, with the bulk procurement of essential medicines and the Pacific Petroleum Project never being implemented.

Pacific Possible estimated the potential savings PICs could achieve by pooling public procurement. Using public expenditure, customs, and procurement data for Fiji, the Solomon Islands, Samoa, and Tonga, we estimate the potential savings from regional strategic procurement. The combined public expenditures on procurable items for the four countries over the period 2010-14 amounted to about US\$2.3 billion per year out of a total combined public expenditure of about US\$7.2 billion. Detailed analysis of spending data suggests five expenditure categories that may be suitable for pooled procurement, namely office supplies and stationery, fuel, vehicles, computer hardware, and computer software. Some frequently considered categories such as pharmaceuticals and construction supplies are deemed to be less suitable for pooled procurement. With regard to pharmaceuticals, the large number of individual items makes it difficult to devise an efficient strategy in a multicountry context. Construction materials are typically procured by private sector contractors with little participation by government.

Pacific Possible estimates savings for key procurable items under two scenarios: (a) a moderate scenario of change, where specifications and requirements are standardized and demand is consolidated at the national level; and (b) a more ambitious scenario that would also tackle waste, reduce volume, and set forth policies and strategies for purchase and use of items.

Potential savings from regional procurement All in USD million, avg annual spend 2010-2014



Improved procurement of fuel and vehicles could yield savings in the range of 4 to 11 percent, while office supplies and stationery, computer equipment, and computer software could yield a higher potential of savings, ranging from 10 to 25 percent. In absolute terms, total potential savings would be between US\$3.9 million and US\$7.4 million per year.

Pacific Possible thus concludes that there is still significant scope to enhance national procurement outcomes through the application of strategic procurement. Only once the application of this approach is ingrained in a number of countries may it be beneficial to launch a consolidation of efficient national procurement systems and joint procurement. Given the significant transaction cost involved in formal pooling arrangements, however, the potential net savings could be quite small and may not justify such a move.

Source World Bank 2016f.

Regional successes in the Pacific show that the model can work, and provide lessons about where a regional approach can work in other areas. The regional solutions that have worked best have supported a very clear need that is recognized by all members, and point toward the importance of a clear, problem-based approach to developing potential new mechanisms. Secondly, clear and impartial leadership is important in making new mechanisms succeed. In this respect, the Pacific has the advantage of having the Pacific Island Forum Secretariat (PIFS) to draw on. PIFS represents all Pacific nations and is tasked with supporting greater regionalism in many areas. Finally, an incremental approach is likely, over time, to be more effective than transformational reforms that may never get off the ground. This is consistent with the idea that regional approaches may be designed to address commonly recognized problems at the service-delivery level, achieving common-sense efficiency savings and improvements in service that provide a springboard for further reform.

Ensuring Sustainability and Sound Environmental Management

Three of the opportunities discussed in *Pacific Possible* are based on the PICs' natural resources—fisheries, deep sea mining, and tourism. Each of these areas faces its specific environmental and sustainability challenges. There are, however, also important interactions among these three areas where environmental damage in one area could severely affect performance in the other two areas. For example, deep sea mining could adversely affect tuna fisheries, especially if spawning grounds are disturbed. In addition, climate change and natural disasters also have significant environmental impacts that directly affect performance in the other three areas.

Environmental management challenges in fisheries include the maintenance of healthy fish stocks that requires limits on the overall catch. The VDS under the PNA seeks to impose such limits and is underpinned by a sophisticated mechanism to determine the maximum allowable catch. This can be undermined, however, by fishing effort shifting to areas outside the areas controlled by PNA member countries, be it fishing in the high seas or in the waters of countries that are not members of the PNA.

The environmental impacts of deep sea mining—consisting of the impact of regular operations, but also the impact of catastrophic events and leakages and spills—are currently not fully understood. This is partly a reflection of limited understanding of oceanic and sea-floor ecosystems.

Environmental consideration need also be at the center of the development of the tourism industry. The PICs face the particular challenge of a fragile natural environment that is the source of the PICs' attractiveness to tourists, but which could easily be destroyed if the number of tourists is too high and environmental impacts are not properly managed. The PICs' fragile environment may limit the number of tourists that can be received without an overly adverse impact. Most PICs have limited land and freshwater resources and limited capacity to absorb waste water and solid waste. In addition to environmental impacts, social and cultural impacts of growing tourism sectors also require close attention.

Addressing the Special Challenges of Low-lying Atoll Nations

Because of their extreme remoteness and small size, economic opportunities in the atoll nations are even more limited than those in other PICs, including in the areas of the knowledge economy and tourism. At the same time, these countries are most exposed to the negative effects of climate change. Sea-level rise will increase the likelihood of king tides and worsen the salinization of land and water resources, which further reduces already very low agricultural productivity. Although some of the atoll nations are projected to be able to benefit from increased fisheries revenues, they will incur particularly high costs to protect against climate and disaster risks. Targeted measures such as special labor-mobility schemes and climate-change funding are, therefore, of particular importance for the atoll nations.

Appendix 1: Pacific Possible Methodology

Pacific Possible (PP) not only identifies transformational economic opportunities for Pacific Island Countries (PICs), but also quantifies the potential economic gains that could be achieved if these opportunities were fully exploited. This appendix explains the methodological approach to the quantification of economic benefits. It outlines the specific quantification objectives of PP, sets out the general methodology underlying the projections, and notes the key assumptions and limitations.

OBJECTIVES

PP answers the following question: How could transformative interventions in each of the identified areas affect levels of income, employment, and government revenue/spending in 2040, relative to a BAU baseline projection? Framing the quantitative question in this manner draws attention to three important points:

- PP is focused on interventions that could have a transformational impact on PIC economies in the longer-term—that is, over a 25-year horizon (2015-2040).
- To gauge the size of these benefits, *Pacific Possible* focuses on levels of income, employment, and government spending in 2040. In doing so, it accounts for interventions that would prompt a one-time level shift in incomes, as well as interventions that would help to boost the rate of growth over this time horizon.
- The benefits are evaluated relative to a ‘current projections’ baseline, under which PICs develop according to current trends but without pursuing transformational opportunities.

GENERAL METHODOLOGY

The general approach was flexible enough to allow background report authors substantial discretion as to the identification of interventions and the estimation of their economic impact. This flexibility was preferred to a more structured top-down methodology, given that each of the proposed interventions has quite different characteristics which, in turn, influences the most appropriate choice of modelling strategy. For instance, the most appropriate approach to estimate benefits from oceanic fishing opportunities, where both the interventions and potential effects are quite well defined in the PICs, is likely to differ from the most appropriate approach for estimating the benefits from building a knowledge economy in the PICs, where the interventions are less clear, data are more scarce, and the benefits are likely to be much more diffuse.

At the same time, some standardization was required: in particular, to enable summation, comparison and prioritization, the economic benefits from each proposed intervention need to be conveyed in the same terms. To achieve this, each of these benefits are translated into an induced change in the level of national income, employment, and government revenues in 2040, relative to a baseline projection. The methodological approach adopted has been designed to facilitate this translation and provide some consistency across the various approaches to quantification. It ensures the production of a standardized set of bottom line economic impacts, while at the same time allowing the specific estimation methodologies to vary by sector and by intervention.

The sequence of steps taken to produce the economic impacts is as follows:

1. Establish baseline projections of income, employment, and government revenues for each country.

i) Income

Baseline income estimates for each country through to 2040 are based on projected medium- and long-term GDP growth rates in the most recent IMF-WB Debt Sustainability Analyses. These are assumed to represent central ‘status quo’ projections, that is, projections of economic activity absent the new and transformative interventions proposed in *Pacific Possible*. Separate baseline projections are produced for Gross Domestic Product (GDP), Gross National Income (GNI), and Gross National Disposable Income (GNDI). All projections are in constant 2015 US dollars.

GDP is the monetary value of the finished goods and services produced within a country's borders in a specific time period. GDP is the sum of household consumption, private fixed capital investment, government expenditure, and the external balance (exports minus imports). Equivalently, it is the sum of the gross value added of each industry (adjusted for taxes less subsidies). Projections of GDP are drawn from the IMF-WB Debt Sustainability Analyses (DSA) for each country. GDP does not, however, directly incorporate factor income earned overseas (including rents from fishing license fees) or remittance flows. GDP is only influenced indirectly by remittances and foreign income to the extent that these are spent in the domestic economy and generate economic activity.

GNI projections address some of the limitations of GDP as a measure of national income by also incorporating factor income flows (wages, profits, and rents) to and from overseas. As such, GNI is a measure of the total domestic and foreign output claimed by residents of a country, consisting of GDP less primary incomes payable to nonresident units plus primary incomes receivable from nonresident units. This difference is particularly important when analyzing the impacts of labor mobility, as GNI incorporates the incomes of seasonal or other workers from the Pacific working overseas for less than 12 months, whereas GDP does not. GNI does not, however, incorporate remittance flows, meaning that the remittances of migrants that live overseas for longer than one year are not reflected in GNI. In the baseline, GNI is assumed to grow at the same rate as GDP for each country.

GNDI differs from GNI in that it also accounts for net current transfers, including remittance flows from migrants living overseas (as well as other current transfers such as aid). It therefore measures the total income available to a country for final consumption and gross saving. As the most inclusive of the three income measures, the analysis focuses on GNDI as the main measure of 'income' in the baseline and in the opportunity scenarios.¹⁷ In the baseline, GNDI in some cases grows at a different rate to GNI, depending on specific assumptions made about base case remittance flows for each country.

ii) Employment

Employment is forecast in the baseline to grow at the rate of GDP, after netting out assumed growth in labor productivity. For most countries, assumed labor productivity growth from 2015 to 2040 is the rate of labor productivity growth required to keep the estimated unemployment rate constant at current levels, given baseline projections of GDP growth and labor force growth. Baseline projections of labor force growth are calculated using UN projections of the 15+ population and ILO estimates of the participation rate for Fiji, the Solomon Islands, Papua New Guinea, Samoa, Tonga, and Vanuatu (for the other countries the participation rate is estimated using census data as a guide).

iii) Government revenues

Government revenue-to-GDP ratios for each of the PICs are based on projections in the latest DSA.

2. Identify the key sectoral indicators to be affected by proposed opportunities.

Sectoral indicators are those that are directly affected by the proposed intervention(s) and that directly affect macroeconomic aggregates such as income and employment. For the four growth-enhancing areas considered by *Pacific Possible*, the key sectoral indicators are as follows:

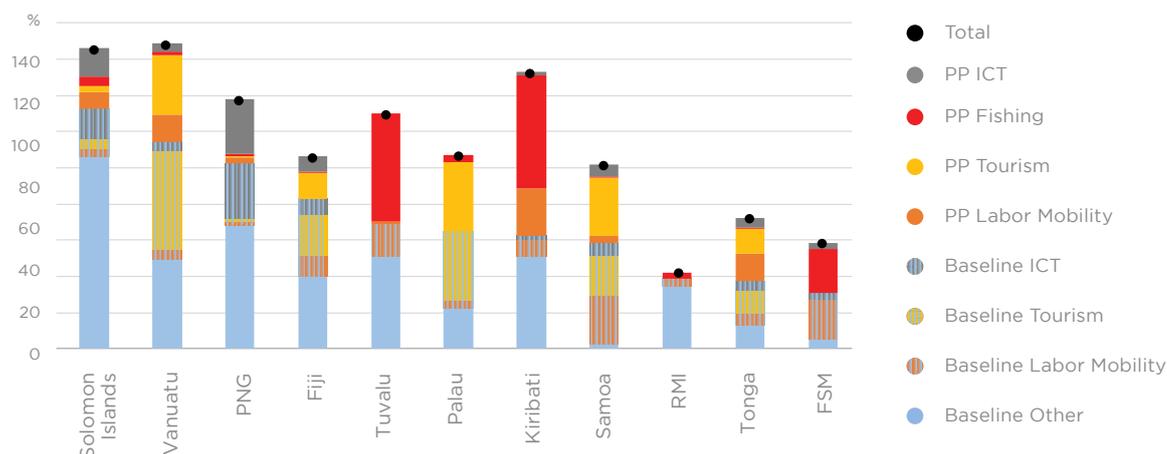
- Fishing: fishing license fee revenues.
- Tourism: tourist arrivals and expenditures.
- Labor mobility: number of seasonal workers, number of migrants, and remittances.
- ICT: unique mobile penetration rates, growth of the global outsourcing sector, and productivity impacts of greater use of ICT and knowledge.

3. Establish BAU baseline projections for each sectoral indicator through 2040.

The baseline projections for each sector indicator generally extrapolate from historical trends, in some cases augmented by judgment based on more current information. The BAU projections of sectoral indicators are assumed to be consistent with the baseline projections of macroeconomic aggregates produced in Step 1. To provide a 'sense check' of this assumption, it is possible to back out the implied contribution of fishing, tourism, labor mobility, and ICT to baseline growth projections for each country (Figure 1A-1). For most countries, the baseline sectoral projections do not appear to be inconsistent with priors or the overall macroeconomic projections.

¹⁷ Note that GNDI does not capture the incomes of longer-term migrants (i.e. those living overseas for more than 12 months). The *Labor Mobility background report* proposes a further income measure (GNI+) which also captures the income boost associated with long-term overseas migration for Pacific Islanders.

Figure 1A-1: Growth in Gross National Income plus Remittances 2015–2040



Source World Bank staff estimates.

4. Propose interventions which have the potential to positively impact the sectoral indicators.'

These interventions are detailed in the background reports. They include measures to (inter alia): boost the attractiveness of Pacific destinations to Chinese tourists; strengthen the current purse-seine VDS; and scale up existing seasonal migration schemes, expand quotas for permanent migration, and obtain access to new labor markets in the region.

5. Produce projections of the sectoral indicators assuming that the proposed interventions take place, and calculate the difference from the 2040 BAU projections.

This is the main quantification task of the background reports. In most cases, it is a heavily assumption-driven exercise, and the approach varies depending on the sector and the specific intervention proposed. The estimation of potential economic benefits associated with particular interventions may be based on cross-country experience, or on what has been achieved in other countries with similar characteristics. These projections and the underlying assumptions can be found in each of the *Pacific Possible* background reports.

6. Estimate the effect of the increases in these sectoral indicators on the baseline projections of 2040 income, government revenues, and employment (Step 1). The 'opportunity' projections of income, revenues, and employment in 2040 can then be derived.

In the final step, the estimated gains in the sectoral indicators are translated into effects on the macroeconomic aggregates. The conceptual framework is that of a highly streamlined and aggregated input-output analysis, recognizing that disaggregated supply and use tables are not available for the majority of the PICs. For example, to derive the impact on national income of any projected increase in national expenditure estimated in Step 5 (for example, additional tourist spending), adjustments are made to account for leakages from spending on imported inputs. The effects on national income of an increase in remittances depend on the marginal propensity to consume from remittance flows and the import intensity of that consumption. In each of these cases there are also indirect 'multiplier' effects as the spending recirculates through the economy. Similarly, the income effects of increased government revenues (as in the case of increased fishing license fees) depend on the proportion of revenue that is spent in the domestic economy (rather than saved), as well as the multipliers associated with government spending.

Given the small and undiversified domestic production bases of most PICs, leakages to imports have a particularly marked effect on the estimated multipliers. Assumptions on the proportion of income leaking to imports are based on estimates of the average propensity to import in each economy, based on national accounts data. Similarly, assumptions on savings rates (which determine the marginal propensity to consume) are based on estimates of national saving (gross national income less total consumption) in those countries where the necessary national accounts data exist.¹⁸

¹⁸ Separate assumptions are made for savings rates from remittance income, based on estimates from the empirical literature.

Impacts on employment depend on the employment intensities of economic activity in the affected sectors.¹⁹ Where sectoral employment intensities are not specifically set out in the relevant background report, the growth in GDP attributable to the intervention is used to estimate the associated growth in domestic employment, after making an adjustment for growth in labor productivity. This adjustment is generally based on economy-wide projections of labor productivity growth rather than sector-specific projections.

For most interventions, the impact on government revenues is the product of the GDP impact and the baseline tax revenue-to-GDP ratio in 2040, the latter of which is drawn from the country DSAs. The exception is fishing, for which the background report provides estimates of additional fishing license fees associated with the proposed interventions for each country. The fishing interventions therefore have a direct impact on government revenues, in contrast to the interventions in other sectors where the effect on revenues is only indirect. A proportion of the additional fishing license fees (for most countries, 100 percent) is assumed to be spent, generating a multiplier impact on GDP, which in turn generates an additional indirect effect on government revenues.

Table 1A-1 summarizes the direct and indirect macroeconomic impacts associated with proposed interventions in each of the four growth-enhancing areas of *Pacific Possible*.

Table 1A-1: Direct and Indirect Macroeconomic Impacts of *Pacific Possible* Interventions

Intervention	Direct Impact	Indirect Impacts
Tourism	<p>GDP (additional tourist spending adjusted for leakages to imports and allowing for multiplier effects).</p> <p>Employment (assuming 0.7 additional jobs generated for every additional US\$10,000/year in tourist spending).</p>	<p>Revenues (assuming baseline revenue-to-GDP ratios as per DSAs).</p>
Fishing	<p>Revenues (additional fishing license fees as per the background report).</p> <p>GNI (additional fishing license fees directly translate to increases in GNI).</p>	<p>GDP (as additional government revenues are spent in the domestic economy, adjusting for leakages and multiplier effects).</p> <p>Employment (resulting from the additional growth in GDP).</p> <p>Revenues (additional indirect impact on revenues resulting from the additional growth in GDP).</p>
Labor mobility	<p>GNDI (incomes of additional PIC nationals working overseas for less than one year and remittances from additional PIC nationals working overseas for more than one year.)</p> <p>Employment (number of additional migrants and seasonal workers, adjusted for employment rates in sending and receiving countries).</p>	<p>GDP (as additional migrant remittances and seasonal worker income are spent in the domestic economy, adjusting for leakages and multiplier effects).</p> <p>Employment (resulting from the additional growth in GDP).</p> <p>Revenues (resulting from the additional growth in GDP).</p>
Knowledge economy	<p>GDP (as modelled in background report).</p>	<p>Employment (resulting from the direct impact on GDP).</p> <p>Revenues (resulting from the direct impact on GDP).</p>

¹⁹ For instance, the tourism background report uses an assumed elasticity of 0.7 additional employees for every additional US\$10,000 / year in tourist expenditure.

In summary, to derive the opportunity scenarios for incomes, employment, and revenues, the difference between BAU and intervention scenarios for each proposed intervention (in terms of the associated sectoral indicator) is estimated, the implied effect on 2040 incomes, employment and revenues is modelled, and that effect is added to the corresponding baseline projection. This allows an assessment of the effect of the proposed interventions on these macroeconomic indicators in 2040, which can then be compared with the BAU baseline projections.

▶ LIMITATIONS

For each of the opportunities outlined in *Pacific Possible*, the economic benefits of the associated interventions are estimated according to the methodology outlined above. Given the long time horizon of the projection exercise, the heavy dependence on assumptions, and the paucity of data available for many PICs, precision in these estimated effects should not be expected. Rather, the quantitative analysis should be viewed simply as providing a sense of the possible scale of the economic opportunities available to each of the PICs over the next 25 years.

One key limitation of this overall methodological approach is that it assumes no supply-side constraints. Rather, a simple Keynesian spending-multiplier is used to model the overall economic impact of an initial stimulus to domestic spending or national income. As such, it is implicitly assumed that any resulting increase in national production is not restricted by domestic capacity constraints, and (equivalently) that there are no responses in prices or interest rates. Similarly, in modelling the effects on employment, it is assumed there is sufficient slack in the labor markets in each of the PICs to provide the required workers for each estimated increase in domestic production.

The simplicity of the adopted quantification approach also means that there may be interdependencies between interventions or effects on other economic sectors that are not captured by these estimates.

This means that any proposed intervention or combination of interventions could give rise to overall economic benefits that are greater (for example, because of positive externalities, feedback loops, and so forth) or lesser (for example, due to negative externalities or economy-wide constraints) than those estimated here.

***Pacific Possible* estimates the economic burden of increased morbidity and mortality due to NCDs as well as the potential cost of selected measures to enhance climate and disaster resilience.** Ideally, we would have liked to present: (a) estimates of how full accounting for the evolution of the NCD crisis and climate and disaster risks would affect projected incomes by 2040 in a BAU scenario; and (b) estimates of the quantitative impact of “optimal” measures to reduce these risks.

Such estimates would have allowed us to develop *Pacific Possible* projections that add up opportunities and risks when optimal measures are taken to fully exploit opportunities and to minimize the losses due to risks. With respect to climate and disaster resilience, estimating the economic impacts of climate change is challenging because of the deep uncertainties on the speed and intensity of climate change. It has already been undertaken within the ADB study (2013). Under *Pacific Possible*, the assumption and methods that were used focused on the cost of adaptation to the challenges posed by climate change, and strategies for choosing the appropriate level of investments in climate and disaster resilience. With regard to NCDs, *Pacific Possible* projects the likely negative impact on the workforce and economic activity. However, while interventions to curb NCDs are known, there is currently not sufficient knowledge that would allow this report to quantify the link between interventions and the incidence of NCDs.

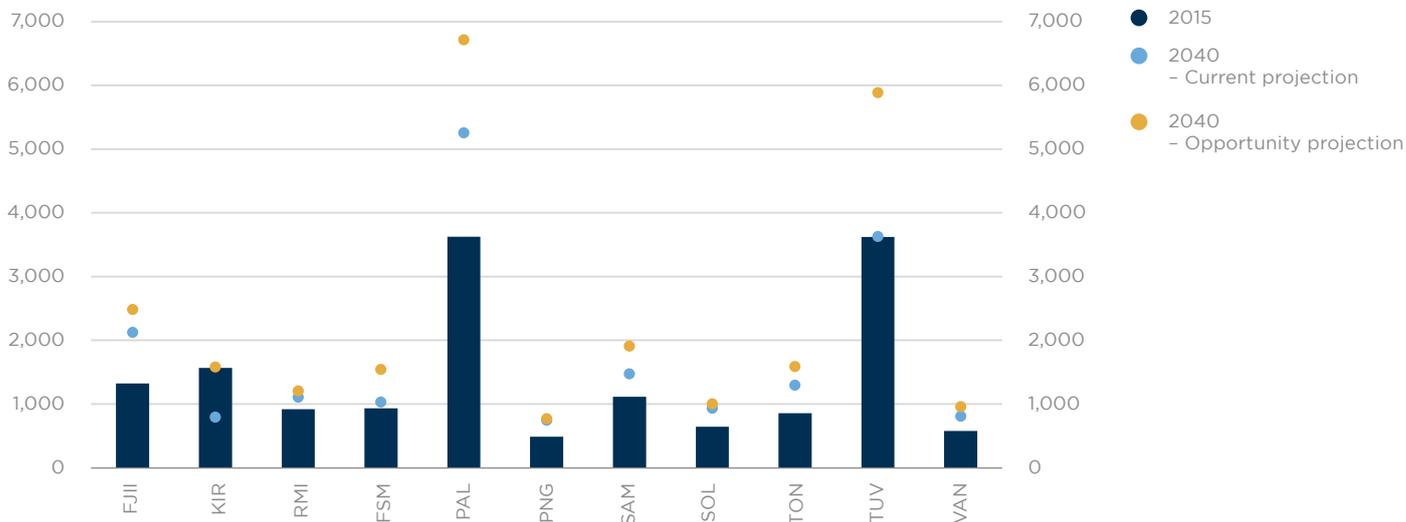


Photo Tom Perry

Appendix 2: The Implications of *Pacific Possible* for Public Spending and Human Development

***Pacific Possible* opportunities would raise government revenues in each of the PICs.** This boost comes from direct increases in the fishing license fees accruing to PIC governments, as well as increases to the revenue base flowing from the impact of *Pacific Possible* interventions on GDP (Figure 2A-1).

Figure 2A-1: Projected Revenue per capita (Constant 2015 US\$)



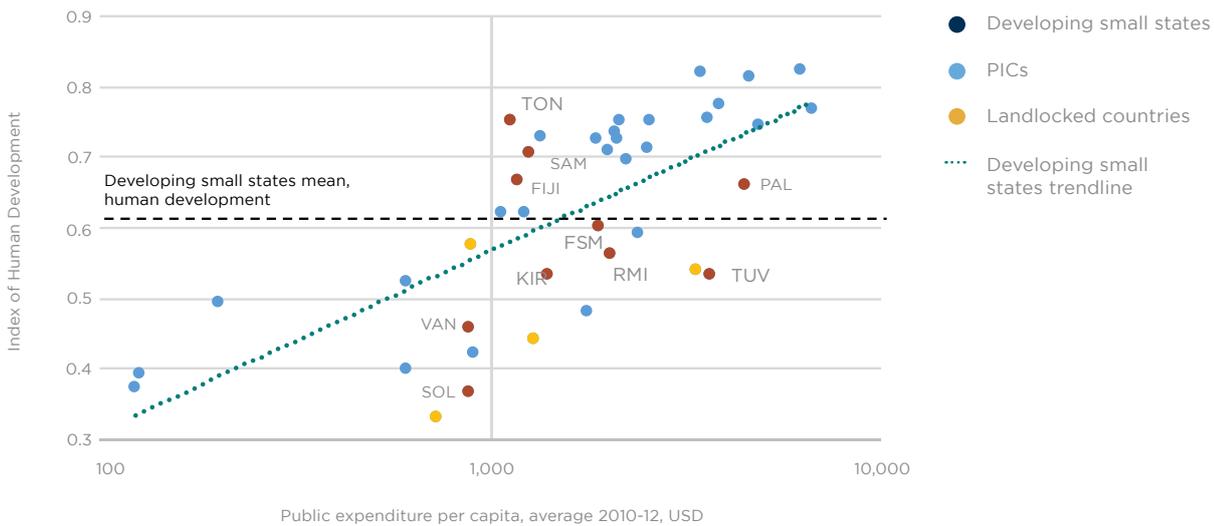
Source World Bank staff estimates.

By boosting government revenues, the *Pacific Possible* interventions can potentially help PIC governments finance increases in public expenditure. According to a human development index (HDI) incorporating health, education, and infrastructure provision, seven out of the 11 PICs have human development levels that are lower than expected given government spending per capita (Figure 2A-2). After controlling for geographic constraints associated with remoteness and dispersion, however, the effectiveness of public spending in most PICs—as measured by the development outcomes associated with a given level of public spending per capita—appears to be close to, or better than, that in other developing small states (Table 2A-1). At the same time, human development indicators remain relatively low in a number of PICs due to low levels of public spending and/or geographic constraints, implying that there is an argument to raise public expenditure to improve development outcomes. The *Pacific Possible* interventions improve the capacity of PICs to fund such increases in public expenditure.

By estimating a relationship between the HDI and government spending, it is possible to project the levels of spending that would be consistent with the achievement of human development targets.²⁰ The estimates suggest that the spending required to meet these development targets would be substantially higher than the 2040 baseline projections of spending in almost all of the PICs (Table 2A-1). If *Pacific Possible* opportunities were fully exploited, however, the public spending required in 2040 to meet these targets would fall as a proportion of GDP, due to the associated increases in national income (Figure 2A-3). Notable declines are evident in Kiribati, Vanuatu, and the Federated States of Micronesia, consistent with the more pronounced GDP effects of *Pacific Possible* interventions in these countries. The direct revenue impacts of fisheries interventions will also provide more fiscal space to finance these expenditure needs in some cases.

²⁰ For the majority of the PICs, the target HDI is set at the developing small states average. However, for those PICs in which the HDI is already above the developing small states average (Fiji, Tonga, Samoa, and Palau), the target is set equal to the current HDI of the highest-performing PIC on this measure (Tonga).

Figure 2A-2: Relationship between Human Development and Public Spending per capita in Small States²¹



Source World Bank, World Development Indicators.

Table 2A-1: Current Human Development Outcomes in the PICs

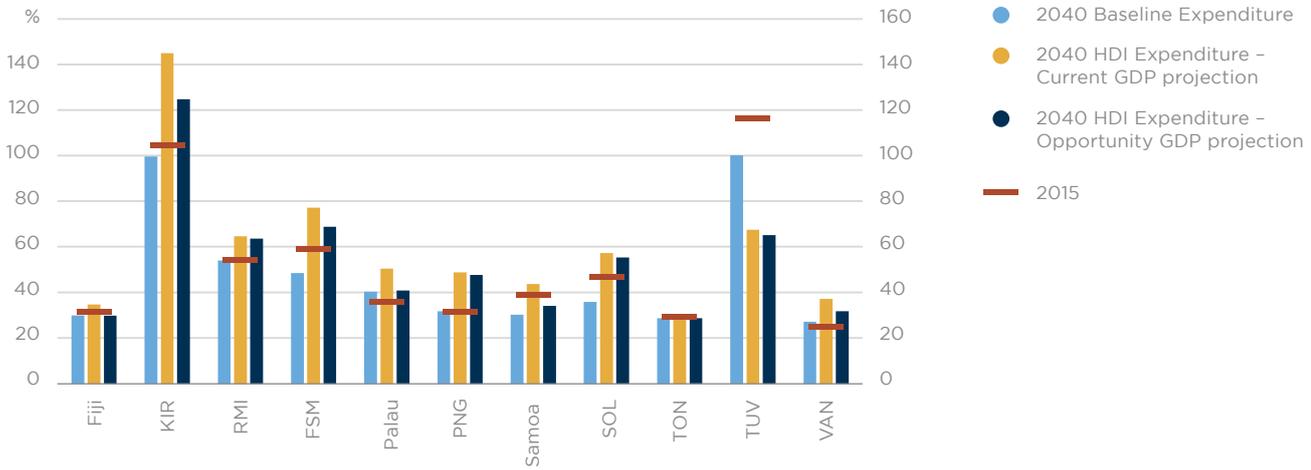
	of which				
	Index of human development	Difference from small states average	Explained by geography	Explained by other factors reducing spending effectiveness*	Explained by shortfall in public spending**
Tonga	0.75	0.137	-0.035	0.205	-0.033
Samoa	0.704	0.091	-0.001	0.112	-0.02
Fiji	0.668	0.055	-0.008	0.091	-0.028
Palau	0.659	0.046	-0.052	-0.022	0.12
Micronesia	0.602	-0.011	-0.059	0.022	0.026
Marshall Islands	0.562	-0.051	-0.074	-0.009	0.032
Kiribati	0.534	-0.079	-0.071	0.001	-0.009
Tuvalu	0.532	-0.081	-0.126	-0.052	0.097
Vanuatu	0.457	-0.156	-0.016	-0.08	-0.06
Solomon Islands	0.368	-0.245	-0.005	-0.18	-0.06
Papua New Guinea	0.332	-0.281	0.004	-0.182	-0.103
Small states average	0.613				

* relative to the small states average
 ** the deviation from the developing small states average index of human development that is associated with a shortfall in public spending. A negative (positive) value indicates more (less) spending would be required, assuming small states average geographic constraints and spending effectiveness (i.e. assuming the PICs moved to the regression line estimated in Figure 2A-2)

Source World Bank staff estimates using World Development Indicators.

²¹ The measure of human development represented by the vertical axis is a nonincome variant of the standard Human Development Index. The methodological details of its derivation are contained in World Bank (2016g).

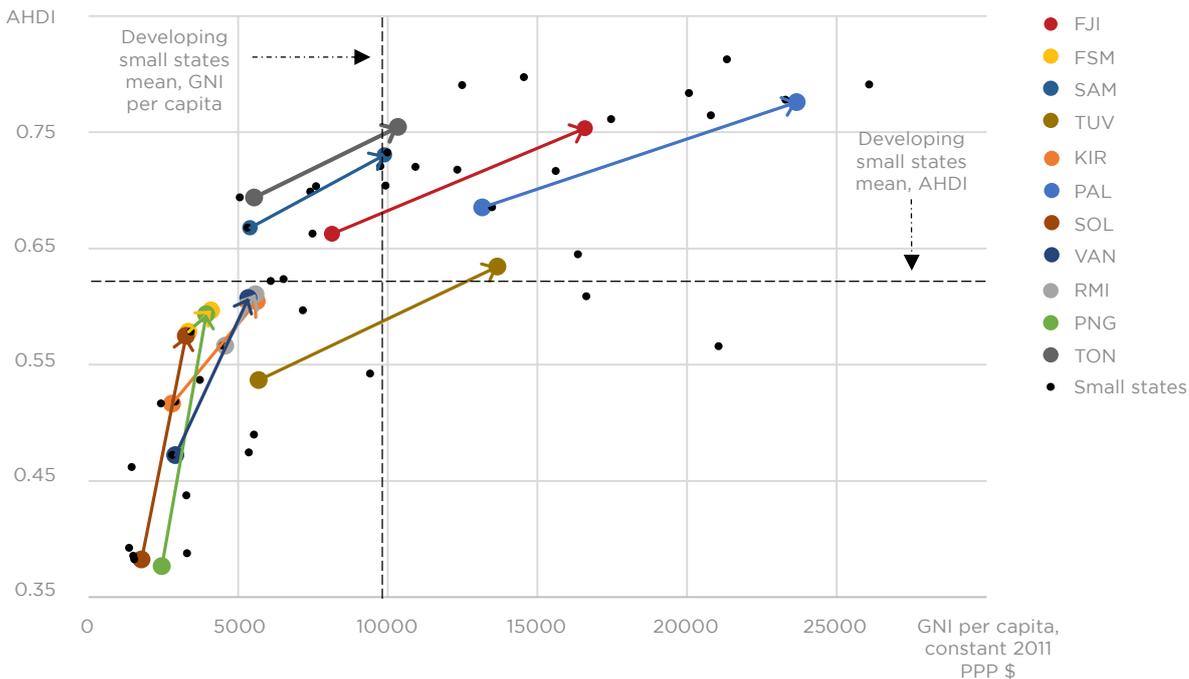
Figure 2A-3: Projected Expenditures as a Share of GDP (%)



Source World Bank staff estimates.

In addition to increasing the PICs' ability to finance development expenditures, the *Pacific Possible* interventions will also spur human development directly through their effect on per capita incomes. Assuming public spending consistent with the human development targets and income growth consistent with *Pacific Possible* interventions would lead to the Augmented HDI (AHD) trajectories depicted in Figure 2A-4 (the AHD includes income per capita as well as health, education, and infrastructure components).

Figure 2A-4: AHD and Income per-capita Trajectories From 2015 to 2040 Assuming Pacific Possible Interventions



Source World Bank staff estimates using World Development Indicators.

Nevertheless, the projections suggest that achieving public spending levels necessary to meet the human development targets is likely to remain difficult in the North Pacific countries and in Papua New Guinea, the Solomon Islands, and Vanuatu, even assuming *Pacific Possible* growth dividends. As a result, measures to increase domestic revenue flows (including from natural resources) and/or aid may be required to finance additional public spending in these countries over the next 25 years. In addition to increasing the quantity of spending, measures to improve the quality of public spending will be of critical importance in several PICs. According to the estimates, in a number of countries—including Papua New Guinea, the Solomon Islands, and Vanuatu—failure to improve the effectiveness of public spending would mean that the human development target would remain well out of reach.

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Pacific Island countries face unique development challenges. They are far away from major markets, often with small populations spread across many islands and vast distances, and are at the forefront of experiencing the impacts of climate change.

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Will a rising Chinese middle class choose the Pacific Islands as their holiday destination? Are recent increases in revenues from tuna fisheries likely to continue into the future? What should countries do to respond to increasing interest in deep sea minerals mining? Will the ICT revolution help Pacific Island countries overcome the tyranny of distance? What would it take to expand overseas employment opportunities for Pacific Islanders? How can the Pacific Island countries mitigate the threats of climate change, high vulnerability to natural hazards, and the non-communicable diseases crisis? *Pacific Possible* endeavors to provide some answers to these questions. The findings also provide insights into what these issues could mean for incomes and employment in the Pacific.

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