Regional population dynamics and mobility trends in the Pacific

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Executive summary

This report discusses the contemporary demographic context and future dynamics of population change, including international mobility, in the Pacific region. It draws on various sources including existing studies, census data, demographic measures (such as births and deaths), and arrival and departure data where available. The report contains reliable evidence on the scale, patterns and processes of population change in the Pacific for the region as a whole, for its three major subregions and some individual countries.

A key finding is that it would be prudent to monitor population change in five different Pacific population clusters, rather than focussing on the usual three subregions of Melanesia, Micronesia, and Polynesia. These clusters are western Pacific, central Pacific, eastern Pacific, northern Pacific, and French territories. In the summary below these clusters are referred to along with the three subregions.

Climate change

Population change and climate change are similar in that both require lengthy timeframes for their monitoring and analysis. The primary objective of this report is to produce a synthesis of findings relating to population change in the Pacific region over the century between 1950 and 2050. This synthesis is designed to align with findings relating to climate change in the Small Islands group of countries that are contained in the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment in 2022.

There is no recent assessment of population change at regional, subregional and national scales in the Pacific to place alongside the findings relating to climate change in the IPCC's Sixth Assessment, so the focus of this report is deliberately on population change.

The accompanying Thematic Paper entitled *Pacific Population Dynamics in the Context of Climate Change* examines more directly how demographic changes in the region are related to hazards and climate scenarios and some of the policy implications for Aotearoa New Zealand (hereafter referred to as Aotearoa).

Two key messages that can be drawn from the analysis of population change at the regional scale are that through to 2050: 1) the great majority of Pacific peoples will continue to adapt to the changing climate while residing in the countries where they are currently living; 2) a well-established trend towards increasing life expectancy in all Pacific populations is expected to continue despite the impacts of climate change on Pacific health and livelihoods.

While there is likely to be a significant increase in migration to other countries within and outside the Pacific region over the next 30 years, some of which will be directly linked to climate change, the ongoing momentum of population growth will more than compensate for the numbers who choose to or are forced to migrate elsewhere.

Hazards arising from climate-related events (cyclones, floods, droughts, heat stress), as well as earthquakes, volcanoes, and slow-onset sea-level rise, could lead to significant population movement within as well as out of some countries. But despite these disruptive impacts, at the regional scale, the great majority of Pacific peoples will still be living in countries in the region in 2050.

Populations in the Pacific and Aotearoa

The estimated population of the region's 21 Pacific Island Countries and Territories (PICTs) in July 2023 was 13 million. Aotearoa's population was 5.22 million – the equivalent of 40% of the Pacific's population. This compares with 78% around 1950 when the populations of Aotearoa (1.9 million) and the Pacific region (2.5 million) were much more similar. By 2050 Aotearoa's projected population of 6.3 million would be equivalent to 30% of the Pacific's projected population of just under 20 million.

These comparisons are useful because they indicate the relative magnitude of population change over the century during which migration from Pacific countries has become a specific immigration policy issue in Aotearoa. The 1950s saw the beginning of increasing flows of Pacific peoples from countries in Polynesia and Fiji seeking employment, education and residence opportunities in Aotearoa.

Between 1950 and 2000 the population identifying with a Pacific ethnicity living in Aotearoa increased to over 230,000. Recent Stats NZ ethnic projections suggest that by 2050 there could be at least 800,000 people identifying with a Pacific ethnicity in Aotearoa. Most of these people would have been born in Aotearoa, and most of them will have a Polynesian ethnicity.

Polynesian transnational populations

A Pacific population of 800,000 in Aotearoa in 2050 could be marginally larger than the projected population for the nine PICTs in Polynesia in 2050 (around 716,000) but it would be equivalent to only 4% of the Pacific's projected total population of just under 20 million.

Polynesia's nine PICTs, which include the three Realm countries (Cook Islands, Niue, Tokelau), two French territories (French Polynesia and Wallis and Futuna), one Incorporated Territory of the United States of America (American Samoa) and three independent states (Samoa, Tonga and Tuvalu), all have some privileged rights of access to countries on the Pacific Rim or, in the case of the French territories, to France.

These access rights, coupled with opportunities citizens of Aotearoa have under the Trans-Tasman Travel Arrangement to move to Australia, have resulted in large Polynesian transnational societies evolving in Aotearoa, Australia and the United States. Around 2020 there were over 350,000 Polynesians in Aotearoa, just under 180,000 in Australia and at least 360,000 in the USA – around 890,000 in the three countries.

In 2020 the total population resident in the nine Polynesian PICTs was estimated to be 675,000. The island-resident Polynesians comprised only 43% of the 1.57 million Polynesians, including the 890,000 in the three Pacific Rim countries. Over half of the people identifying as Polynesians around 2020 were resident overseas.

Much can be learned from the trajectory of population change since the 1950s in Polynesia when seeking insights into possible future climate (im)mobility in the region. Progressive net migration losses since the 1950s have resulted in significant populations overseas who continue to self-identify with one or more of Polynesia's distinctive ethnic groups. Polynesia's recent demographic history provides a window into how people in the much more populous subregion of Melanesia might respond to more opportunities for movement to and from countries on the Pacific Rim.

The exceptional case of PNG and the western Pacific cluster

The estimated 13 million people living in the Pacific region in 2023 are distributed very unevenly across the 21 PICTs. Papua New Guinea (PNG) accounts for 73% (9.5 million) of this total, and the five countries that comprise Melanesia (Fiji, New Caledonia, PNG, Solomons and Vanuatu) between them account for just over 90% (11.8 million). The remaining 16 PICTs comprising Micronesia (0.55 million) and Polynesia (0.68 million) have an aggregate population of around 1.2 million or just over 9% of the region's total.

At a regional level, the Pacific's trajectory of population change is determined by one country – PNG. This country has some distinctive demographic features which need to be recognised when examining relationships between population change and climate change at a regional level.

PNG's population is growing quite rapidly (3.1% per annum compared with 1.6% in Aotearoa) because of high fertility, declining mortality and low international migration. It is a youthful population with considerable growth potential (doubling time around 35 years).

It is the only Pacific country where the great majority (70%) of the population live more than 10 km inland from the coast and the only Pacific country with inland urban areas. The great majority (over 80%) of Papua New Guineans live in rural communities deriving their livelihoods from their lands and, if living close to the coast, their marine resources.

These characteristics are common to only two other PICTs: Solomons and Vanuatu. Both countries are experiencing rapid population growth, have high fertility and declining mortality, limited access to overseas migration opportunities, and have youthful populations with high growth potential. The great majority of their populations are also rural residents, but most live within 10 km of the coast.

Given their similar demographic characteristics, these three countries have been grouped into a western Pacific cluster. Their combined population in 2023 is 10.6 million and they have very small overseas transnational populations. The only Melanesian

country with a sizeable transnational population outside the region is Fiji. Its overseas-resident population is usually significantly understated because Fiji's Indian population is not counted as a Pacific Indigenous community.

Around 2020, there were 148,000 people of Melanesian ethnic origins living in Aotearoa (38,000), Australia (73,000) and the USA (37,000). This is equivalent to only 16% of the Polynesians resident in the three countries. Melanesia's transnational population comprises 1.3% of the combined island-resident and overseas-resident population of the subregion. Just under 99% of Melanesia's people around 2020 were living in the region compared with 43% of Polynesia's people.

This has very important policy implications in the context of the adjustment of Melanesians to climate scenarios and hazards over the next 30 years. Even with significant migration to countries outside the subregion, the great majority of the current 11.7 million residents, and projected growth of a further 6.5 million by 2050, will be adjusting to the impacts of climate change mainly in rural areas in the subregion.

Fiji and the central Pacific cluster

Fiji and New Caledonia have very different demographic profiles and trajectories than the three Melanesian countries that comprise the western Pacific cluster. New Caledonia is part of the French Territory cluster while Fiji is an important source of and destination for migrants within the Pacific region.

Fiji has the second largest population in the Pacific (over 900,000 in 2023) which is growing much more slowly (around 0.3% per annum) than its western Pacific neighbours as a result of lower fertility and net migration losses to countries in the Pacific Rim. The country has long been an important hub in the central Pacific with its capital, Suva, being home to the University of the South Pacific, a regional university, and a major regional hospital and associated medical training facilities at the National University of Fiji which also provides a range of technical training services.

Fiji has long been a source of skilled migrants for other Pacific countries as well as Aotearoa and Australia. Its national airline, Fiji Airways, provides the only regular services to the atoll countries of Kiribati and Tuvalu. Fiji is home to significant Micronesian and Polynesian communities from those two countries – a legacy of resettlement schemes in the 1940s and 1950s.

Over the past decade, Fiji government officials have signalled that if sea level rise and saltwater damage to freshwater lenses means that atolls in Kiribati and Tuvalu become uninhabitable, some I-Kiribati and Tuvaluans will be able to find new homes in Fiji. Kiribati's previous government purchased land in Fiji as a potential investment is such an eventuality.

The central Pacific cluster includes Nauru, also part of Micronesia, with a population of 12,000. Nauru is another significant player in intra-regional air transport with strong

historical links with Kiribati and Tuvalu through labour migration to service its former phosphate mines and with Australia as a major player in its colonial and postcolonial development.

The four countries that comprise this cluster all have at least 50% of their residents in urban places (in Nauru's case it is 100%). They all have histories of migration to countries on the Pacific Rim, fostered by temporary work schemes and, in three of them by small quotas of residence places in Aotearoa through the Pacific Access Category. They are all likely to also have quotas under Australia's proposed Pacific Engagement Visa.

Fiji has transnational communities in the three Pacific Rim countries, Kiribati has them in Aotearoa and the USA, Tuvalu has one in Aotearoa and Nauru has a small one in Australia. The central Pacific cluster is likely to be as source of increasing numbers of migrants to the Pacific Rim over the next 3 decades, especially from the low-lying atolls in Kiribati and Tuvalu and from Nauru's raised coral island.

Fiji, with its various large (by Pacific standards) high islands and more diverse economy is likely to be a destination for migrants from Kiribati and Tuvalu. It also has the region's most developed strategy for the internal relocation of communities affected by hazards linked with climate change. Notwithstanding its more developed capitalist economy and society, Fiji is likely to supply increasing numbers of skilled migrants, especially to countries on the Pacific Rim, as climate-related hazards become more frequent and intensive.

The northern Pacific cluster and Micronesia

North of the equator are five PICTs that all have strong links with the USA. Guam, with the largest population in Micronesia in 2023 (around 173,000) is an Unincorporated Territory of the United States, the Northern Mariana Islands is a commonwealth in free association with the USA (CNMI), while Palau, the Federated States of Micronesia (FSM) and the Marshall Islands are independent countries with Compacts of Free Association with the USA.

A combination of declining fertility and extensive migration to the USA, especially since the 1990s, has resulted in CNMI, Palau and Marshall Islands, which all had populations of less than 50,000 in 2023, beginning to experience absolute population decline. Patterns of population change in the northern Pacific are variable, but a common trend seen in their population pyramids is increasing percentages of residents in the older age groups. In this regard, age–sex structures are very different from those found in the western Pacific and much more akin to the population pyramids found in Polynesia.

All PICTs in the northern Pacific cluster have transnational communities in the USA where the total Micronesian population (including I-Kiribati and Nauruans) was around 175,000 in 2020. A further 5,300 Micronesians (mainly from Kiribati and Nauru) were resident in Aotearoa (3,400) and Australia (1,900).

The 180,000 Micronesians living in the three Pacific Rim countries comprise 25% of the total Micronesian population resident in the islands and the Pacific Rim. Unlike Polynesia, which was home to less than 50% of Polynesians around 2020, 75% of Micronesians were living in the Northern and central Pacific clusters (Kiribati and Nauru).

The main destination for migrants from the northern Pacific over the next 30 years will continue to be the USA. Countries on the southern Pacific Rim and other Pacific states are unlikely to be destinations for many migrants from this cluster. Their main sources of Micronesian migrants will continue to be Kiribati and Nauru.

The eastern Pacific cluster

The eastern Pacific cluster comprises five PICTs excluding France's territories (French Polynesia, Wallis and Futuna), the US Unincorporated Territory of American Samoa, and Tuvalu (part of the central Pacific cluster). Included are the three Realm countries with their small resident populations that have citizenship rights, and consequently much larger transnational communities, in Aotearoa. Also included are Samoa and Tonga with larger resident populations but also very large transnational communities in Aotearoa and the USA, and rapidly growing communities in Australia.

The populations of the Realm countries have been transformed by migration since the 1950s and their populations in 2023 are much lower than they were in the 1960s and 1970s. The major concentrations of Cook Island Māori, Niueans and Tokelauans are found outside the Pacific region; the homelands remain cultural heartlands but are no longer the bases of sustainable livelihoods for the great majority of the populations who identify with these ethnic groups. The 18,500 Cook Islanders, Niueans and Tokelauans living in the islands in 2023 all have the right to move to Aotearoa in the future should they choose to do so.

The populations of Samoa and Tonga have also been transformed by international migration since the 1950s, but their residents do not have the access to Aotearoa that the Realm populations have, or American Samoans have to the USA. Their populations continue to grow, although Tonga's recent censuses indicate that their growth has plateaued around a total of 100,000.

Both countries have declining fertility and mortality and population structures that show the effects of extensive net migration losses over the years. Their ageing populations remain predominantly rural resident and their economies are heavily dependent on remittances from overseas kin as well as workers on temporary visas participating in managed labour migration schemes in Aotearoa and Australia. Persistent negative impacts of climate-related hazards on rural and urban populations in these countries are likely to be accompanied by increasing international migration over the next 30 years.

The French territories cluster

While New Caledonia (Melanesia). Wallis and Futuna (Polynesia) and French Polynesia remain territories of France it is appropriate to consider them as a cluster because of the strong interdependencies of their economies and associated flows of labour, especially to New Caledonia.

They are widely separated in terms of location and have some different demographic characteristics. But while they remain territories of France it is appropriate to acknowledge their colonial status and the responsibilities that the French government has when it comes to assisting their citizens to address challenges associated with climate change.

Momentum and migration in Pacific population futures

While there is considerable diversity in the sizes and age–sex structures of Pacific populations, they all have two common attributes. The first is in-built momentum for further population growth, and for most of them, this growth will continue for at least the next 30 years.

The second is the growth in opportunities for international mobility, especially labour migration, to countries on the Pacific Rim, as well as to some PICTs with ageing populations. Momentum and migration are defining features of the contemporary Pacific demographic transitions, and the report concludes with a summary of their role at the regional and subregional levels.

There is a very big difference between the impacts of migration on individuals and their families and communities, and the impacts of migration on the populations of countries. Migration as an adaptation strategy in the face of climate change will play out over many decades at the national, subregional and regional scales. It is not something that will be able to be addressed by short-term policy responses. Consistent approaches to addressing climate (im)mobility in the Pacific, that can transcend the 3-year terms of government in Aotearoa, will be essential given the variable trajectories of future demographic change in the Pacific.

To get a more comprehensive understanding of the interrelationships between large and small-scale climate impacts with local and regional population mobility, new holistic approaches are needed. Holistic approaches allow for a deeper understanding of how demographic factors intersect with climate-related challenges and population movement. Conducting in-depth community case studies within the demographic broader context provided by this report will produce nuanced insights into the dynamics at play.

1. Introduction

A key policy priority for the Ministry of Foreign Affairs and Trade (MFAT), which is identified on p.13 of the University of Auckland's "Costed Research Plan. MFAT Climate (Im)mobility Research in the Pacific," is specified in the form of two related questions:

1. What are the regional and national population dynamics and mobility trends and how are they related to hazards and climate scenarios?
2. What are the implications for Aotearoa New Zealand and the in-scope Pacific countries?

The primary focus of this report is the first part of the first question – what are the regional and national population dynamics and mobility trends? The report provides "a region-wide analysis of the contemporary demographic context and dynamics that affect mobility in the region and, where possible, insights into specific countries. This will draw on and update existing studies and work with key datasets including census data, demographic measures (e.g. births and deaths) and arrival and departure data where it is available. It will also draw on a special dataset of RSE movements over the last decade" (Costed Research Plan, p. 5).

This synthesis of findings relating to demographic change in the Pacific aims to complement and align with findings relating to climate change in the Small Islands group of countries that are contained in the Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment in 2022. The accompanying Thematic Paper entitled *Pacific Population Dynamics in the Context of Climate Change* addresses the second part of the question – how are the (demographic changes) related to hazards and climate scenarios? The Thematic Paper also addresses the question – What are the implications for Aotearoa New Zealand and the in-scope Pacific countries?

1.1 Content of this report

The report commences with a brief review of the key sources of data used in the analysis of population change at the regional, subregional and national levels. The agencies that produced the population estimates and projections between 1950 and 2050 that are used in this report do not explicitly state that their assumptions relating to the key processes that change populations consider climate scenarios and hazards. This limitation is discussed briefly at the beginning of the section with reference to the relationship between climate scenarios and population trends at a regional scale.

Three major themes relating to population growth and distribution are then addressed in sequence. The first, and the one that comprises the bulk of the report, is a review of the variable rates and dynamics of population growth in the 21 Pacific Countries and Territories (PICTs) in the region. This is addressed at two scales: a) a regional perspective on population dynamics over the 100 years 1950–2050 and the place of Aotearoa's

Pacific populations in this perspective, and b) summary assessments of subregional trends in population growth and the associated changes in fertility, mortality, migration and population structure.

The second theme relates to the contemporary distribution of populations within countries in the region with particular reference to the proximity to the coast, elevation above sea level, and rural and urban distribution. The report looks at the percentage of people living within 5 km of the coast or residing in dwellings built on sites below 5 m in elevation above sea level. This is critical because coastal areas are heavily impacted by cyclones, storm surges and floods, and these locations are the sites of most of the region's major towns and cities. In addition, sizeable numbers of people in the most populous country in the region live in predominantly high-altitude rural settlements with specific climate-related hazards such as frost and drought. The distribution of people living in rural and urban areas, where livelihoods, resources and infrastructure differ, is reviewed briefly. This assessment is valuable because understanding where people live in the region has significant implications for the impacts of climate change on their livelihoods and their potential need to relocate in the future.

The third theme that the report explores is the significance of transnational living in the Pacific region and its relevance to the resilience of Pacific communities, both in the Pacific as well as in Aotearoa in the context of climate change. Access to opportunities for residence in other countries is very uneven for contemporary Pacific people. Understanding the impact this unevenness of access has had on the development of transnational Pacific societies in the region is essential in any assessment of the implications for Aotearoa of regional population dynamics and mobility trends in the Pacific in the context of climate-related hazards.

The final section outlines a more relevant framework for the analysis of contemporary and future population dynamics at the subregional level than the three frequently used subregions of Melanesia, Micronesia and Polynesia. This framework is used in Thematic Paper 1 in the discussion of implications of key findings from this report and from reports prepared by the IPCC's Working Group II for their major publication *Climate Change 2022: Impacts, Adaptation and Implications*.[1]

[1] Portner, H.-O. et al. *Climate Change 2022: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press.

2. Population dynamics, climate scenarios and data: A context

Population change, like slow-onset climate change, is a long game. Populations and climates very rarely change rapidly. The prevailing demographic trend in the Pacific region, as in most regions of the world, continues to be growth in population numbers. A comparable long-term trend in climate at the regional scale is increasing average temperatures. Because of the slow and often fluctuating nature of population growth and climate change over time, their analysis requires timeframes spanning multiple decades rather than years. In recognition of this common feature of demographic change and slow-onset climate change, the discussion of Pacific populations in this report spans the century between 1950 and 2050.

The data that inform the analysis of population change in this report, like those that inform the climate scenarios in the IPCC's Sixth Assessment, include a mix of observations and estimates up to 2021 as well as projected values through to 2050 and beyond. The observations and estimates between 1950 and 2021 have gaps and inconsistencies so there is an element of uncertainty about the precise nature of the trends in the data. The projected values for both the climate variables and the population variables generally have higher levels of uncertainty associated with them when it comes to what might be actual outcomes by 2050 or beyond. The projected values should never be taken literally but, with varying levels of probability, they give us useful insights into possible outcomes, over the medium term, for populations and climates at the regional scale.

2.1 Relationships and impacts

The relationships between demographic change and climate change, at a regional scale, are not well-understood or researched in the Pacific at this stage. The accompanying Thematic Paper summarises some of the emerging evidence of the impacts of climate change on morbidity, mortality and migration at regional and subregional scales in the Pacific. Two key messages can be drawn from the analysis of population change in the substantive sections of this report. The first is that, at the regional scale, the great majority of Pacific peoples will continue to adapt to the changing climate while residing in the countries where they are currently living. The second message is that a well-established trend towards increasing life expectancy in all Pacific populations is expected to continue despite the impacts of climate change on Pacific livelihoods at the regional scale.

While there is likely to be a significant increase in migration to other countries within and outside the region in response to a range of factors over the next 30 years, including climate change, the ongoing momentum of population growth, especially in the

countries where most of the region's population currently live, will more than compensate for the numbers who migrate elsewhere. Hazards arising from climate-related events (cyclones, floods, droughts, heat stress), as well as earthquakes and volcanoes, could lead to significant population movement within the larger countries in the western Pacific where these events tend to occur most frequently. But despite these disruptive impacts, at the regional scale, the great majority of Pacific peoples will still be living in countries in the western Pacific in 2050.

A well-established trend towards lower death rates and increasing life expectancy may be dampened in parts of the region by changes in physical and mental health linked with the impacts of climate change on livelihoods in rural and urban areas. But unless these impacts are at a scale not witnessed in the region to date, the trend towards lower mortality, as projected by the two agencies whose population data we have used extensively in this report, is likely to continue at the regional and subregional scales. The various scenarios that are discussed in the IPCC's Sixth Assessment Report of climate change will have quite variable impacts on Pacific populations at the national level. However, at the regional level, and for those countries that contain the great majority of the region's population, the magnitude of projected population growth is not likely to be impacted much by climate change, at least not in the near future through to 2050.

2.2 Sources of data

Extensive use is made of two well-established and widely used sets of population estimates and projections for Pacific Island Countries and Territories (PICTs) in this report. These are the Pacific Community's (SPC) estimates and projection series and the United Nations Department of Economic and Social Affairs (UN DESA) series prepared by the Department's Population Division.[2] Both series include annual estimates for populations at the national and sub-regional level for the Pacific for the period 1950 to 2021 and projections of populations each year from 2022 until 2050 (SPC) and 2100 (UN DESA).

The SPC projections are for the 'medium' variant fertility, mortality and migration assumptions for each national and sub-regional population. The UN DESA projection series contains several variants with different mixes of fertility, mortality and migration assumptions. In the following sections, we compare estimates and projections from the two series at the regional and sub-regional levels in the Pacific.

Population estimates, 1950–2020

The SPC and UN DESA estimates of the total population for the Pacific region, and for Melanesia, Micronesia and Polynesia, in 1950, 1980, 2000 and 2020 are compared in

[2] The SPC's estimates and projections can be accessed at: https://pacificdata.org/data/dataset/population-projections-df-pop-proj. The UN DESA's estimates and projections can be accessed at: https://population.un.org/wpp/Download/Standard/MostUsed/.

Table 1. The estimated populations for the 4 years in the two data series are quite similar in most years. The biggest difference is in the estimate for Melanesia's population in 2020 and this is mainly due to a lower estimate for Papua New Guinea's (PNG) population by the SPC. As noted in the discussion later in this report, there has not been a census in PNG since 2011 and there is considerable speculation about the actual size of the country's population in the 2020s.

Table 1: SPC and UN DESA population estimates, 1950–2020

	Population estimate (000s)			
Region/subregion	1950	1980	2000	2020
Pacific region				
SPC	2,563.0	5,209.0	8,304.0	12,330.0
UN DESA	2,488.8	5,066.7	8,349.5	13,202.2
Difference (SPC-UN DESA)	74.2	142.3	-45.5	-872.2
Melanesia				
SPC	2,165.0	4,431.0	7,194.0	11,110.0
UN DESA	2,071.8	4,249.8	7,184.4	11,959.3
Difference	93.2	181.2	9.6	-849.3
Micronesia				
SPC	155.1	303.6	497.6	541.7
UN DESA	161.7	316.7	525.4	531.1
Difference	-6.6	-13.1	-27.8	10.6
Polynesia				
SPC	242.2	474.7	613.0	674.6
UN DESA	255.4	500.1	639.8	711.8
Difference	-13.2	-25.4	-26.8	-37.2

Up to the 2000s, there was a tendency for the SPC to have slightly higher estimates for the population of Melanesia than UN DESA. In the case of Micronesia, the reverse applied. UN DESA's estimates tended to be higher than the SPC's up to 2000. This has changed in 2020 and the difference is mainly due to the lower populations for Guam, the Commonwealth of the Northern Mariana Islands (CNMI) and the Marshall Islands in the UN DESA series than is the case in the SPC series. In Polynesia, the SPC's estimates in the 4 years are consistently smaller than the UN DESA's estimates reflecting a combination of faster fertility decline and heavier net migration losses in the SPC's estimates for several Polynesian populations.

Population projections, 2030–2050/2100

The UN DESA's medium variant projections series through to 2050 almost invariably give larger populations at the regional and subregional levels than the SPC's medium variant projection series (Table 2).

Table 2: SPC and UN DESA medium variant projections, 2030–2100

Region/subregion	Population estimate (000s) 2030	2040	2050	2100
Pacific region				
SPC	14,560.0	16,940.0	19,560.0	n.a.
UN DESA	15,513.9	17,716.6	19,692.5	24,553.2
Difference (SPC-UN DESA)	-953.9	-776.6	-132.5	n.a.
Melanesia				
SPC	13,290.0	15,630.0	18,210.0	n.a.
UN DESA	14,161.4	16,264.7	18,161.7	22,985.7
Difference	-871.4	-634.7	48.3	n.a.
Micronesia				
SPC	579.3	608.3	629.8	n.a.
UN DESA	579.4	621.3	652.4	656.1
Difference	-0.1	-13.0	-22.6	n.a.
Polynesia				
SPC	693.1	708.4	716.5	n.a.
UN DESA	773.1	830.7	878.5	911.5
Difference	-80.0	-122.3	-162.0	n.a.

Two patterns are evident in the differences between the two series that are shown in Table 2. In the case of Melanesia, and for the region's population, sizeable differences between the projected population for 2030 begin to narrow as the series progresses towards 2050. By 2050 the differences between the SPC and UN DESA estimates are small – both are projecting populations of around 19.6 million for the region and 18.2 million for Melanesia. In Micronesia and Polynesia, the differences between the two are quite small in 2030 but slowly get larger over the next 2 decades. These differences are due mainly to variations in the assumptions relating to fertility in the two series. The SPC's projections also tend to have higher net migration losses for many of Polynesia's populations than the UN DESA's projections.

The last column in Table 2 shows the UN DESA's medium variant projected population for the region and the subregions in 2100. These are highly speculative projections given the number of decades the projection series is covering. The key thing that they reflect for all three subregions is that their populations in 2100 will still be larger than they are projected to be in 2050, despite major declines in fertility across the region. Slowing the momentum of growth in populations always takes considerable time unless there are quite exceptional circumstances that result in very high death or migration rates, or changes in fertility behaviour. Populations at the subregional and regional levels are like very large vehicles – they require plenty of time to slow down and stop.

UN DESA's projection variants for the Pacific: some examples

A clearer appreciation of the impacts of changes in fertility, mortality and migration on the populations of the Pacific region and its three subregions can be seen when different projection variants are compared. The UN DESA has published projected populations, by year, at the country, subregional and regional levels for several combinations of fertility, mortality and migration assumptions. The populations produced by some of these variants for the total population of the Pacific region are compared in Table 3 with the medium variant projection highlighted in red. There are no equivalent published data available for the SPC projection series.

Table 3: The Pacific region's population under different UN DESA projections

Projection variant	Estimate 2020	Projected population (000s) 2030	2050	2080	2100
High	13,202.20	15,806.70	21,806.70	29,789.20	35,244.30
Medium	**13,202.20**	**15,513.90**	**19,692.50**	**23,604.90**	**24,553.20**
Low	13,202.20	15,221.20	18,028.70	18,392.40	16,486.10
Constant fertility	13,202.20	15,659.10	21,394.60	32,830.90	44,126.40
Constant mortality	13,202.20	15,485.00	19,705.30	21,823.90	21,374.10
Zero net migration	13,202.20	15,603.10	20,014.30	24,317.00	25,520.60
Instant replacement-level fertility	13,202.20	14,807.60	17,732.20	19,705.30	20,121.20

This is not the place for a detailed discussion of the UN DESA's various projection variants, but it is clear from Table 3 that different scenarios for fertility levels especially can produce quite different outcomes in population numbers over the longer term. Two extreme examples of this are the projected populations for 2100 under the "constant" fertility variant (44.1 million) and the "instant replacement-level" fertility variant (20.1 million). In the former projection, fertility levels are held constant at levels applying around 2020 through to 2100, while the mortality and migration assumptions that apply to the medium variant projection play out. The "instant replacement-level" fertility variant has all populations having fertility rates at replacement levels between 2022 and 2100. Both projections are quite unrealistic, but they are produced to show what the effects on population numbers would be either if current fertility levels were to persist over the long term or if replacement-level fertility were to become the norm and persist over the long term.

The "high," "medium" and "low" variants produce populations ranging between 21.8 million and 18.0 million in 2050 and 35.2 million and 16.5 million in 2100. Subreplacement-level fertility from around 2040 in the "low" variant ensures that the region's projected populations for 2080 and 2100 are smaller than the populations in those years that are generated by the "instant replacement-level" fertility variant where replacement-level fertility is constant through the period. The "high" variant's fertility

assumptions allow for current variable patterns of fertility change to continue, including the achievement of levels below replacement by countries in the region at different times after 2050. This results in a lower population in 2100 for the "high" variant (35.2 million) than is delivered by the "constant" fertility variant (44.1 million).

The challenge posed by migration

Of the three processes that change the numbers of people present in a given locality or nation at a particular time (fertility, mortality, and migration), the most difficult to work with when projecting future numbers is migration. Unlike patterns of change in fertility and mortality, there are no regular patterns relating to migration that apply consistently in all populations, irrespective of location.

UN DESA's migration assumptions for Pacific subregions and countries are much less variable over time than the assumptions for fertility and mortality. Most of the projection variants listed in Table 3 make use of the same assumptions for migration levels and rates other than the zero net migration variant. In the case of this variant, the only way people enter or leave the population is through birth or death. There are no immigrants or emigrants. This is not a realistic assumption for any national or subregional population, but the variant is useful for comparing projected populations with variants that allow for net migration gains and losses over time.

UN DESA's "zero net migration" variant has the same fertility and mortality assumptions as their "medium" variant. The former generates a larger regional population in 2050 and 2100 than is generated by the latter. This is because the "medium" variant allows for net migration gains and losses to national populations over the projection period. As a result, by 2050 there will be 320,000 fewer people in the region under the "medium" variant than under the "zero net migration" variant because of net migration losses to countries outside the region. By 2100 this difference increases to 967,000.

These are conservative net losses of people through international migration to countries outside the Pacific region; UN DESA's migration assumptions tend to be based on recent historical experience of population movement into and out of countries in the region. They make no allowances for changes in migration rates that might be linked to climate change or significant changes in migration policies in the region or countries on the Pacific Rim.

The analysis of migration: A caveat

Migration is examined at the level of the nation and subregion in this report. Missing is any substantive discussion of migration within countries or internal migration. The only discussion of population distribution within countries relates to their shares living at varying distances from the coast or at different elevations, and the shares living in rural and urban areas around 2021. Consistent time series data relating to the distribution of people within countries is not readily available for the 21 PICTs. There are also gaps in the

availability of data on internal migration that can be obtained from national population censuses.

The absence of any substantive analysis of internal migration in this report is a critical limitation when it comes to addressing the question: What are the regional and national population dynamics and mobility trends and how are they related to hazards and climate scenarios? In the countries in Melanesia, where 91% of the region's population lives, internal migration has much more impact on the changing distribution of the population than international migration. The same cannot be said of many of the countries with much smaller populations in Micronesia and Polynesia, especially those whose citizens have access to work and residence opportunities in countries on the Pacific Rim.

There is much more variability at the national level in the Pacific in the impacts of hazards on population distribution than is the case with impacts on population growth. However, even in the case of population distribution, the available data suggest that staying and adapting to changing conditions remains much more common than moving permanently to another location. Temporary migration in the face of destruction by hazards has always been an integral part of adaptation to hazards in the Pacific, frequently followed by a return to former places of residence rather than long-term migration to another location. But this pattern of return and reconstruction of homes and lives in former places of residence is going to become increasingly untenable in many low-lying coastal locations as sea levels rise. Slow-onset climate change as well as increasing population pressure on available land resources will both make increasing contributions to changes in the distribution of Pacific populations within as well as outside their countries over the next 30 years.

3. Population trends in the Pacific and Aotearoa, 1950–2050

This lengthy section commences with a comparison between the estimated and projected total populations of the 21 PICTs in 1950, 2000 and 2050, the census populations in Aotearoa in 1951 and 2001 and the projected population in that country in 2053.[3] Reference is also made to growth in the Pacific-born population in Aotearoa between 1951 and 2001, and to the populations identifying with Pacific ethnicities at these two dates and projected to be in Aotearoa in 2053.

In the second part a series of graphs are used to examine the variable trajectories of population change between 1950 and 2050 for Papua New Guinea (PNG) which is home

[3] Aotearoa's five-yearly censuses changed from years ending 1 and 5 to years ending 3 and 8 after the Christchurch earthquakes caused the postponement of the 2011 census until March 2013. StatsNZ's projections of the population of Aotearoa now are for years ending 3 and 8, hence 2053.

to just over 70% of the estimated Pacific population of around 13 million in 2023,[4] and for seven regional and subregional entities. The entities are the 21 PICTs, the Pacific excluding PNG, the five PICTs that are usually grouped under the label Melanesia[5], Melanesia excluding PNG, the seven PICTs labelled Micronesia[6], the eight PICTs in Polynesia[7], and a central Pacific subregion identified specifically for the MFAT project[8]. Reference is made to national population profiles that use similar graphs for the in-scope countries and Fiji and Vanuatu, and some of these are used for illustrative purposes in the following sections.

3.1 Total populations compared: 1950, 2000 and 2050

According to the two most frequently cited sources of population estimates and projections for the PICTs their combined population around 1950 was 2.5 million.[9] Aotearoa's population, at the time of the 1951 Census of Population and Dwellings, was 1.94 million – the equivalent of just under 78% of the Pacific total. In 1951 the total number of people born in Pacific countries living in Aotearoa was just over 5,200 – 0.03% of the country's total population.[10] The 1950s marked the beginning of the modern era of migration from Pacific countries to their southern rim neighbour, mainly in response to demand for labour to support expansion in Aotearoa's postwar rural and urban economies.[11]

Fifty years later, at the turn of the century, the population of the 21 PICTs was estimated to be 8.3 million.[12] Aotearoa had a population in 2001 of 3.74 million – the equivalent of 46% of the Pacific total. While the Pacific's total population in 2000 was almost eight times larger than it had been in 1950, Aotearoa's population had not quite doubled during

[4] The medium variant projections for the Pacific's total population in July 2023 are: SPC 12.99 million; UN DESA 13.91 million.
[5] Melanesia includes PNG, Solomon Islands, Vanuatu, New Caledonia and Fiji. Fiji is sometimes included in Polynesia (see, for example, Statistics New Zealand). However, the postcolonial group of countries that comprise the Melanesian Spearhead Group includes Fiji and in this report, Fiji is included in Melanesia.
[6] Micronesia includes the Commonwealth of the Northern Marianas, Guam, Kiribati, Federated States of Micronesia, Marshall Islands, Nauru, and Palau.
[7] Polynesia includes American Samoa, Cook Islands, French Polynesia, Niue, Samoa, Tonga, Tokelau and Wallis and Futuna. Pitcairn Island, with its population of around 60 people, is also part of Polynesia but separate estimates and projections are not produced for such a small population.
[8] The central Pacific subregion comprises Fiji, Kiribati, Nauru and Tuvalu.
[9] The SPC's and UN DESA's estimates for the population of the Pacific's 21 countries and territories in 1950 are quite similar: SPC 2.56 million; UN DESA 2.49 million.
[10] See Bedford, R.D. and Hugo, G. (2012) *Population movement in the Pacific: a perspective on future prospects*. Labour and Immigration Research Centre, Department of Labour, Wellington. Accessed at: https://www.mbie.govt.nz/dmsdocument/2750-population-movement-in-the-pacific-pdf
[11] See chapters by Sean Mallon, Kolokesa Māhina-Tuai and Damon Salesa on migration between the Pacific and New Zealand in the 19th and 20th centuries in their 2012 book: *Tangata o le moana. New Zealand and the people of the Pacific.* Wellington: Te Papa Press.
[12] The SPC and UN DESA estimates for the region's total population in 2000 are also very similar: SPC 8.31 million; UN DESA 8.35 million.

the 50 years, despite the prolonged postwar baby boom and significant net gains from international migration, including from the Pacific Islands.[13]

In 2001 there were 118,000 Pacific-born people living in Aotearoa, just under 23 times more than there were in 1951. The Pacific-born comprised 3.2% of the total population in 2001. The population identifying with a Pacific ethnicity living in Aotearoa in 2001 was much larger – almost 232,000 and the equivalent of 6.5% of the country's 3.74 million residents. This ethnic population had increased 29 times during the 50 years and by 2001 Auckland was home to the largest urban concentration of Pacific peoples in the world.[14]

By 2050 the PICTs are projected to have a population approaching 20 million.[15] The latest median variant projection for the population of Aotearoa in 2053 is 6.2 million of which over 800,000 (13%) could be people self-identifying with a Pacific ethnicity.[16] While the aggregate population of the PICTs is likely to be almost 2.5 times larger than the number present in 2000, Aotearoa's total is unlikely to have increased by more than 66% by 2050. The Pacific ethnic population, however, could be over three times larger than it had been in 2001. This is without factoring in any significant increase in international migration to Aotearoa from the Pacific that might be linked to climate change.

Aotearoa's population in 2050 could be equivalent to around 30% of the combined population of the PICTs in that year – a very significant shift from the situation which prevailed 100 years earlier in 1950 when the country's 1.94 million was equivalent to 78% of the Pacific's 2.5 million. In this context, it is important to keep in mind that the growth in the population of the 21 PICTs has been completely dominated by one country – PNG. Of the 2.5 million people in the region in 1950, 1.6 million (64%) were in PNG. By 2050 PNG's projected population of 15 million could account for 75% of the Pacific's projected total of just under 20 million. PNG, like China and India in Asia, is in a league of its own in all sorts of contexts in the Pacific, including the size of its country and its population.

PNG's estimated population of 1.6 million in 1950[17] was smaller than New Zealand's 1.94 million in 1951. In 2000 the estimated population of PNG was 5.5 million compared with

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[13] See Bedford, R.D. and Heenan, L.D.B. (1987) The people of New Zealand: reflections on a revolution, pp. 133–178 in P.G. Holland and W.B. Johnston (eds) *Southern approaches. Geography in New Zealand*. Christchurch: New Zealand Geographical Society.

[14] See Statistics New Zealand and Ministry of Pacific Island Affairs (2010) *Demographics of New Zealand's Pacific population*. Accessed at: https://www.stats.govt.nz/assets/Uploads/Reports/Demographics-of-New-Zealands-Pacific-Population-2010/Demographics-of-New-Zealands-Pacific-Population-June-2010.pdf.

[15] The SPC and UN DESA medium variant projections for the region's total population in 2050 are, again, similar: SPC 19.56 million; UN DESA 19.69 million.

[16] See Statistics New Zealand (2022) The National population projections: 2022(base) – 2073. Accessed at https://www.stats.govt.nz/information-releases/national-population-projections-2022base2073/.
The estimate for the Pacific ethnic population in Aotearoa around 2053 is based on figures derived from Statistics New Zealand(2022) National ethnic population projections: 2018(base)-2048. Accessed at: https://www.stats.govt.nz/information-releases/national-ethnic-population-projections-2018base2043-update/.
Pacific ethnicities are restricted to Indigenous Pacific ethnicities; they do not include long-established Indian and Chinese populations in the region.

[17] UN DESA and SPC have reasonably similar estimates for PNG's population in 1950 and 2000 and medium variant projections for 2050. In 1950 the estimates are: SPC 1.67 million; UN DESA 1.54 million. In 2000 they were: SPC 5.57

Aotearoa's 2001 population of 3.74 million. By 2050 the projected population of 15 million for PNG could be around 2.5 times larger than the population of 6.2 million for Aotearoa New Zealand in 2053. The medium variant projection gives a population of 4.6 million for the other 20 PICTs in 2050; the equivalent of 75% of Aotearoa's 6.2 million in 2053.[18]

These comparisons of total populations in 1950/51, 2000/01 and 2050/53 provide three useful high-level findings. Firstly, the difference between the size of Aotearoa's population and the combined population for the 21 PICTs, has widened considerably over the 100 years. The 600,000 difference between the populations in 1950 had ballooned out to a 4.6 million difference by 2001, more than Aotearoa's population (3.74 million) in that year. By 2050 the difference could be 13.8 million, more than twice Aotearoa's projected population in 2053.

The second finding is that the significant growth in Aotearoa's Pacific-born population between 1951 and 2001 (just under 113,000) represents a very small share (2.3%) of the total population growth (4.8 million) in the Pacific during the 50 years.[19] This migration had a big impact on the three Realm source countries (Cook Islands, Niue and Tokelau), and made a dent in Tuvalu's and Tonga's population growth, but at the regional level it did not have any real impact on the trajectory of Pacific population growth.

The third finding is that by 2001, and much more so by 2050, the population identifying with Pacific ethnicities was much greater than the population of Pacific-born people in Aotearoa. While the Pacific-born are clearly migrants entering Aotearoa from countries in the region, the Pacific ethnic population is a much larger transnational population that includes the rapidly growing Aotearoa-born Pacific peoples as well as a small but increasing number of migrants that identify with Pacific ethnicities from other countries, especially the United States of America and, in recent years, Australia.[20] It can be noted here that a Pacific transnational population of at least 800,000 in Aotearoa around 2050 would be larger than the SPC's projected population of 716,500 for the nine PICTs in Polynesia in 2050. And this is before any allowance is made for an increase in climate-related mobility from the eastern Pacific.

Impact of PNG's population on regional population change, 1950–2050

It has already been noted that since 1950 PNG has been home for at least two thirds of the Pacific's population in any given year. Not surprisingly, PNG's pattern of estimated

million; UN DESA 5.51 million. Their respective medium variant projections for 2050 are: SPC 15.09 million; UN DESA 14.91 million.

[18] The SPC and UN DESA estimates and projections for the population of the 20 PICTs, excluding PNG, in 1950, 2000 and 2050 are: 1950 – SPC 0.89 million; UN DESA 0.94 million. 2000 – SPC 2.7 million; UN DESA 2.8 million. 2050 – SPC 4.5 million; UN DESA 4.8 million.

[19] The 'just under 113,000' is the difference between the 5,200 and 118,000 Pacific-born people in Aotearoa in 1951 and 2001. The 4.8 million is the difference between the Pacific population estimates of 2.5 million (1950) and 8.3 million (2000).

[20] Migration between hubs in Pacific transnational populations is discussed further later in the report.

and projected population growth between 1950 and 2050, shown in Figure 1, has had a profound impact on the profiles of absolute and relative population change in the Pacific's total population (Figure 2). When PNG's population is removed from the total, the patterns of absolute and relative change for the remaining 20 PICTs are quite different (Figure 3).

Three key messages about population change in PNG, the Pacific region, and the region (excluding PNG's population) are evident in these graphs. The first is that there is not a lot of difference between the SPC's and the UN DESA's estimates and projections of the population numbers, by year, between 1950 and 2050, as shown in the solid lines in Figures 1–3. There are signs of some deviation between the projected totals for the Pacific without PNG after 2020. It looks as though this deviation would continue beyond 2050 given the trajectory of growth for the next 50 years out to 2100 in the UN DESA data series (Figure 3).

Figure 1: Population change in Papua New Guinea, 1950–2100

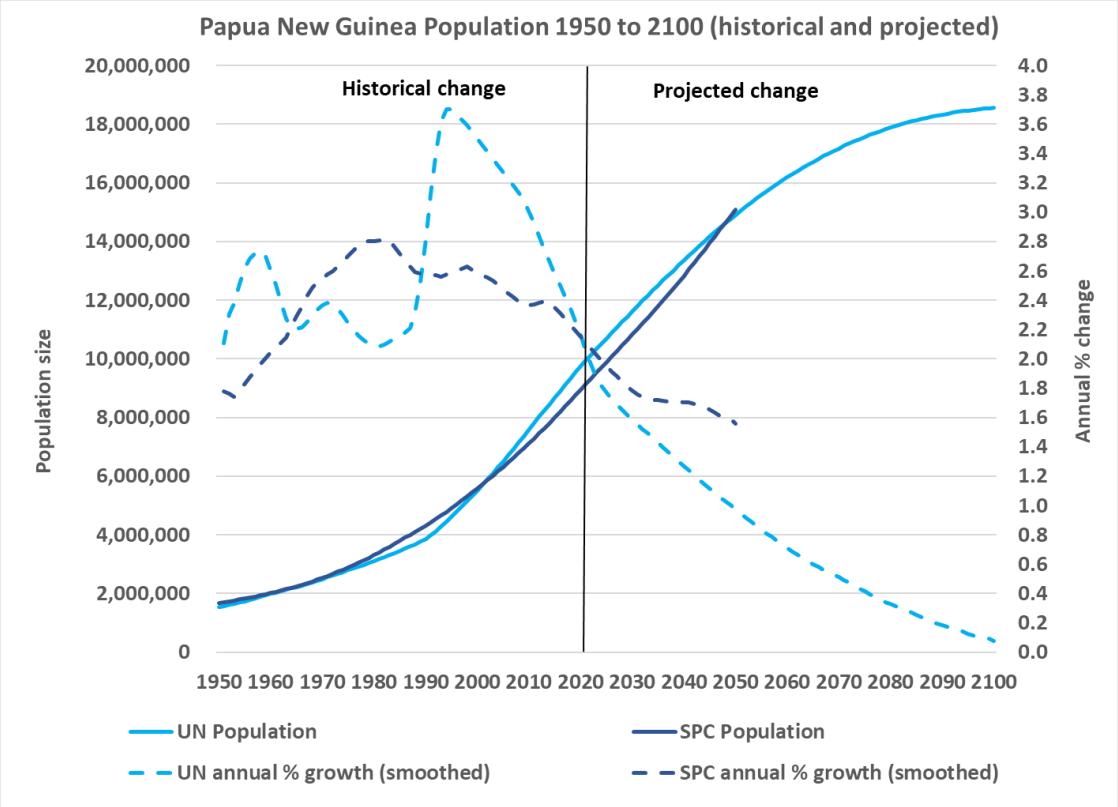


Figure 2: Population change in the Pacific region (21 PICTs), 1950–2100

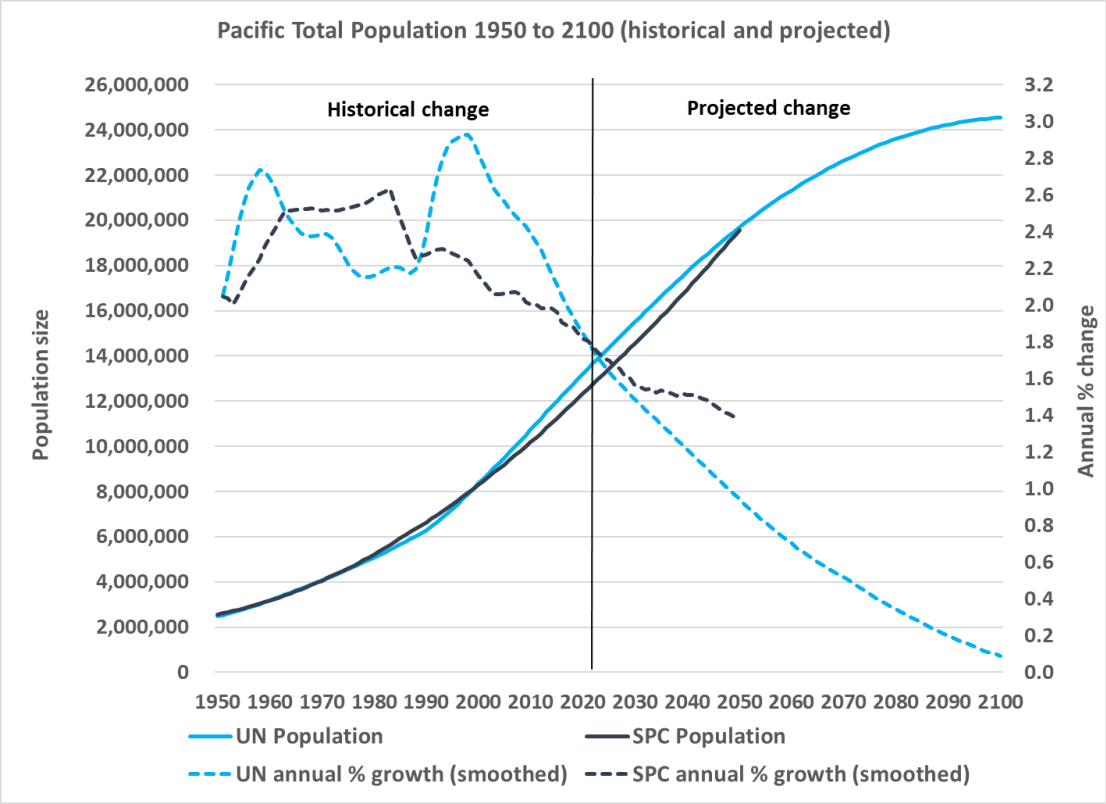
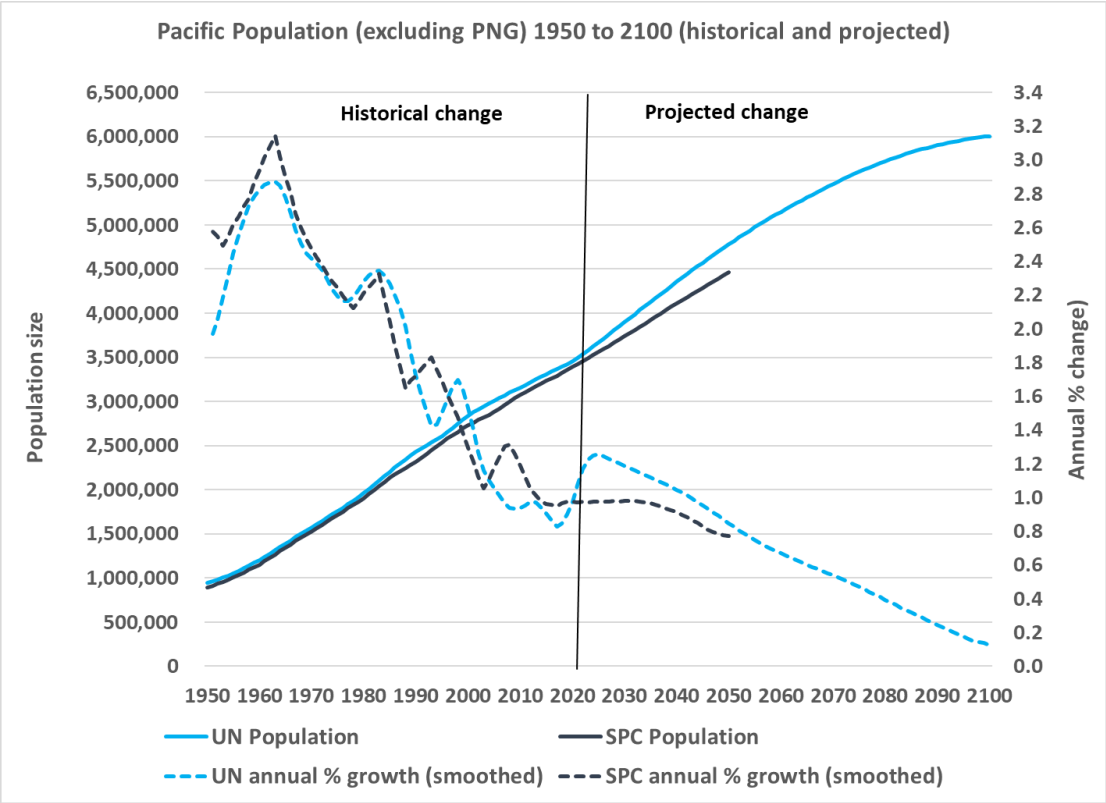


Figure 3: Population change in the Pacific (excluding PNG) , 1950–2100



Note: Solid lines show changes in the annual estimated and projected population over time. Dashed lines show percentage changes (3-year rolling averages) in the estimated and projected populations. The SPC's annual estimated and projected populations are shown in black; UN DESA's are shown in blue.

The UN DESA's projected populations between 2050 and 2100 are included in the graphs because most of the PICTs have populations which are likely to still be increasing in 2050, and this is certainly the case for PNG (Figure 1). It was not until late in the 21st century that some populations started to show signs of decline in absolute numbers in the projections.

The second message is that there is quite a bit of variability between the rates of population change for the SPC's and UN DESA's estimated populations (1950–2021) and projected populations (2022–2050). There was a lot of variability in the UN DESA's estimates for PNG's population as revealed in the peaks and troughs in the dashed blue line representing percentage changes in population numbers using 3-year averages. The major spike in average annual rates of population change in the 1990s is likely to be due to a belated adjustment made to the UN DESA estimates to accommodate the results of PNG's census in 1990.[21] The SPC's more consistent curve for changes in rates of population growth in PNG seems to capture better the impact of census enumerations every 10 years on population estimates.

The third and most significant message is the shift towards declining rates of population growth from around 1980 in the SPC's estimated and projected populations for PNG as well as for the Pacific region (Figures 1 and 2). The UN DESA's estimates show this decline setting in about a decade later, in the 1990s. Once PNG's population is removed from the total for the Pacific region, the trajectories for SPC's and UN DESA's annual growth rates for the region's remaining population are more similar with both showing a steady, if bumpy, decline from the 1960s (Figure 3). There are several minor peaks and troughs in the general downward trajectories for the two dotted lines, and some of these will be linked with adjustments made to SPC and UN DESA estimates as census results become available. Censuses in most Pacific countries are held during years ending in either 0, 1, 5 or 6.

While the estimated and projected populations of PNG, the Pacific region and the Pacific population excluding PNG all continue to increase between 1950 and 2100, the annual rates of population growth began falling reasonably consistently from the 1980s. Population growth is slowing throughout the region mainly because of declining fertility levels. Changing fertility profiles for Pacific subregional populations are discussed briefly in the next part of this section; more comprehensive commentary is in the national population profiles that are currently being developed.

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[21] PNG's first national population census was in 1966 followed by enumerations in 1971, 1980, 1990, 2000 and 2011. A census was scheduled for 2021 but that had not been held by mid-2023. Enumerating the total population has been very challenging for a number of reasons and there remains a debate about the actual size of the country's population. See, for example, Bourke, R.M. and Allen, B. (2021) Estimating the population of Papua New Guinea in 2020, *Development Policy Centre Discussion Paper No. 90*, The Australian National University. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3770356, and Laveil, M. (2023) PNG needs a census, not more population estimates, *The Interpreter*, 13 January 2023, The Lowy Institute, Sydney. Available at: https://www.lowyinstitute.org/the-interpreter/png-needs-census-not-more-population-estimates#:~:text=In%20December%20last%20year%2C%20a,and%2011%20million%20for%202022.

3.2 Subregional population change, 1950–2050

The grouping of PICTs into three subregions labelled Melanesia, Micronesia and Polynesia (all labels with colonial origins) is a common practice when seeking clusters of countries in the region with some similar cultural and, to a lesser extent, environmental attributes. In terms of demographic development, these subregions have some utility but there are more meaningful groups in the specific context of MFAT's in-scope countries which will be discussed briefly at the end of this section. Attention is focussed first on the three conventional subregions given MFAT's interest in having all countries in the region covered in the "region-wide analysis of the contemporary demographic context and dynamics that affect mobility." Graphs of population change between 1950 and 2050 are presented for the total populations in each of the subregions as well as for Melanesia excluding PNG.

Melanesia

Not surprisingly, the graph for population change between 1950 and 2050 in Melanesia (Figure 4) is very similar to that presented in Figure 1 given that PNG accounts for around 80% of Melanesia's population. When PNG's population is removed, the combined populations of Fiji, New Caledonia, Solomon Islands and Vanuatu have trajectories for absolute and relative population change between 1950 and 2050 which are quite different (Figure 5).

The SPC and UN DESA estimates for growth in the combined population for this group of countries track very closely up to the 2020s. This is partly because Fiji, with the largest population in the group (around 915,000 in 2023), has had regular reliable censuses since the late 19th century. Fiji's last census was in 2017 and its projected population for 2023 accounts for just under 40% of the 2.3 million people living in Melanesia, excluding PNG. Solomon Islands, with a population at its last census in 2019 of 721,500[22], is another 'Pacific giant' in terms of population and is projected to have more residents than Fiji by the early 2030s.[23] Vanuatu (300,019 in 2020[24]) and New Caledonia (271,400 in 2019[25]) have much smaller populations than their Melanesian neighbours, but these are still large by comparison with national populations in Micronesia and Polynesia.

[22] Solomons National Statistics Office (2020) Provisional count. 2019 National Population and Housing Census, Census Release 1/2020, 16 November 2020. Accessed at: https://www.statistics.gov.sb/images/SolomonFiles/Social-and-Demography-Statistics/2019_National_Population_and_Housing_Census/Provisional_Count-2019_Census_Result.pdf

[23] By the mid-2040s the medium variant projections produced by SPC and UN DESA both have a larger population in Solomon Islands than in Fiji given their different population growth rates.

[24] Vanuatu Bureau of Statistics (2021) *Vanuatu 2020 National Population and Housing Census. Basic Tables Report, Volume 1*. Port Vila, Vanuatu. Accessed at: https://vnso.gov.vu/index.php/en/statistics-report/census-report/national-population-and-housing-census/province#volume-1-basic-tables-report

[25] Rivoilan, P. (2020) New Caledonia's population growth declines sharply between 2014 and 2019, INSEE Premiere No. 1823. Accessed at: https://www.insee.fr/en/statistiques/4964074

Figure 4: Population change in Melanesia, 1950–2100

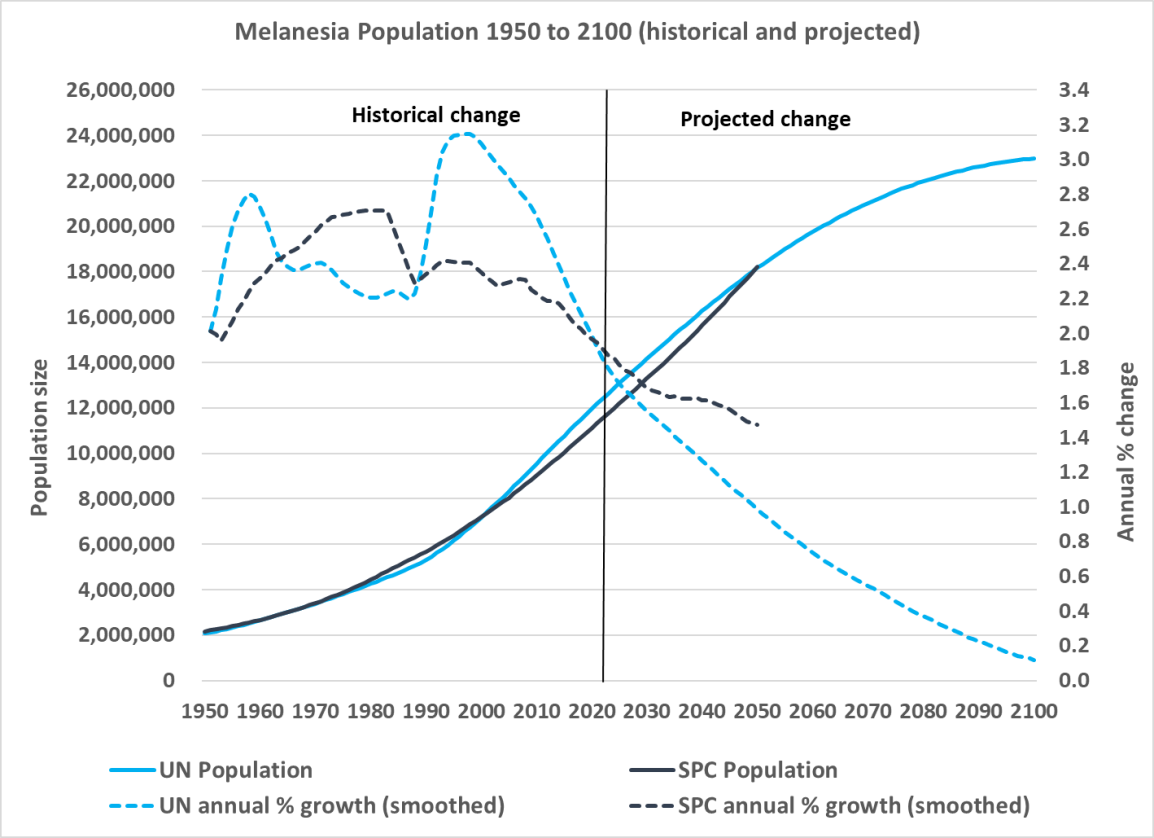
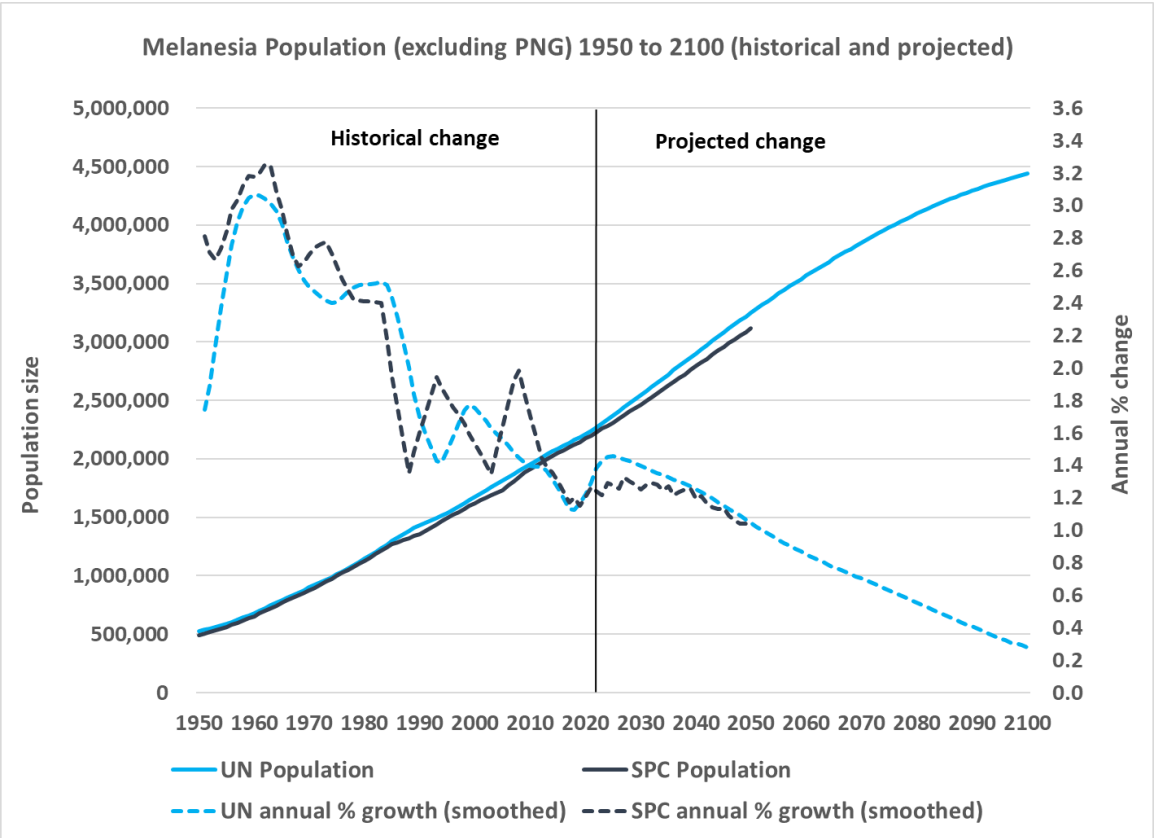


Figure 5: Population change in Melanesia (excluding PNG), 1950–2100



Declining fertility

Melanesia has experienced significant growth in its aggregate population since the 1950s and this growth will continue through to 2100, whether PNG is included or not (Figures 4 and 5). One of the reasons for this is the persistence of high fertility levels between 1950 and 2000 especially in PNG, Solomons and Vanuatu (Table 4). Data for New Zealand from the same source (UN DESA's Demographic Indicators) is provided for comparison. The total fertility rate or TFR (live births a woman would have, on average, during her reproductive life) is a useful indicator of fertility required to ensure ongoing population growth. When the TFR falls below 2.10 it means that there are not enough births to ensure population replacement.

Based on UN DESA's estimates of fertility levels before 2022, and assumptions about future fertility levels between 2022 and 2100, replacement-level fertility was reached from as early as 2017 in New Caledonia (2011 in New Zealand, according to UN DESA's estimates). However, there is plenty of momentum for ongoing population growth in the region because of the persistence of above-replacement levels of fertility until the 2040s or later in the other countries in the subregion (Table 1). UN DESA's projected TFRs suggest that Vanuatu's fertility may not reach replacement level until after 2100.[26]

Table 4: Total fertility rates (per woman) for Melanesia, 1950–2100[27]

	Total fertility rate (TFR)				Year TFR
Subregion	1950	2000	2050	2100	at 2.10
Melanesia	**5.84**	**4.27**	**2.36**	**1.89**	**2071**
Fiji	6.30	3.03	2.01	1.77	2040
New Caledonia	5.14	2.47	1.79	1.70	2017
Papua New Guinea	**5.71**	**4.53**	**2.33**	**1.87**	**2066**
Solomon Islands	**7.00**	**4.76**	**2.86**	**2.06**	**2095**
Vanuatu	7.14	4.48	2.88	2.12	after 2100
Micronesia	**6.00**	**3.25**	**2.20**	**1.85**	**2058**
Polynesia	**6.58**	**3.40**	**2.32**	**1.90**	**2073**
Aotearoa	**3.55**	**2.16**	**1.69**	**1.66**	**2011**

Source of data: UN DESA (2022).

Declining mortality

A related reason for the decline in fertility since the 1950s is the decline in infant mortality rates and an associated increase in life expectancy at birth. There remains a lot of

[26] There is a detailed discussion of fertility measures and estimates in Hakkert, R. and Pontifex, S. (2022) *Vanuatu 2020 National Population and Housing Census Analytical Report, Volume 2*, Vanuatu Bureau of Statistics and Pacific Community, Noumea, pp. 17–28. Available at: https://vnso.gov.vu/index.php/en/statistics-report/census-report/national-population-and-housing-census/province. On the basis of a range of assessments of the responses to census questions relating to children ever born, and Vanuatu's incomplete birth registration data, the authors concluded that a TFR of 3.7 children per woman was a reasonably reliable estimate for 2020 (see Summary of main indicators, p. xii). This compares with UN DESA's estimate of 3.78 for Vanuatu's TFR in 2020.

[27] Countries that are in-scope for the MFAT Climate (Im)mobility Research project are highlighted in red.

variability in infant mortality rates (IMR), which are expressed per 1,000 live births, and trends in this significant indicator of demographic change are summarised in Table 5. The estimates for 1950 and 2000, and the projected rates for 2050 and 2100, come from UN DESA's medium projection variant. PNG has the highest IMRs throughout the period and it is infant mortality levels in this country that have a major impact on the rates for Melanesia as a subregion.

Declining IMRs have a significant impact on life expectancy at birth and across the Pacific longevity has been increasing in all subregions. In Melanesia average life expectancy at birth (both sexes combined) in 1950 was below 40 years compared with 50 years in Micronesia, 49 years in Polynesia and 69 years in New Zealand. By 2000 the respective levels were: 63 years in Melanesia, 69 years in Micronesia, 73 years in Polynesia and 78 years in New Zealand. SPC and UN DESA both build further significant increases in life expectancy into their medium variant projections for 2050, and by that year life expectancy (both sexes) is projected to exceed 70 years in Melanesia, 76 years in Micronesia, 81 years in Polynesia and 86 years in New Zealand. Increases in longevity, along with declining infant mortality, make a direct contribution to population growth rates by reducing overall death rates.

Table 5: Infant mortality rates (per 1,000) for Melanesia, 1950–2050

	Infant mortality rate (IMR)				Year IMR
Subregion	1950	2000	2050	2100	under 10
Melanesia	**156.3**	**47.5**	**17.6**	**8.0**	**2083**
Fiji	90.8	18.8	8.9	4.8	2045
New Caledonia	125.4	18.8	4.8	2.0	2022
Papua New Guinea	**169.7**	**53.9**	**19.5**	**8.8**	**2091**
Solomon Islands	**166.4**	**25.3**	**9.9**	**5.1**	**2050**
Vanuatu	125.9	23.5	8.3	3.6	2043
Micronesia	**94.9**	**26.3**	**11.7**	**5.2**	**2058**
Polynesia	**104.2**	**14.0**	**5.4**	**2.2**	**2025**
Aotearoa	**27.7**	**5.3**	**2.1**	**0.9**	**1990**

Source of data: UN DESA (2022)

Low net migration

A third reason for Melanesia's sustained rapid population growth is that the Indigenous populations in all countries, except Fiji, have had limited opportunities for migration to other countries during the 20th and early 21st centuries. Fiji is an exception because it has a history of mobility of skilled and unskilled Indigenous Fijian and Fiji-Indian labour to New Zealand since the 1950s, and to Australia especially since the first military coup d'etat in Fiji in 1987. New Caledonia remains a colony of France, and while there has been significant population movement between France's Pacific territories and, for the

expatriate population, to the metropole in Europe, there has not been a lot of international migration of the Indigenous Kanak population of New Caledonia.[28]

UN DESA has included estimates of absolute levels of net migration as well as net migration rates (NMR) per 1,000 population in the demographic indicators that are presented in their various projection series. Their NMRs in 1950, 2000, 2050 and 2100 for the three subregions, the five countries in Melanesia and New Zealand are shown in Table 6. The rates for 1950 and 2000 are based on data relating to flows of people into and out of the respective countries/subregions while the rates for 2050 and 2100 are assumed balances between these flows.

The high net migration gains for Papua New Guinea in 2000 (7.6 per 1,000) is not an annual aberration; there is a sustained period of net gains from international migration to PNG's population at or above 7.0 per 1,000 (or over 40,000 a year) between 1992 and 2007, presumably linked with the development of the country's lucrative energy and mineral resources. In the case of New Caledonia, the net migration gains shown in Table 6 are associated with its ongoing status as a colony of France and the movement of labour within the French colonial cluster in the Pacific. In Fiji, Solomon Islands and Vanuatu the prevailing pattern between 1950 and 2000 has been net migration losses, not net gains.

Table 6: Net migration rates (per 1,000) for Melanesia, 1950–2100

	Net migration rate			
Subregion	1950	2000	2050	2100
Melanesia	**-2.896**	**4.764**	**-0.439**	**-0.157**
Fiji	-3.246	-7.278	-1.559	-1.627
New Caledonia	0	4.383	1.417	1.365
Papua New Guinea	**-3.134**	**7.626**	**-0.054**	**-0.043**
Solomon Islands	**0.738**	**-4.957**	**-1.305**	**-0.798**
Vanuatu	-3.174	-2.381	0	0
Micronesia	**-5.202**	**-13.950**	**-2.514**	**-2.500**
Polynesia	**-3.833**	**-11.621**	**-3.088**	**-2.976**
Aotearoa	**3.570**	**-1.576**	**2.188**	**2.144**

The net losses of around 3 per 1,000 population in Melanesia overall in 1950, and for Fiji, PNG and Vanuatu, were similar to those experienced in Micronesia and Polynesia in that year (Table 6). But by 2000 the net losses had become much higher in the latter two subregions, reflecting their very different experiences of international migration between 1950 and 2000 to those in Melanesia. UN DESA's projected NMRs for all three regions in 2050 and 2100 are very low by comparison with their historical experience of

[28] See Bedford and Hugo (2012), Burson and Bedford (2013) and Burson, Bedford and Bedford (2021) for reviews of the variable contemporary histories of international migration in Melanesia's five PICTs.

international migration. These are not projections that have built into them any assumptions about net losses to Pacific populations because of climate mobility.

Youthful age structures

Currently, the fastest population growth at a national level in the subregion can be found in Solomon Islands and Vanuatu. This is reflected in the persistence of their youthful age–sex structures. Figures 6 and 7 compare the percentages of the population in the two countries in each five-year age group in 1970 (grey shading) with their percentages in the population in 2020 (solid black lines).

The age–sex pyramids for 1950 both have a very wide base which is a defining characteristic of populations with very youthful populations that are consistent with sustained high fertility. The narrower bases of the pyramids in 2020 are a clear indication that fertility has been falling. The smaller gap between the bars for the 0–4 and the 5–9 year age groups in the 2020 pyramids signals that the decline is continuing. Figures 8 and 9 contain a similar comparison between the age structures in 2020 and 2050.

Figure 6: Population structure, Solomon Islands, 1970 and 2020

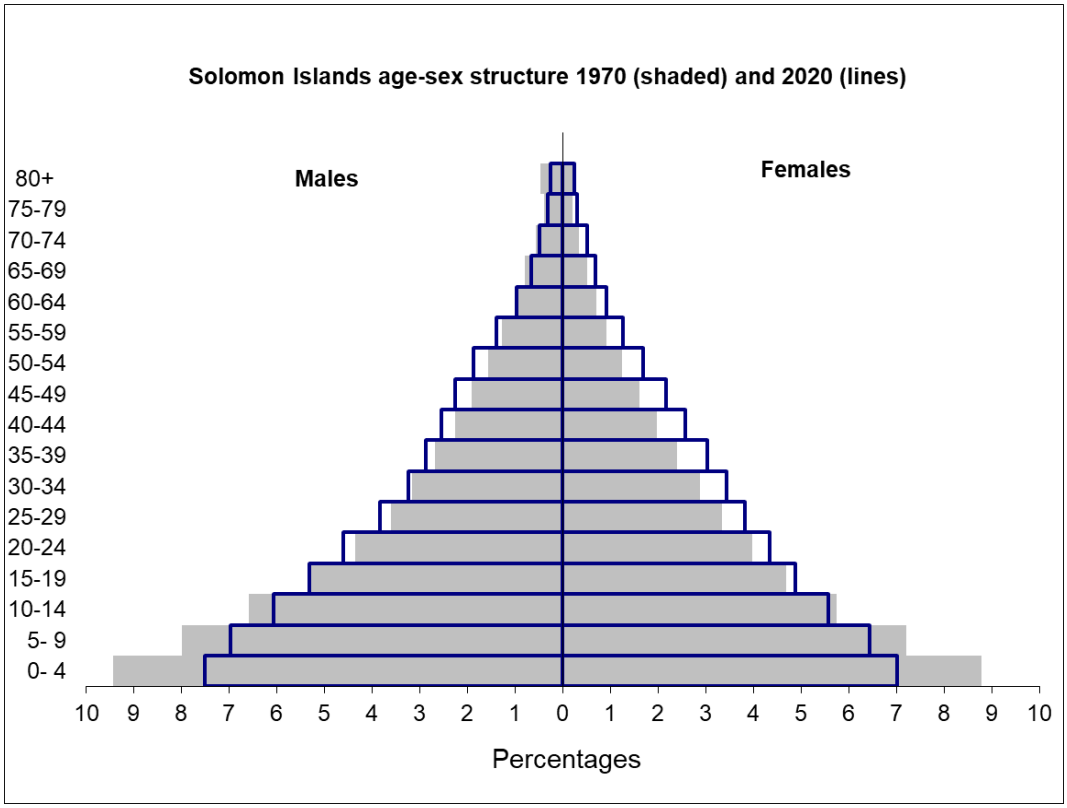


Figure 7: Population structure, Vanuatu, 1970 and 2020

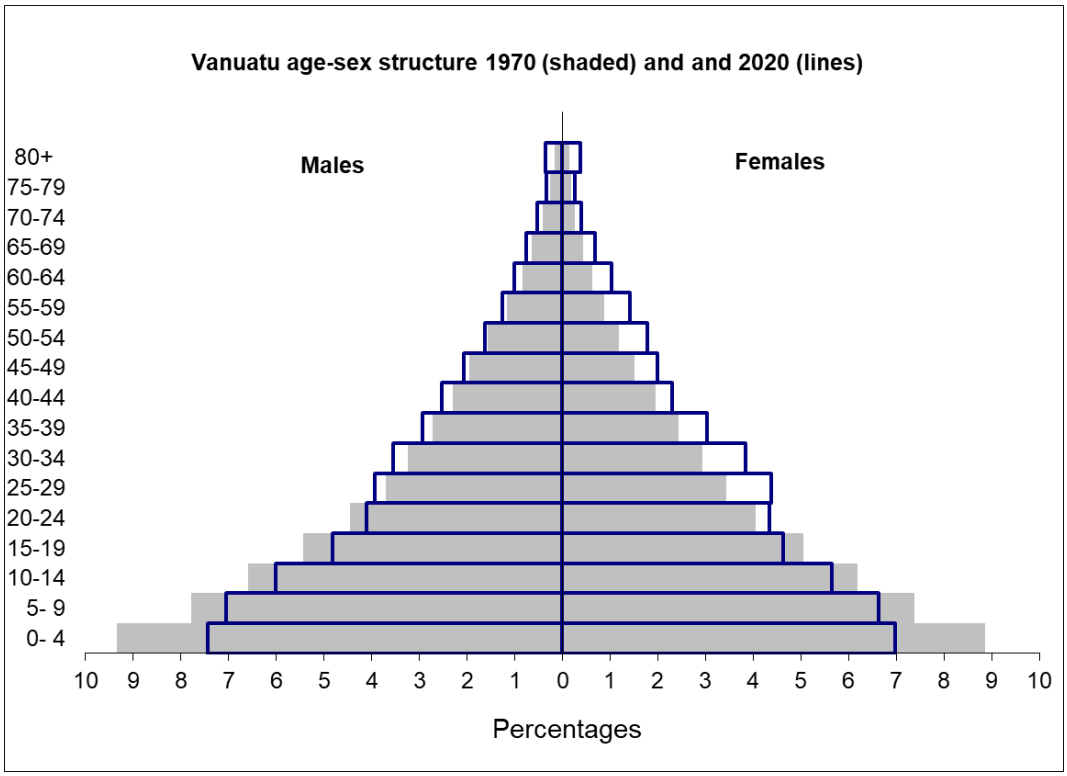


Figure 8: Population structure, Solomon Islands, 2020 and 2050

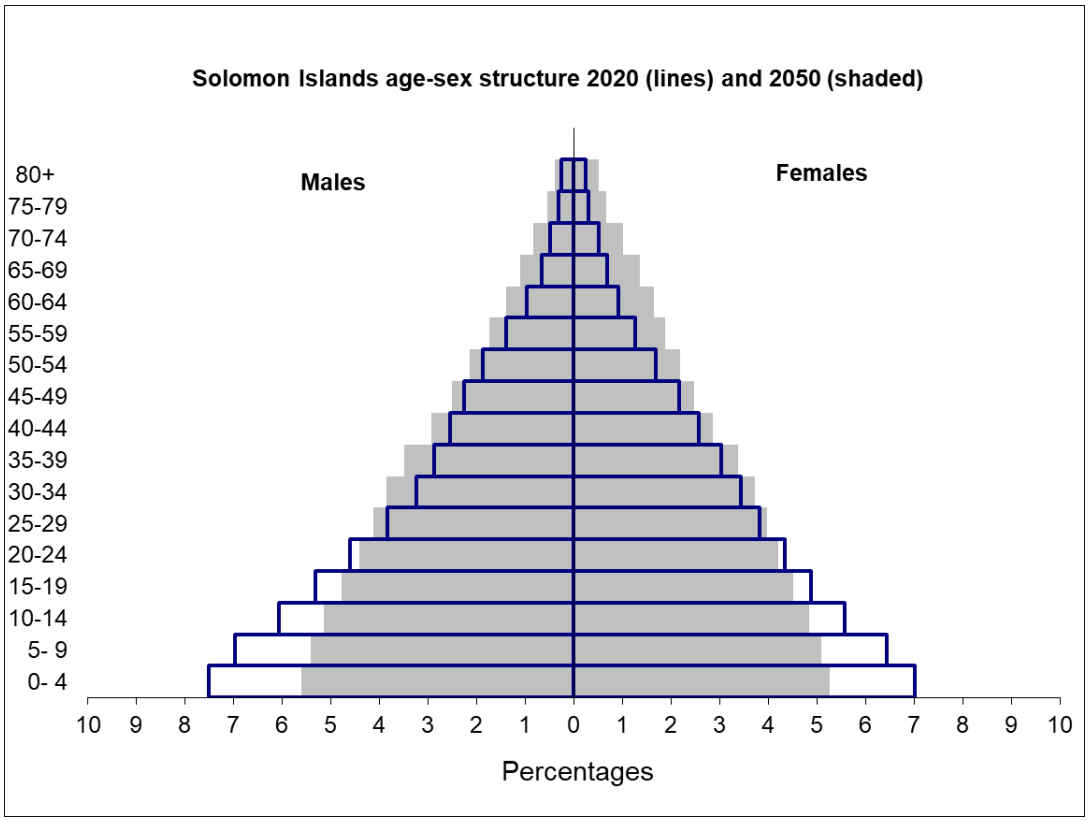
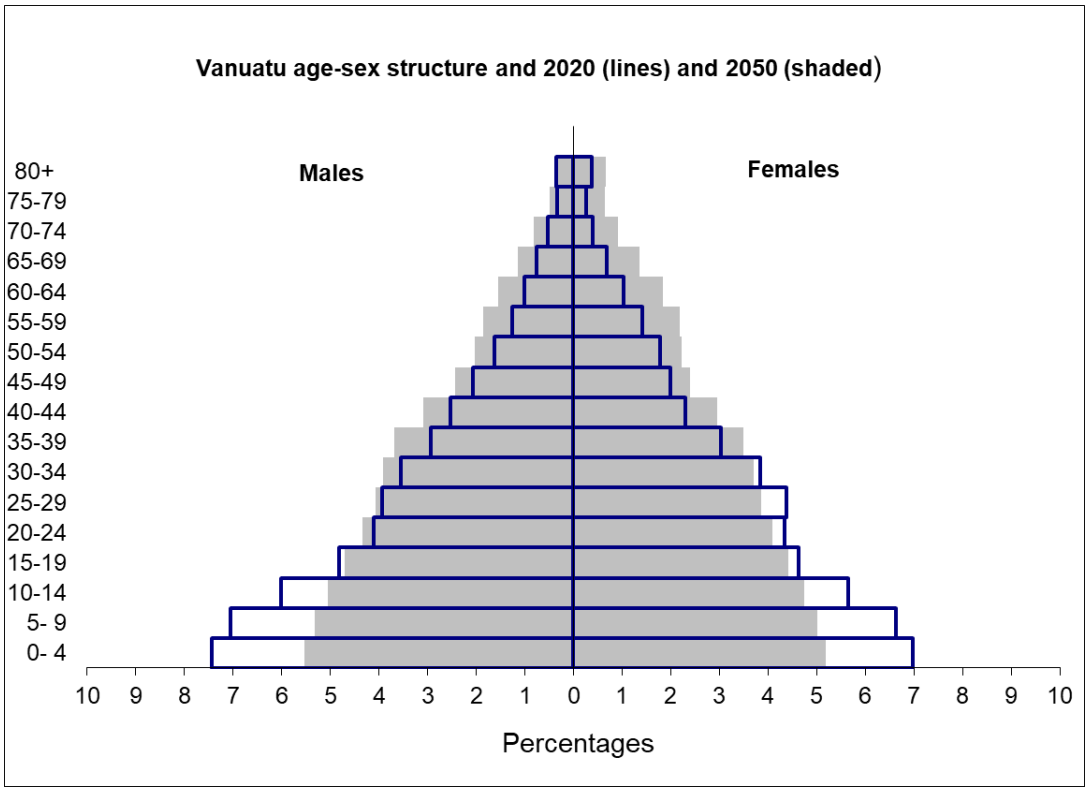


Figure 9: Population structure, Vanuatu, 2020 and 2050



Continued decline in fertility between 2020 and 2050 is reflected in smaller shares of the population in the younger age groups in the 2050 pyramids and larger shares aged 20 and above. There is also evidence of progressive improvements in life expectancy in the increased percentage of men and women aged 60 years and over by 2050. What is not shown in either pyramid is any discernible impact of the small net migration losses shown in Table 6. Migration is an age-selective process, favouring people in the younger working ages, especially men aged 20–49 years. Despite the sizeable numbers of ni Vanuatu involved in seasonal work schemes in Australia and New Zealand by the 2020s there is no obvious 'nip' in the bars in the pyramid for the age groups between 20 and 49 years (Figures 8 and 9). This phenomenon is a characteristic of the age structures of some of the populations in Micronesia and Polynesia.

Summary

In the early 2020s, Melanesia remains a subregion characterised by quite rapid population growth. A continuing legacy of high, but declining fertility and mortality rates, increasing life expectancy at birth and limited access to migration outlets overseas is the large share of the population in the younger working age groups. This is sometimes called a 'demographic dividend.' But to capitalise on that dividend there needs to be expanding opportunities for employment in economies that have been struggling for some time to meet the demand by Melanesia's youthful workforce for well-paid jobs in the public and private sectors.

Evidence of increasing pressure for opportunities to work and live overseas in the three western Melanesia countries can be found in responses to the Pacific Australia Labour Mobility (PALM) programme which allows low-skilled and semiskilled workers to be recruited for jobs in rural and regional Australia in a wide range of industries. Australia's Department of Home Affairs reported that in the year ended 30 June 2023 9,396 ni Vanuatu, 3,533 Solomon Islanders and 1,083 Papua New Guineans had been granted short-term and long-term PALM visas.[29]

These are by far the largest numbers of labour migrants from the three countries awarded visas during a given 12-month period to work in Australia for more than a century. In the year ended 30 June 2019, before COVID-19 severely disrupted flows of international migrants, visas issued to seasonal workers from these three countries were much smaller: 5,029 ni Vanuatu, 345 Solomon Islanders and 128 Papua New Guineans. The potential for significant temporary as well as permanent migration from these three countries is considerable, and Aotearoa, as well as Australia will be a favoured destination. In the year ended June 2023 7,100 ni Vanuatu, 960 Solomon Islanders and 248 Papua New Guineans arrived on Recognised Seasonal Employment (RSE) visas – the largest numbers recruited since the scheme began in 2007.[30]

Micronesia

Of the seven PICTs that comprise Micronesia, only two have much direct connection with Aotearoa and Australia. These are Kiribati and Nauru, former colonies, respectively, of Great Britain and Australia. They were both major sources of guano (phosphate) that was extracted by the British Phosphate Commission, a consortium of British, Australian and New Zealand commercial interests.

The other five PICTs, all north of the equator, have distinctive political relationships with the United States of America (USA). One is an unincorporated territory (Guam, a major military facility), one is a commonwealth in free association (the Commonwealth of the Northern Mariana Islands or CNMI), and three are independent states with Compacts of Free Association (Federated States of Micronesia or FSM, Marshall Islands and Palau). These states and territories were all administered by the USA under a United Nations trustee arrangement between 1947 and 1994.

All of Micronesia's countries and territories have small populations. The largest is Guam with an estimated population in 2021 of 170,500 (UN DESA; SPC 178,300). Two other countries had populations in excess of 100,000 around 2021 – Kiribati (119,438[31]) and

[29] C. Bedford (2023) The RSE in 2022–23 and the supply of Pacific labour: what is sustainable? Paper presented at the New Zealand Ethical Employers Conference, Tauranga, 19–20 July.
[30] C. Bedford and R. Bedford (2023) Staying ahead of the game. The RSE and PALM schemes, 2022–23. Paper presented at the RSE Conference, Christchurch, 2 August.
[31] National Statistics Office (2021) *2020 Population and Housing Census. General Report and Results.* Ministry of Finance, Bairiki, Kiribati. Accessed at: https://nso.gov.ki/census/kiribati-2020-2021-population-and-housing-census-data/

FSM (UN DESA 113,000; SPC 105,700). Total populations of the other four countries are: CNMI (2020) 47,329,[32] Marshall Islands (2021) 42,418,[33] Palau (2020) 17,614,[34] and Nauru (2021) 12,500 (UN DESA; SPC 11,800).

Population change

Micronesia's population more than trebled between 1950 and 2000 with average annual rates of growth ranging mostly between 2.0% and 3.5% over this period (Figure 10).[35] This growth has slowed since 2020, mainly as a result of extensive emigration to the USA. Some of the subregion's populations are already experiencing absolute numerical decline, as is evident in the recent census results for the CNMI, Marshall Islands and Palau.

Notwithstanding these declines, the medium variant projections by both the SPC and UN DESA have the subregion's population growing by over 130,000 between 2000 and 2050 to a total exceeding 630,000 in 2050. The numerical decline in Micronesia's total population does not emerge in the projections until around 2080 (Figure 10). Driving this ongoing growth of Micronesia's population is sustained higher fertility in Kiribati and the associated 'demographic dividend.' Kiribati's population is projected to be over 180,000 by 2050 and to reach 239,000 by 2100.[36] The quite different demographic outcomes for Kiribati in Micronesia are of interest because this is the only country in this subregion that is in-scope for MFAT's project on Climate (Im)mobility Research in the Pacific.

[32] United States Census Bureau (2022) *2020 Island Areas Censuses: Commonwealth of the Northern Mariana Islands (CNMI)*. Accessed at: https://www.census.gov/data/tables/2020/dec/2020-commonwealth-northern-mariana-islands.html

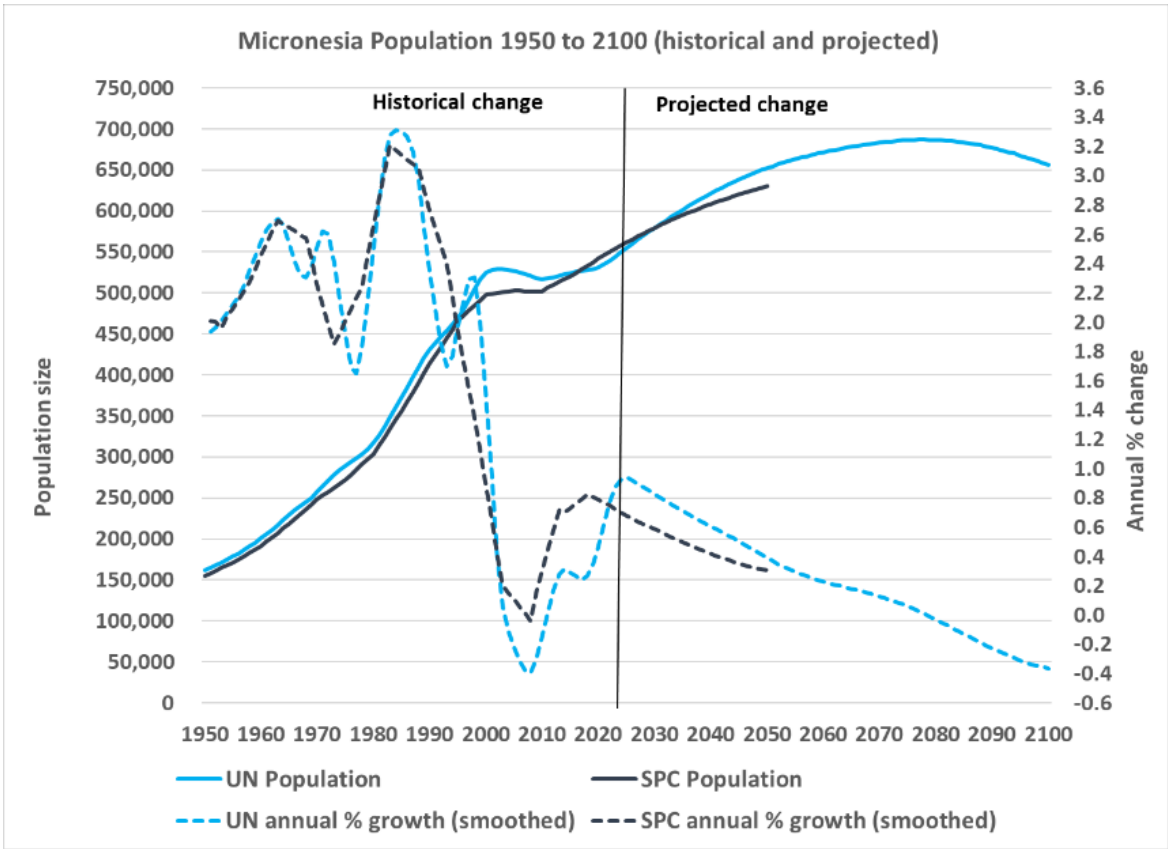
[33] The 2021 Population and Housing Census in the Marshall Islands enumerated a much lower population than was expected by the SPC. The SPC's estimate for 2021 was 55,000. UN DESA's estimate for 2021 of 42,050 was much closer to the enumerated total of 42,418. See Economic Planning and Statistics Office (2023) *Republic of the Marshall Islands 2021 Census Report. Volume 1: Basic Tables and Administrative Report*, accessed at: https://sdd.spc.int/news/2023/05/30/marshall-islands-2021-census-report-basic-tables

[34] Office of Planning and Statistics (2022) *2020 Census of Population and Housing of the Republic of Palau*, Koror, Palau. Accessed at: https://www.palaugov.pw/wp-content/uploads/2022/09/2020-Census-of-Population-and-Housing.pdf

[35] The SPC and UN DESA estimates for the total population of Micronesia in 1950 and 2000 are: 1950 – SPC 155,100; UN DESA 161,660. 2000 – SPC 497,600; UN DESA 525,390.

[36] The SPC's and UN DESA's medium variant populations give populations for Kiribati in 2050 of, respectively, 181,900 and 188,600. UN DESA projects a population of 239,000 for Kiribati in 2100, and this population is still growing.

Figure 10: Population change in Micronesia, 1950–2100



Declining fertility

UN DESA's estimated and projected TFRs, at 50-year intervals, between 1950 and 2100 are shown for Micronesia's PICTs and the subregions in Table 7. At the subregional level, there was a much greater decline in fertility in Micronesia between 1950 and 2000 (46%) than in Melanesia (27%). The same was not the case for Polynesia where the average TFR in 1950 (6.58 children per woman) was higher than it was in Micronesia (6.00 children per woman) and there was a 48% decline by 2000.

There is considerable variability in TFRs between states and territories in Micronesia. The most significant declines in fertility between 1950 and 2000 were in CNMI (65%) and Palau (67%).[37] As already noted, both these countries have small populations and, in the case of CNMI, population growth in the 1990s and early 2000s was heavily affected by labour migration from countries in Asia to work in a low-wage export-oriented garment

[37] The estimated TFRs reported by UN DESA for CNMI and Palau for 2000 are actually below the ones cited in Table 4. There was a short-lived dip in the data to TFRs below 2.0 between 1997 and 2002 in both countries which is out of line with estimates before and after this period. A sustained decline in TFRs below 2.10 is not achieved in the estimates and projections for CNMI and Palau until 2024 and 2033 respectively (Table 4).

industry.[38] This contrasts sharply with much smaller fertility declines in Nauru (25%), Kiribati (34%), FSM (35%), Marshall Islands (41%) and Guam (43%).

Table 7: Total fertility rates (per woman) for Micronesia, 1950–2100

	Total fertility rate (TFR)				Year TFR
Subregion	1950	2000	2050	2100	at 2.10
Micronesia	**6.00**	**3.25**	**2.20**	**1.85**	**2058**
CNMI	6.08	2.13	1.87	1.74	2024
FSM	6.59	4.28	2.04	1.78	2046
Guam	5.29	3.01	2.05	1.79	2047
Kiribati	**6.19**	**4.07**	**2.53**	**1.94**	**2080**
Marshall Islands	7.74	4.59	1.99	1.74	2043
Nauru	4.85	3.64	2.56	1.97	2082
Palau	6.74	2.17	1.92	1.75	2033
Melanesia	**5.84**	**4.27**	**2.36**	**1.89**	**2071**
Polynesia	**6.58**	**3.40**	**2.32**	**1.90**	**2073**
Aotearoa	**3.55**	**2.16**	**1.69**	**1.66**	**2011**

Fertility decline is projected to continue in all the subregion's countries with only two of the seven not achieving a TFR at or below 2.10 (replacement level) by 2050 (Table 7). The two exceptions are Nauru (2.56) and Kiribati (2.53). According to UN DESA's medium variant projections, the TFR in these countries will reach replacement level in the early 2080s. Because Kiribati has the largest population in Micronesia, its ongoing higher fertility keeps the average TFR for Micronesia above what would otherwise have been the case.

There is considerable variability in TFRs between states and territories in Micronesia. The most significant declines in fertility between 1950 and 2000 were in CNMI (65%) and Palau (67%).[39] As already noted, both these countries have small populations and, in the case of CNMI, population growth in the 1990s and early 2000s was heavily affected by labour migration from countries in Asia to work in a low-wage export-oriented garment industry.[40] This contrasts sharply with much smaller fertility declines in Nauru (25%), Kiribati (34%), FSM (35%), Marshall Islands (41%) and Guam (43%).

Two key messages emerge from this brief review of fertility in Micronesia. The first is that all the subregion's countries and territories, except for Kiribati and Nauru, will be

[38] See Short, F-M. C. (2005) An experiment in protecting workers rights: the garment industry of the Commonwealth of the Northern Marianas. Accessed at: https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1226&context=jbl

[39] The estimated TFRs reported by UN DESA for CNMI and Palau for 2000 are actually below the ones cited in Table 4. There was a short-lived dip in the data to TFRs below 2.0 between 1997 and 2002 in both countries which is out of line with estimates before and after this period. Sustained decline in TFRs below 2.10 are not achieved in the estimates and projections for CNMI and Palau until 2024 and 2033 respectively (Table 4).

[40] See Short, F-M. C. (2005) An experiment in protecting workers rights: the garment industry of the Commonwealth of the Northern Marianas. Accessed at: https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1226&context=jbl

experiencing a natural decrease (fewer births than deaths), rather than a natural increase (more births than deaths), in their populations by the second half of the 21st century. This will not necessarily be accompanied by absolute population decline for some time unless there are also persistent net losses of people through international migration. It is the combination of declining fertility and net migration losses that have contributed to the smaller populations in CNMI, Marshall Islands and Palau at the time of their last census in 2020 or 2021 than the numbers resident a decade earlier.

The second message is that persistent losses to the population through net migration overseas contribute indirectly to declining numbers of births in the source country by removing women in their reproductive age groups. Men and women in the prime labour force age groups (20–49 years), which also happen to be the prime age groups for childbirth, tend to dominate flows of long-term migrants everywhere. This results in many migrant women making their contributions to fertility overseas.

Declining mortality

At the subregional level, Micronesia's IMRs have consistently been lower than those found in Melanesia and higher than the rates in Polynesia (Table 8). At the country level, there is considerable variation in IMRs. Guam, with its large military base, and CNMI, with its sizeable migrant labour force in a small resident population, have consistently had IMRs that are less than half the subregional average while Kiribati and the Marshall Islands have consistently had higher than average rates (Table 8). The very low IMR for CNMI in 2000 (5.4 infant deaths per 1,000 births) almost matches that for Aotearoa in that year (5.3 infant deaths per 1,000 births).[41]

Kiribati and the Marshall Islands stand out as the exceptions to the general pattern (Table 8). Whereas UN DESA's medium variant projection has the other five PICTs with IMRs below 10 at some stage before the end of the 2040s, it is the 2080s before Kiribati's IMR falls to this level, and after the end of the century in the case of the Marshall Islands (Table 8). The atoll territories in eastern Micronesia are projected to retain IMRs at levels found in Melanesia rather than following their western neighbours to levels approaching those found in Polynesia. High infant mortality in Kiribati will continue to reduce the growth potential of their higher than average TFRs over the coming decades.

[41] The very low IMR for CNMI in 2000 was consistent with estimated rates in the preceding 2 decades and with projected rates from 2022.

Table 8: Infant mortality rates (per 1,000) for Micronesia, 1950–2050

Subregion	Infant mortality rate (IMR)				Year IMR under 10
	1950	2000	2050	2100	
Micronesia	**94.9**	**26.3**	**11.7**	**5.2**	**2058**
CNMI	45.4	5.4	3.4	1.9	1985
FSM	117.5	31.1	8.4	3.6	2044
Guam	41.9	10.1	4.9	2.1	2022
Kiribati	**146.4**	**51.7**	**18.6**	**7.0**	**2081**
Marshall Islands	92.8	34.0	17.8	10.5	after 2100
Nauru	64.2	25.7	9.4	3.5	2047
Palau	91.0	25.5	7.9	2.6	2042
Melanesia	**156.3**	**47.5**	**17.6**	**8.0**	**2083**
Polynesia	**104.2**	**14.0**	**5.4**	**2.2**	**2025**
Aotearoa	**27.7**	**5.3**	**2.1**	**0.9**	**1990**

Net migration rates

When assessing estimates of net migration gains and losses per 1,000 population in Micronesia it is important to keep in mind the access associated with the American administration of the five countries and territories comprising the Trust Territory of the Pacific Islands (TTPI) between 1947 and 1994. Nauru and Kiribati were not part of this UN-mandated trusteeship arrangement, but both were taken by Japan during the Second World War and joined their northern Micronesian neighbours under Japanese administration.

After the war thousands of Micronesians returned to countries where they had been living before the Japanese invasion of Micronesia in 1941. This movement accounts for some of the net migration losses to particular Micronesian countries in 1950 and the higher overall net losses for this subregion in that year than either Melanesia or Polynesia (Table 9). There are gaps in the net migration estimates for FSM and Kiribati; UN DESA does not have any estimates for most of the 1950s for these two countries (Table 9). By the time estimates started to be recorded (1960 in FSM and 1966 in Kiribati), net losses were the prevailing pattern.

The high net migration rates in 2000 for CNMI, FSM and the Marshall Islands make sense in the context of the access to residence in the USA that these countries have via their respective negotiated free association arrangements. What does not make a lot of sense is the zero net migration assumption for Marshall Islands in the UN DESA medium variant projections, nor the net losses of only one person per 1,000 population for CNMI and Palau around 2050 and 2100 (Table 6). These are very conservative migration assumptions given the histories of population movement between these countries and the USA.

Table 9: Net migration rates (per 1,000) for Micronesia, 1950–2100

Subregion	Net migration rate			
	1950	2000	2050	2100
Micronesia	**-5.202**	**-13.950**	**-2.514**	**-2.500**
CNMI	-33.357	-14.204	-0.988	-1.206
FSM	0	-23.751	-4.419	-5.188
Guam	-5.640	-9.725	-2.552	-2.725
Kiribati	**0**	**-5.759**	**-2.119**	**-1.674**
Marshall Islands	-7.473	-24.097	0	0
Nauru	-19.831	-20.315	-9.479	-11.244
Palau	-12.596	4.013	-1.197	-1.427
Melanesia	**-2.896**	**4.764**	**-0.439**	**-0.157**
Polynesia	**-3.833**	**-11.621**	**-3.088**	**-2.976**
Aotearoa	**3.570**	**-1.576**	**2.188**	**2.144**

The net migration loss of just under 6 per 1,000 population for Kiribati in 2000 is realistic given the limited access I-Kiribati have to residence visas in other parts of the region or countries on the Pacific Rim. There are small communities of Kiribati-born migrants in Fiji, Solomon Islands, Aotearoa and Australia but, aside from a small annual quota (75 places) in Aotearoa's Pacific Access Category, there are no privileged pathways to residence overseas for I-Kiribati or Nauruans like the ones their northern neighbours have to the USA. Notwithstanding the absence of these pathways, the very small net losses that are assumed in UN DESA's medium variant projection for Kiribati over the next 50 years are not realistic (Table 9). A combination of recent and proposed labour mobility initiatives in Australia and Aotearoa, along with the impacts of climate change, will lead to increasing, not falling, net migration losses of I-Kiribati to overseas destinations.

Looking ahead, all of Micronesia's populations are likely to see rising rather than falling net migration losses over the next 50 years. In combination with declining fertility, net migration losses are leading to absolute population decline in the small populations in CNMI, the Marshall Islands, Nauru and Palau. Population momentum, resulting from over 50 years when there have been more births than deaths each year, will continue to keep Kiribati's population growing to at least until 2050, even if net migration losses linked with climate change increase significantly (see below for an experiment with variable migration scenarios in Kiribati).

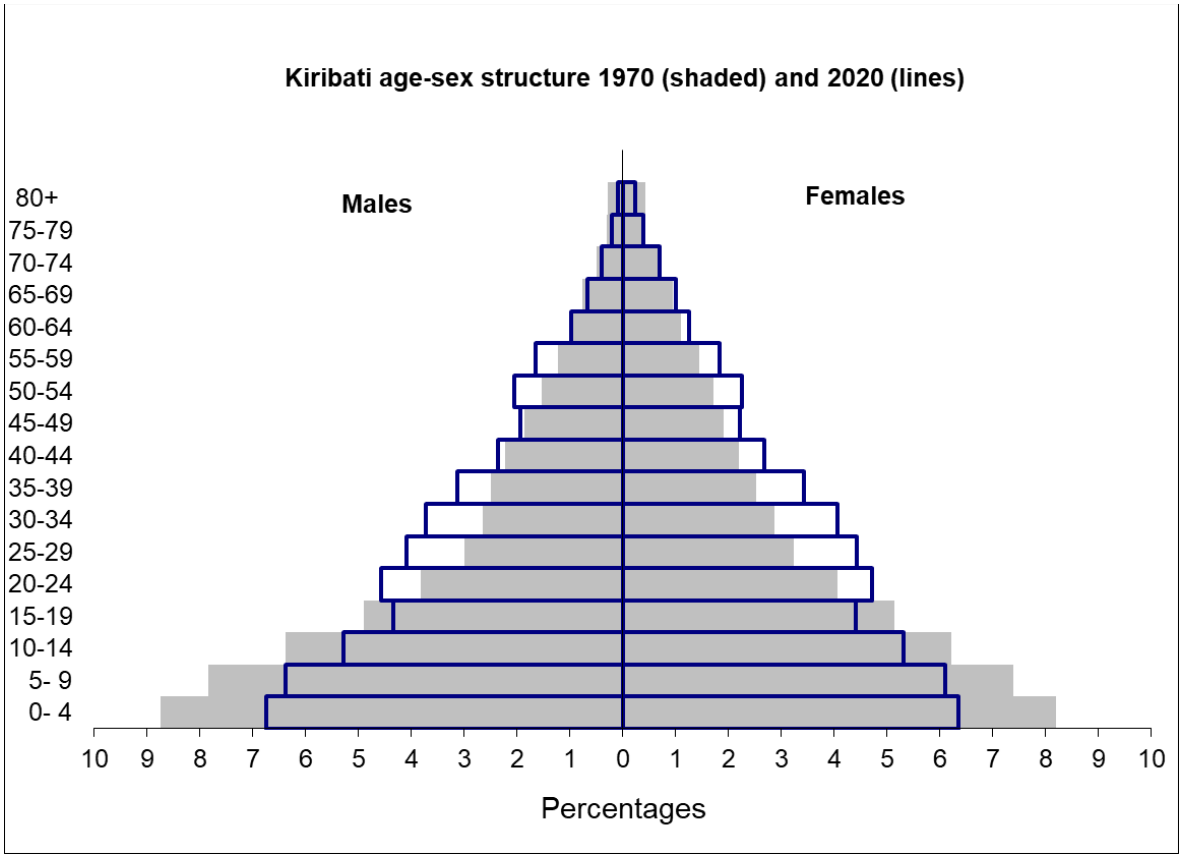
Variable age structures

Age–sex structures in Micronesia vary quite considerably reflecting differences in size of populations, their histories of fertility change and the extent to which they have been impacted by net migration gains and losses. The most youthful populations in 2021 are in Nauru and Kiribati where 50% of their residents are below their respective median ages of 20 and 21 years. These compare with a median age of 26 years for the Micronesia

subregion's population which is inflated by much older populations in CNMI (38 years), Palau (35 years) and Guam (30 years).[42]

It is worth commenting briefly on Kiribati's youthful age–sex structure (Figure 11) given that this is the only in-scope country from Micronesia and is the one in the subregion that is most likely to see Aotearoa as a potential destination for climate migrants longer term.

Figure 11: Population structure, Kiribati 1970 and 2020



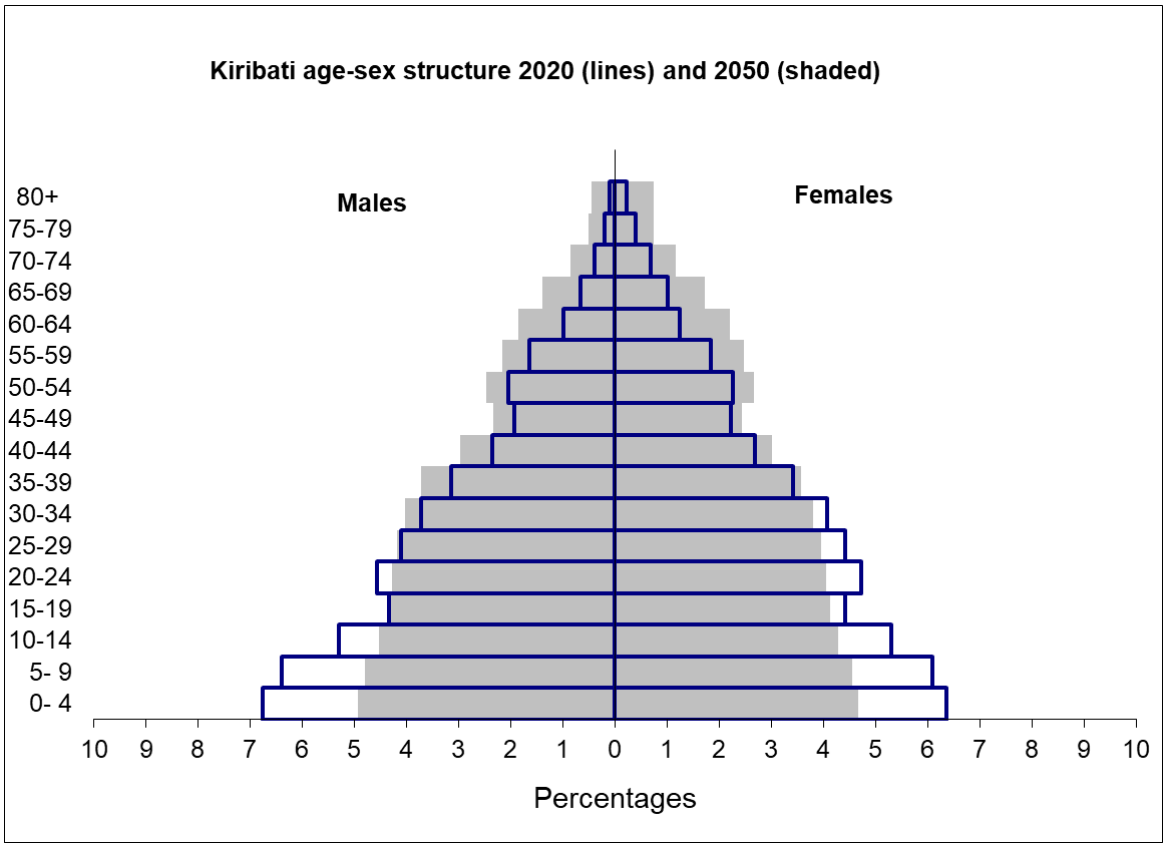
From the mid-1980s Kiribati has been included in a range of immigration policy initiatives in Aotearoa including a visa-waiver programme between 1986 and 2003, a temporary work programme between the late 1980s and 2003, the Pacific Access Category (PAC) since 2003, the RSE scheme since 2007, and a seafarer recruitment pilot programme since 2020. Since 1986 a small diaspora of I-Kiribati has evolved in Aotearoa and the 2018 Census of Population and Dwellings around 3,225 people self-identified as I-Kiribati.[43]

[42] See UN DESA (2022) Demographic indicators by region, subregion and country, 1950–2100. Accessed at: https://population.un.org/wpp/Download/Standard/MostUsed/. Comparable median ages for the populations of the other Pacific sub-regions and for Aotearoa and Australia in 2021 are: Melanesia 22 years; Polynesia 27 years; Aotearoa and Australia 37 years.

[43] The word "around" is used advisedly here – there was significant underenumeration of the Māori and Pacific populations in the 2018 Census of Population and Dwellings. See Bedford, R. (2020) Three population milestones: some comments and cautions, *New Zealand Population Review* 46: 36–53. Accessible at: https://www.researchgate.net/publication/354380816_Three_Population_Milestones_Some_Comments_and_Cautions

The percentages of people in each five-year age group in Kiribati in 1970 and 2020 are shown in Figure 11. The corresponding population pyramids for 2020 and 2050, based on UN DESA's medium variant projection, are shown in Figure 12.

Figure 12: Population structure, Kiribati 2020 and 2050



Two things stand out in the population pyramids. The first is the narrower base in the pyramids for both 2020 (Figure 11) and 2050 (Figure 12) which is clear evidence of declining fertility. The second is the widening of two broad age groups: the youthful working age population (20–39 years) and the increasing share of the population in the older age groups (50 and above). These reflect a combination of improvements in life expectancy and the fact that a smaller share of the population is in the 0–14 year age groups. The only age group that provides some evidence of an impact of overseas migration is the nip in the pyramid for the 15–19 year age group in the 2020 pyramid. This is likely to be related to the movement of students offshore for secondary and tertiary education.

An experiment with net migration scenarios for Kiribati

While the development of population scenarios is not in-scope for this particular report, it is useful to recall an earlier experiment with projecting the impact of different scenarios

for annual net migration losses on Kiribati's population growth through to 2050.[44] This experiment demonstrated that it will take substantial net losses to slow the momentum effect of growth generated by the country's youthful age structure. It is not until the 2040s that the cumulative impact of net losses that get as high as 2,400 a year by the 2030s lead to the population stabilising and then, by the 2040s, beginning to decline.

A range of scenarios with net migration losses for Kiribati were explored and just the one termed "major increase" is mentioned here. Over the course of this particular hypothetical scenario, net migration losses increase from -100 a year between 2010 and 2015, to -300 a year 2015–20, -600 a year 2020–30, -1200 a year 2030–40 and -2400 a year 2040–50. Under this scenario more than 52,000 I-Kiribati migrate overseas between 2015 and 2050 – the direct contribution that international migration makes to population change. In addition, there is the indirect contribution that the movement of potential mothers overseas makes, and this equates to a loss of 21,900 births to the Kiribati population between 2015 and 2050.

In this hypothetical scenario, increasing net migration losses accompanied by declining fertility and mortality levels in Kiribati trigger the onset of population decline during the 2040s. By 2050 the projected population (140,400) was 5,400 smaller than it had been in 2040 (145,800). The overall impact this scenario has on population change between 2015 and 2050 is to reduce the overall projected population growth in Kiribati by 68,800 – 5,000 more than the total population of South Tarawa in 2021 (63,072).

The key message from the experiment is that it is going to take substantial increases in net migration losses from Kiribati to have any major impact on the momentum of growth in their youthful population. Planning for substantial increases in migration from Pacific countries that is linked with climate change needs to keep the momentum effect of population growth in countries with youthful age–sex structures firmly in focus.

There is a very big difference between the impacts of migration on individuals and their families and communities, and the impacts of migration on the populations of countries. Migration as an adaptation strategy in the face of climate change will play out over many decades at the level of the national population. It is not something that will be able to be addressed by short-term policy responses. Consistent approaches to addressing climate (im)mobility in the Pacific, that can transcend the 3-year terms of government in Aotearoa, will be essential given the trajectory of future demographic change in the region.

Summary

The comparatively limited links between the peoples of Micronesia, other than Kiribati and Nauru, and Aotearoa and Australia are reflected in the very small populations born

[44] See Bedford, R. et al. (2016) Population change and migration in Kiribati and Tuvalu, 2015–2050: hypothetical scenarios in a context of climate change, *New Zealand Population Review* 42: 103–134. Accessible at https://population.org.nz/wp-content/uploads/2017/06/Vol-42-Full-document_Final.pdf

in the other five PICTs that are resident in the two southern Pacific Rim states. At New Zealand's census in 2018 there were 126 Micronesians in the usually resident population who had been born in CNMI, FSM, Guam, Marshall Islands and Palau.[45] In Australia, people born in these countries and territories were estimated to total 240 in June 2021.[46]

In the cases of people born in Kiribati and Nauru, the respective populations in Aotearoa (2018) and Australia (2021) were: Kiribati 2,196 (Aotearoa) and 1,070 (Australia); Nauru, 312 (Aotearoa) and 780 (Australia). Neither Aotearoa nor Australia are major places of residence for I-Kiribati or Nauruan transnational populations at this stage, but they could become much more significant destinations in the future, given a range of historical and contemporary migration links.[47]

Polynesia

Most of the nine PICTs that comprise the subregion termed Polynesia[48] have sizeable transnational communities in Aotearoa that owe their origins to migration since the 1950s. These communities are integral parts of the wider societies and economies of Polynesia's countries and territories. They also continue to play a key role in the development of many of Australia's Polynesian communities that owe much of their early growth to the migration of Pacific citizens of Aotearoa across the Tasman under the terms of the Trans-Tasman Travel Arrangement which was signed in 1973.[49]

All PICTs in Polynesia have special relationships with powers on the Pacific Rim or in Europe that allow for migration opportunities that would not otherwise exist. American Samoa, like Guam, is an unincorporated territory of the USA. French Polynesia and Wallis and Futuna are colonies of France, and Tokelau remains under the administration of Aotearoa. The Cook Islands and Niue, while self-governing, have a special relationship with Aotearoa that includes the right to citizenship. Samoa has a Treaty of Friendship with Aotearoa that includes provision for an annual quota of migrants who can become residents subject to certain conditions. Tonga and Tuvalu also have small annual quotas for migrants who can become residents of Aotearoa.

Temporary work schemes in Aotearoa for Samoans and Tongans from the 1970s, and for Tuvaluans from the late 1980s, encouraged population movement between the islands and their southern neighbour. These three countries have participated in Aotearoa's RSE

[45] Unpublished data on the birthplaces of Aotearoa's population, 1858–2018.
[46] See Australia's estimated resident population by country of birth as at 30 June 2021, 34090DO001_20201, accessed at https://www.abs.gov.au/statistics/people/population/australias-population-country-birth/latest-release
[47] See Burson and Bedford (2013) and Burson et al. (2021) for further information on the links between Micronesia's PICTs and the USA, Aotearoa and Australia.
[48] The following PICTs are included in Polynesia: American Samoa, Cook Islands, French Polynesia, Niue, Samoa, Tokelau, Tonga, Tuvalu, Wallis and Futuna..
[49] For a recent history of relations between Aotearoa, Australia and the Pacific Islands see Bedford, R. (2020) Australasia and the Pacific Islands, in C. Inglis, W. Li and B. Khadria (eds) *The Sage Handbook of International Migration*. London: Sage Publications, pp.311–325.

scheme since its inception in 2007 as well as Australia's Seasonal Work Programme (SWP) since 2012 and its Pacific Labour Scheme (PLS) since 2018.

Polynesia's PICTs have populations that range from 1,647 (Tokelau 2019[50]) to 278,786 (French Polynesia 2022[51]). Two have populations totalling less than 2,000 (Tokelau and Niue[52]), most of whom are citizens of Aotearoa by right. Three have populations between 10,000 and 20,000 – Tuvalu (10,778, SPC 2022), Wallis and Futuna (11,303, SPC 2022), Cook Islands (15,040, 2021[53]). Cook Islanders are citizens of Aotearoa, while those in Wallis and Futuna have rights to French citizenship. Two have populations between 40,000 and 110,000 – American Samoa (49,710, 2020[54]) and Tonga (100,179, 2021[55]). Two have populations over 200,000 – Samoa (205,557, 2021[56]) and French Polynesia.

Population change

While Micronesia's population trebled between 1950 and 2000, Polynesia's total population increased by just under 150% (Figure 13).

The much slower growth was a direct result of the impacts of net migration losses and declining fertility. Sustained net migration losses from the 1970s especially have had a significant indirect impact on fertility in many parts of Polynesia. It can be seen from Figure 13 that differences between the UN DESA's and SPC's annual estimates of Polynesia's total population began to widen from the late 1970s.[57] In 2000 the difference was 27,000 (4.5%); by 2021 it was 40,800 (6.0%). By 2050 the UN DESA's projected population for Polynesia (878,490) was 162,000 (22.6%) more than the SPC's projected population (716,500).

Polynesia's population experienced a pretty sustained decline in annual growth rates between the early 1960s and 2010 when there was a short-lived recovery before a return to sustained decline in both UN DESA's and SPC's estimates (Figure 13). It is not clear why UN DESA's estimates assumed a return to higher growth in Polynesia's population

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[50] Tokelau National Statistics Office (2020) 2019 Tokelau population count. Accessible at: https://www.tokelau.org.nz/site/tokelau/2019%20Tokelau%20Population%20Count.pdf

[51] French Polynesia's last census was in September 2022. The provisional total reported by Radio New Zealand on 25 November 2022 was 278,786, just below the SPC's estimate of 280,855. RNZ's report can be accessed at: https://www.rnz.co.nz/international/pacific-news/479456/french-polynesian-population-up-but-only-by-one-percent

[52] Niue's last census was in 2017 when the de facto population was 1,719. See Statistics and Immigration Office (2019) *Niue Household and Population Census 2017*. Ministry of Finance and Planning, Government of Niue. Summary accessible at: https://niuestatistics.nu/census/population-housing/

[53] Cook Islands Statistics Office (2022) *Census of Population and Dwellings 2021*. Ministry of Finance and Economic Management, Cook Islands Government. Accessible at: https://stats.gov.ck/2021-census-of-population-and-dwellings/

[54] US Bureau of Census (2020) Population of American Samoa 2010 and 2020. Accessible at: https://www.census.gov/data/tables/2020/dec/2020-american-samoa.html

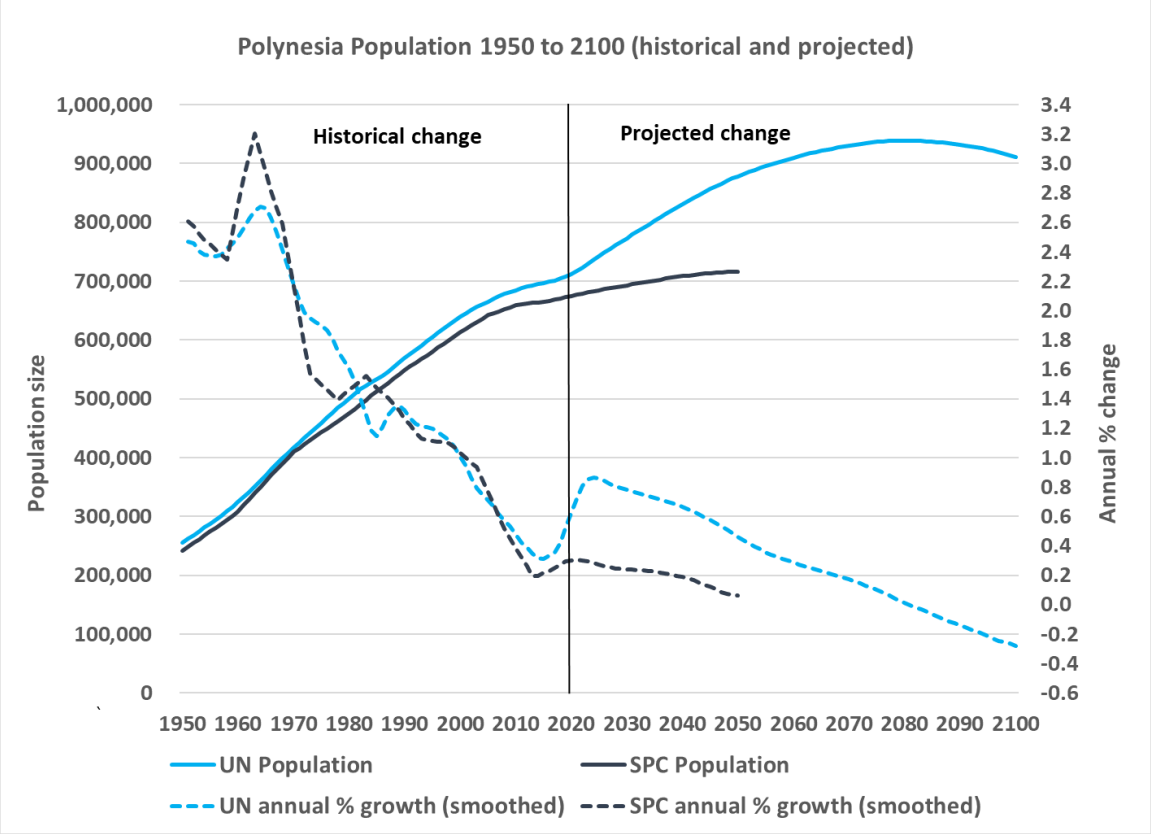
[55] Tonga Statistics Department (2022) *Tonga 2021 Census of Population and Housing. Volume 1: Basic Tables*. Nuku'alofa. Accessible at: https://tongastats.gov.to/census-2/population-census-3/

[56] Samoa Bureau of Statistics (2022) *Samoa Population and Housing Census 2021. Basic Tables,* Apia. Accessible at: http://sbs.gov.ws/documents/census/2021/Census-2021-Final-Report_221122_051222.pdf

[57] UN DESA's estimates for Polynesia's population in 1950 and 2000 were around 5% higher than the SPC's in both years. 1950 – SPC 242,200; UN DESA 255,000. 2000 – SPC 613,000; UNDESA 640,000.

between 2015 and 2020. This is where the gap between the projected populations for Polynesia by SPC and UN DESA begins to noticeably widen (Figure 13). The variation between the two sets of estimates and projections for subregional populations is much greater in the case of Polynesia than in the other two subregions. This becomes very clear when the solid lines in Figure 13 are compared with the solid lines in Figures 5 and 10.

Figure 13: Population change in Polynesia, 1950–2000



UN DESA's projected population of over 900,000 for Polynesia for most of the second half of this century seems much too high in the light of recent census results and migration trends. These recent data have yet to be used in updated medium variant projections for populations in Polynesia and the other subregions by either organisation. UN DESA's assumptions about fertility and net migration in their 2022 medium projection variant are reviewed briefly in the next two sections.

Fertility decline

Reference has already been made to the greater percentage change in the TFR for Polynesia (48%) between 1950 and 2000 than was the case in Micronesia (46%) or Melanesia (27%). However, at the subregional level, the TFR for Polynesia was slightly higher than that for Micronesia in 2000, 2050 and 2100 (Table 10).

Propping up Polynesia's fertility in all 4 years shown in Table 10 are higher than average TFRs for Samoa and Tonga, two of the larger populations in the subregion. French Polynesia, with the largest population and the lowest TFRs in 3 of the 4 years shown in

Table 7, offsets the much higher fertility of the two populations in central Polynesia (Table 10). Together with Wallis and Futuna, these were the first PICTs in Polynesia to reach subreplacement fertility when the TFR hits and falls below 2.10. According to UN DESA, Wallis and Futuna's TFR reached 2.10 in 2004 while French Polynesia passed this milestone in 2011, the same year as Aotearoa (Table 10).

The four PICTs in Polynesia that are projected to reach replacement-level fertility between 2020 and 2050 are all ones where most of their residents have rights to citizenship in either Aotearoa (Cook Islands, Niue, Tokelau) or in the USA (American Samoa). Fertility decline in these countries owes more to net migration losses of women in the reproductive ages than to conscious decisions by women in-country to reduce their family sizes. This is clearly evident in the population pyramids for the Cook Islands in 1970, 4 years before the international airport on Rarotonga opened and a much more sustained exodus of Cook Islanders for Aotearoa commenced, and 50 years later in 2020 (Figure 14).

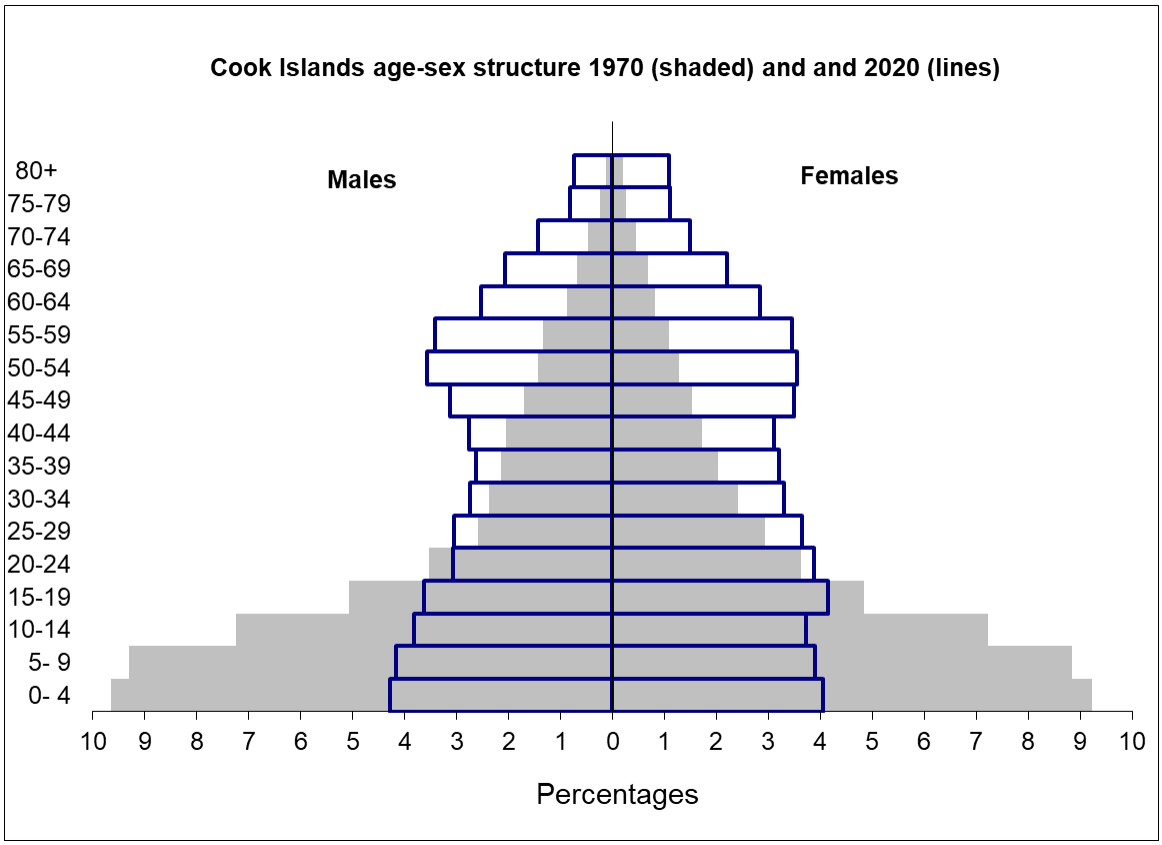
Table 10: Total fertility rates (per woman) for Polynesia, 1950–2100

	Total fertility rate (TFR)				Year TFR
Subregion	1950	2000	2050	2100	at 2.10
Polynesia	**6.58**	**3.40**	**2.32**	**1.90**	**2073**
American Samoa	6.16	3.95	1.89	1.74	2030
Cook Islands	**6.66**	**3.19**	**1.86**	**1.72**	**2028**
French Polynesia	5.55	2.60	1.64	1.64	2011
Niue	**6.33**	**2.94**	**1.97**	**1.75**	**2039**
Samoa	**7.39**	**4.51**	**2.83**	**2.01**	**2090**
Tokelau	**5.42**	**3.92**	**2.05**	**1.77**	**2046**
Tonga	**6.76**	**4.11**	**2.52**	**1.94**	**2080**
Tuvalu	**5.39**	**3.81**	**2.55**	**1.97**	**2083**
Wallis and Futuna	7.03	2.52	1.75	1.69	2004
Melanesia	**5.84**	**4.27**	**2.36**	**1.89**	**2071**
Micronesia	**6.00**	**3.25**	**2.20**	**1.85**	**2058**
Aotearoa	**3.55**	**2.16**	**1.69**	**1.66**	**2011**

The high growth potential of the Cook Islands population in 1970, reflected in the very wide base to the pyramid and the low median age (50% were aged 13 years or younger), transitioned into a population 50 years later with a much narrower base and a median age of almost 33 years. The large cohorts of children in 1971, especially the female children, did not produce births in the Cook Islands that would have sustained growth in the resident population. It is also clear from the population pyramid that the very low median age of the population in 1971 is as much a result of net losses of adults aged between 20 and 49 years through migration during the 1950s and 1960s. The percentages of children have been exaggerated by the smaller numbers of adults than would have been expected in a population with high growth potential.

Between the Cook Island censuses in 1971 and 2021 the in-country population declined from 21,322 to 15,040 while the Cook Island-born population in Aotearoa more than doubled from 7,389 in 1971 to 15,686 15 years later in 1986. Amongst the 8,300 Cook Island-born who left between 1971 and 1986 were many women in their reproductive ages. The Cook Islands population in 2020 had a much smaller share in the younger age groups, as a result of migration between 1970 and 2020, and much lower growth potential than it had in 1970 (Figure 14).

Figure 14: Population structure, Cook Islands, 1970 and 2020

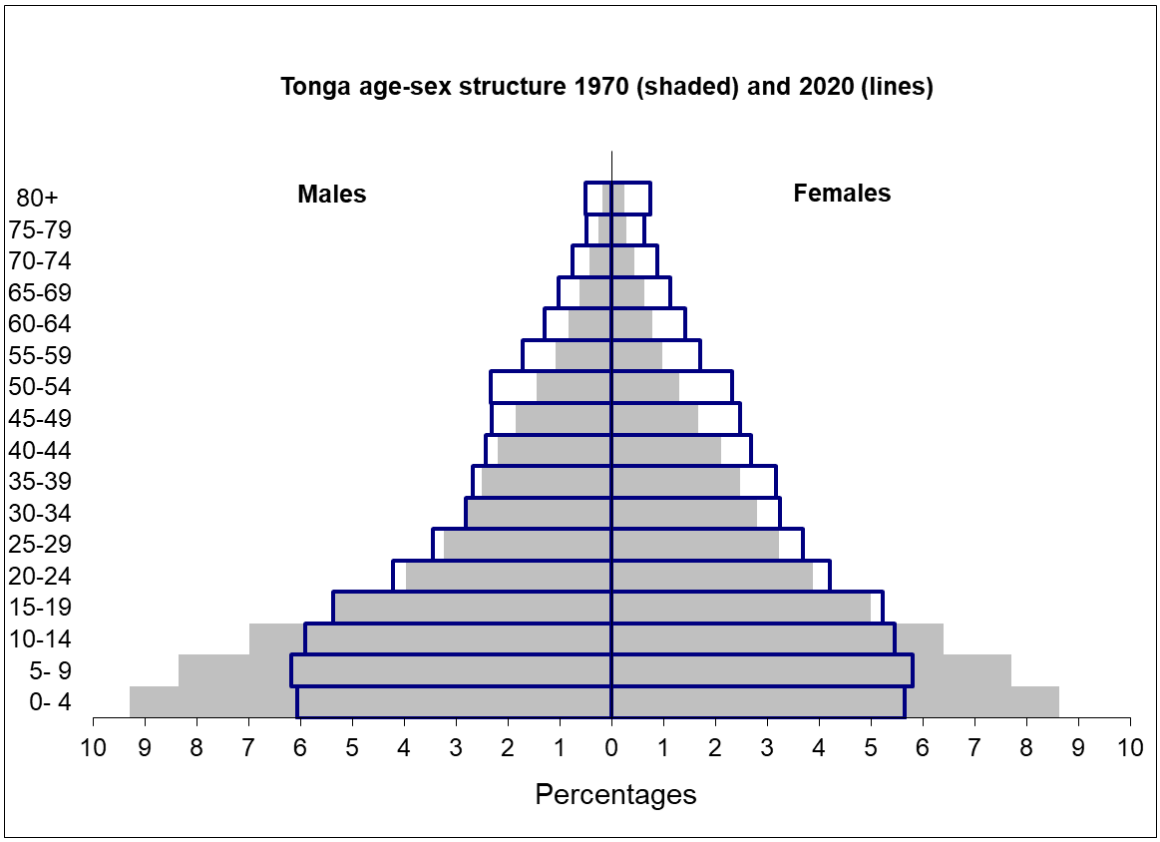


In Samoa, Tonga and Tuvalu fertility rates have remained higher, and these three populations are not projected to have TFRs at or below replacement until the 2080s (Tonga and Tuvalu) and 2090s (Samoa).[58] While the populations in these countries are eligible to apply for specified annual quotas of residence places in Aotearoa, they do not have the same freedom to migrate to countries on the Pacific Rim that the populations of American Samoa and the Realm countries do. Changes in the age–sex structure of Tonga's population between 1970 and 2020, for example, reflect the combination of in-country fertility decline in the narrowing base, and net migration losses in the smaller

[58] For comparison, it can be noted that the SPC's assumed TFRs in 2050 for Samoa (3.17), Tonga (2.62) and Tuvalu (2.63) are higher than the UN DESA's assumed rates for 2050 shown in Table 7: Samoa (2.83), Tonga (2.52) and Tuvalu (2.55).

shares of men and women in the prime productive and reproductive age groups than one would expect to find in populations with high growth potential (Figure 15).

Figure 15: Population structure, Tonga, 1970 and 2020



Declining mortality

Polynesia's population has lower IMRs and, correspondingly, higher life expectancies at birth[59] than are found in the populations of Micronesia and Melanesia (Table 11).

There continues to be a lot of variability in IMRs between Polynesian populations in the 4 years covered in Table 11 and some of these are difficult to explain. For example, why have Niue and Tokelau, both with small populations, persistently had quite different IMRs, and why are these differences projected to continue? The much higher IMRs in Niue seem counter-intuitive given that there is a weekly air service between Niue and Aotearoa which enables mothers to access a much wider range of health-related services before and after childbirth than are available to mothers in Tokelau. Despite this access, Niue's projected IMR in 2050 (10.6) remains more than three times higher than the projected rate for Tokelau (2.8) (Table 11).

[59] UN DESA's estimates of years of life expectancy at birth in the three subregions in 2021 are as follows: Polynesia – 75.5 (both sexes), 72.9 (males), 78.4 years (females); Micronesia – 72.0 (both sexes), 69.0 (males), 75.2 (females); Melanesia – 66.3 (both sexes), 63.9 (males), 69.2 (females). In 2021 UN DESA's estimates of life expectancies at birth in Aotearoa were – 82.5 (both sexes), 80.6 (males), 84.3 (females).

Table 11: Infant mortality rates (per 1,000) for Polynesia, 1950–2050

Subregion	Infant mortality rate (IMR) 1950	2000	2050	2100	Year IMR under 10
Polynesia	**104.2**	**14.0**	**5.4**	**2.2**	**2025**
American Samoa	54.0	12.0	3.3	1.3	2004
Cook Islands	**138.0**	**15.3**	**2.6**	**1.2**	**2009**
French Polynesia	110.2	8.8	2.7	0.9	1999
Niue	**95.1**	**26.4**	**10.6**	**4.6**	**2054**
Samoa	**108.7**	**17.8**	**6.8**	**2.6**	**2037**
Tokelau	**50.6**	**11.8**	**2.8**	**1.2**	**2005**
Tonga	**91.0**	**14.4**	**4.7**	**2.0**	**2020**
Tuvalu	**164.7**	**33.8**	**9.7**	**3.2**	**2049**
Wallis and Futuna	115.8	16.8	6.7	3.5	2022
Melanesia	**156.3**	**47.5**	**17.6**	**8.0**	**2083**
Micronesia	**94.9**	**26.3**	**11.7**	**5.2**	**2058**
Aotearoa	**27.7**	**5.3**	**2.1**	**0.9**	**1990**

Equally puzzling is the difference between IMRs for Tokelau and neighbouring Tuvalu. Both are countries of low-lying coral islands with restricted opportunities for people to move between islands and access centralised health services. Tuvalu's estimated IMR of 33.8 infant deaths per 1,000 live births in 2000 was almost three times higher than Tokelau's estimated IMR of 11.8. Annual IMRs of under 10 infant deaths per 1,000 live births were achieved in Tokelau in 2005; UN DESA's medium variant projection has this occurring in Tuvalu almost 50 years later in 2049. It can be seen in Table 8 that Niue and the Melanesia subregion population have more similar levels and patterns of change in their IMRs than is the case for Niue and the Polynesia subregion population.

The persistence of high IMRs for the populations in Niue and Tuvalu during the 21st century are exceptions to the general experience of sustained mortality decline in Polynesia. In countries like Samoa and Tonga, declines in infant mortality have played a role in maintaining their reasonably high TFRs which are summarised in Table 10. This is not so evident when IMRs for Niue and Tokelau are compared with their respective TFRs. Net migration losses, rather than declining fertility and mortality, have played a major role in reducing TFRs in the two very small Polynesian populations. This is another illustration of the interactions between different demographic processes and their variable impacts on patterns of population change in the Pacific.

Net migration rates

The variability in UN DESA's measures of mortality for PICTs in Polynesia is more than matched by the variability in their estimates and projections of NMRs per 1,000 population in 1950, 2000, 2015 and 2100 (Table 12). Perhaps not surprisingly from a technical point of view, there is a zero net migration assumption in the medium variant projections for Niue and Tokelau in 2050 and 2100. Specification of meaningful age and

sex-specific NMRs is difficult in very small populations. However, given the magnitude of the estimated NMRs for Niue and Tokelau in 1950 and 2000, zero net migration over a lengthy period from 2022 is not realistic (Table 12).

There are some very unusual figures for NMRs for specific countries which cannot all be reviewed here. However, two stand out in Table 12 that merit a brief mention. The first is the -23.980 NMR for American Samoa in 2100 – the highest negative rate for a single year between 2022 and 2100 for any country in the Pacific. UN DESA does record higher negative NMRs for American Samoa for 2001 (-24.441) and 2021 (-35.895) but these are halved for 2022 (-18.130) and then progressively reduced through to 2050 (-9.135). They start rising slowly again from 2051 (-9.221) and continue increasing through to the end of the century to reach -23.980 in 2100.

Table 12: Net migration rates (per 1,000) for Polynesia, 1950–2100

	Net migration rate			
Subregion	1950	2000	2050	2100
Polynesia	**-3.833**	**-11.621**	**-3.088**	**-2.976**
American Samoa	-2.465	-19.689	-9.135	-23.980
Cook Islands	**7.860**	**-54.535**	**-0.962**	**-1.014**
French Polynesia	4.130	-1.831	-0.288	-0.355
Niue	**-23.017**	**-37.895**	**0**	**0**
Samoa	**-12.818**	**-16.278**	**-4.676**	**-3.394**
Tokelau	**-52.634**	**-8.359**	**0**	**0**
Tonga	**0**	**-15.636**	**-6.077**	**-6.140**
Tuvalu	**9.779**	**-16.596**	**-4.531**	**-4.214**
Wallis and Futuna	-4.201	-5.219	-0.879	-1.011
Melanesia	**-2.896**	**4.764**	**-0.439**	**-0.157**
Micronesia	**-5.202**	**-13.950**	**-2.514**	**-2.500**
Aotearoa	**3.570**	**-1.576**	**2.188**	**2.144**

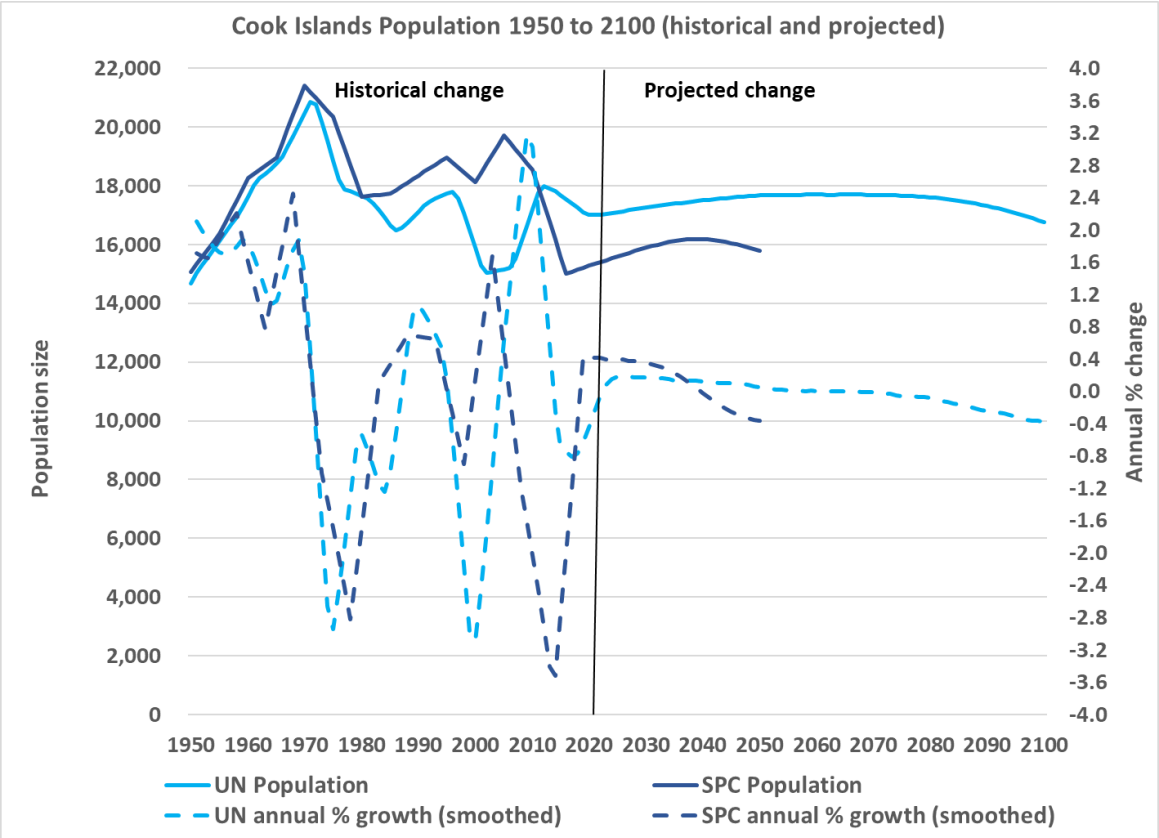
The projected net migration profile for this small unincorporated territory of the USA is completely different from the projected net migration profiles for any of the Micronesian PICTs with privileged access to American citizenship. The migration profile for American Samoa might be the only one in UN DESA's projections for Pacific populations that may have relevance in a world where migration in response to climate change results in increasing net losses of people to Pacific Rim countries. UN DESA's projected population for American Samoa in 2100 is 12,684 – just under four times smaller than the 2020 census population of 49,710. It is the only population in the Pacific region to experience such a dramatic decrease between 2020 and 2100 in UN DESA's medium variant projections.

At the opposite end of the spectrum, is the very low negative NMR for the Cook Islands in 2050 (-0.962 per 1,000 population). This looks particularly anomalous given the very high

rate in 2000 (-54.535 per 1,000 population) which is part of a short-lived period of much higher than average negative NMRs for the Cook Islands. By contrast with American Samoa, the Cook Islands population is projected to be roughly the same size in 2100 (16,790) as it was in 2022 (16,989) in UN DESA's medium variant projection. The NMRs for the Cook Islands start at -5.862 per 1,000 population in 2022 and get progressively smaller through to 2054 where they stabilise at -0.960 until 2071 when they start to rise again very slowly to reach -1.014 per 1,000 in 2100. This is not a profile of NMRs that is likely to have much relevance for the future population of the Cook Islands in the context of the impacts of climate change.

The annual estimates and projected populations for the Cook Islands between 1950 and 2100 produced by SPC and UN DESA are reproduced in graphical form in Figure 16.

Figure 16: Population change in the Cook Islands, 1950–2100



There are big differences in the estimates from around 1970 which are difficult to understand given that regular censuses of the Cook Islands population were undertaken throughout the 20th century and continue to be held every 5 years. What is clear is the trend towards a very slow increase and then decline in the UN DESA's projected population through to 2100. The SPC's projected population for the Cook Islands in 2050 (15,786) is almost 2,000 smaller than UN DESA's population (17,674) – a reverse of the situation in 2000 when the SPC's Cook Island estimate was 18,120 and UN DESA's estimate was 15,897 (Figure 16).

The key message to take from this brief discussion of NMRs in Polynesia is that generalising the impact of international migration on demographic change in small populations is difficult. As noted earlier, all of the subregion's populations have varying levels of access to work and residence in one or more Pacific Rim or European countries. The six PICTs that are either independent states (Samoa, Tonga, Tuvalu) or have some specific administrative arrangements with Aotearoa (Cook Islands, Niue and Tokelau). All have large transnational populations in one or more of Aotearoa, Australia and the USA. The resident populations in the Cook Islands, Niue and Tokelau are significantly smaller than their overseas-based populations. While these islands remain the cultural homelands for their dispersed populations, they have become places of second homes and good holidays for many. The small resident populations in the islands are, in one sense, a residual group rather than the core of the contemporary demography of Cook Islanders, Niueans and Tokelauans.

Variable age structures

Some examples of Polynesia's variable age structures have been discussed in the section on fertility (Cook Islands and Tonga). Essentially, the subregion's population structures fall into three groups. Firstly, there are two youthful populations with median ages of 21 or 22 years – Samoa (21) and Tonga (22, see Figure 15). These populations continue to have high growth potential although total numbers may not be increasing much because of the effects of net migration losses. This can be seen in the almost stable total population for Tonga between 2006 (101,991) and 2021 (100,179).

Secondly, there are three populations with median ages between 25 and 28 years – Tuvalu (25), Tokelau (27, see Figure 17) and American Samoa (28) – where the impacts of age-selective migration on population structures are much more evident than is the case with the first group. In the case of Tokelau, the very small resident population was significantly impacted by a New Zealand government-led scheme to resettle Tokelauans in Aotearoa in the 1960s.[60] This is evident in the heavily reduced adult age groups remaining in the islands in 1970 in Figure 17.

A longer term impact of this resettlement scheme, as well as ongoing net migration losses, was the significant decline in fertility that can be seen in Tokelau's population structure in 2020 (Figure 17).

The third group includes four older populations with median ages between 33 and 36 years – French Polynesia (33), Cook Islands (33), Wallis and Futuna (36), Niue (36). Access to residence rights in Aotearoa through citizenship has had a major impact on the structures of the populations of the Cook Islands (Figure 14) and Niue (Figure 18) over a long period and this has resulted in considerable ageing in the two populations.

[60] See Huntsman, J. and Hooper, A. (1996) *Tokelau: an historical ethnography*. Auckland: Auckland University Press.

Figure 17: Population structure, Tokelau, 1970 and 2020

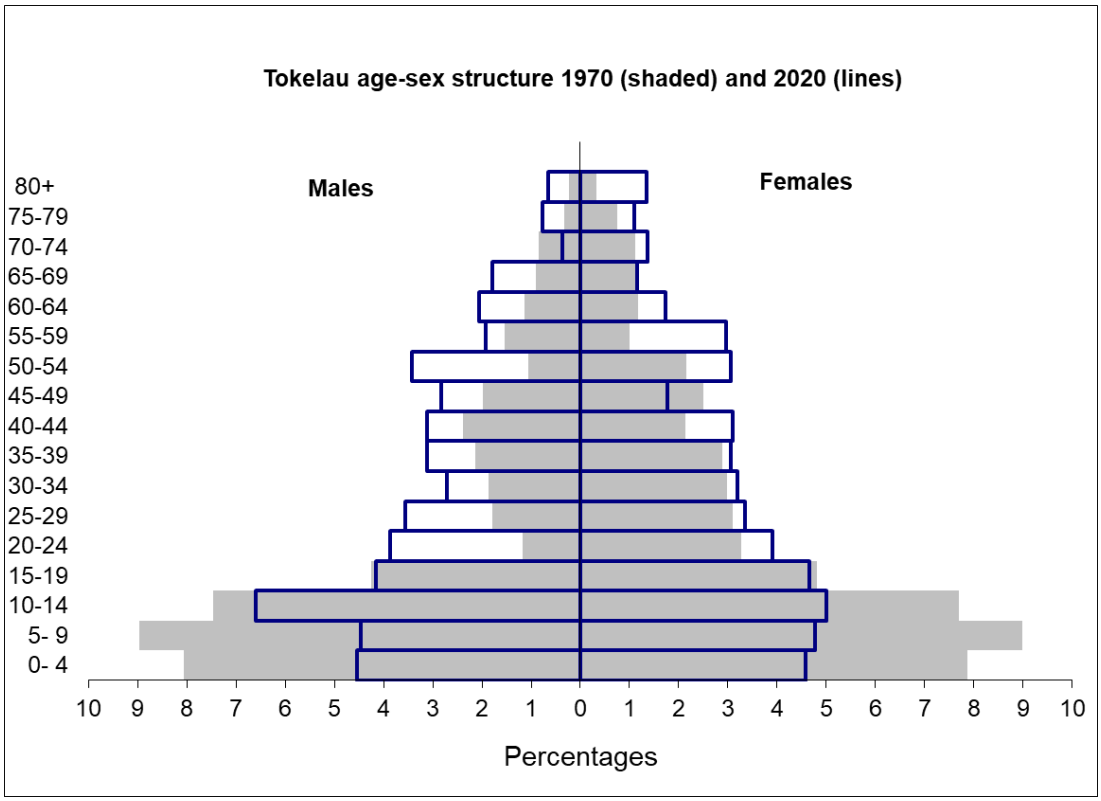
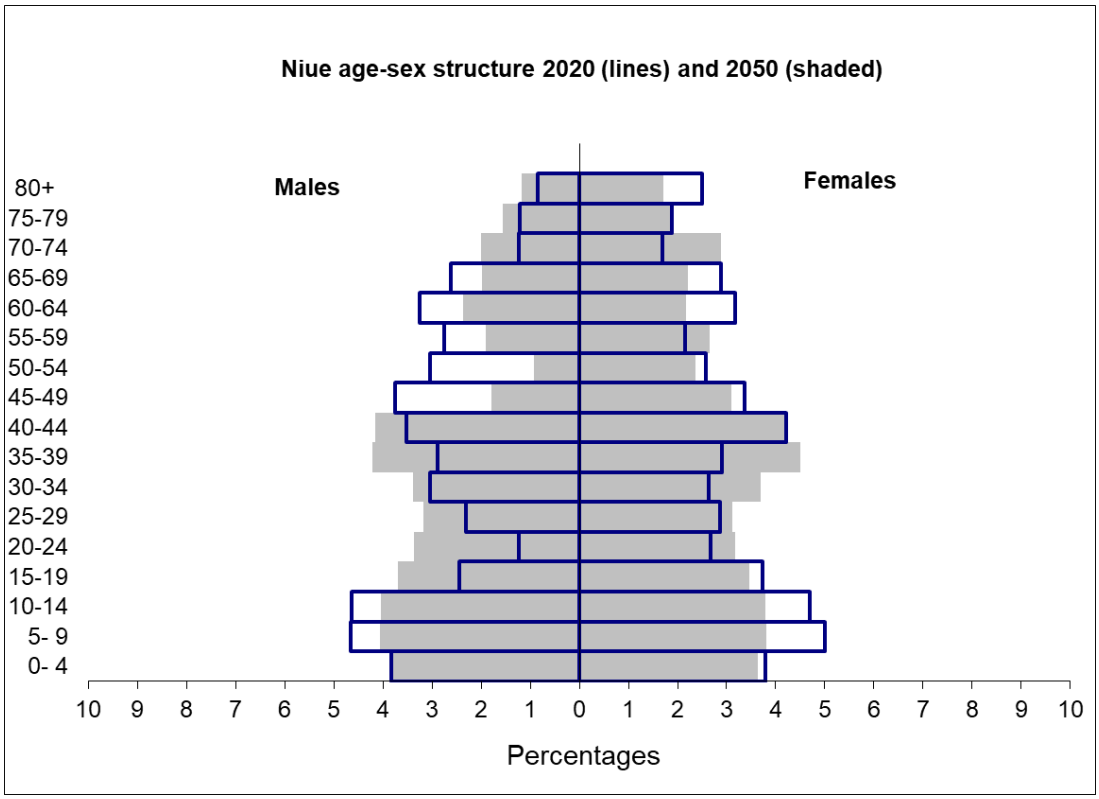


Figure 18: Population structure, Niue, 1970 and 2020



According to UN DESA's age–sex data, the shares of their populations aged 50 and over effectively trebled between 1970 and 2020: from 9.9% to 30.9% in the Cook Islands and

from 12.5% to 31.8% in Niue. The PACER Plus's Labour Migration Specialist, Alisi Holani, is currently leading research programmes dealing with intra-Pacific mobility pathways in both countries and one of the key potential demands for labour in Cook Islands and Niue is linked with caring for their ageing populations.[61]

It will be very clear from this brief comment that generalisation about Polynesia's age structures and their potential to support future population growth is most unwise. There are youthful populations like the ones found in Solomons, Vanuatu and Kiribati, especially in Samoa and, to a lesser extent now in Tonga. There are also populations that are much older, especially those with access to citizenship in Aotearoa like the Cook Islands, Niue and Tokelau. What is common to the six PICTs in the subregion that have access to residence in Aotearoa, either through common citizenship or through quotas and labour mobility schemes, is their large communities in Aotearoa, Australia and the USA. The enduring links fostered by mobility between overseas-based and island-based kin mean that in Polynesia, as in Micronesia, any meaningful assessment of their contemporary and future population dynamics needs to acknowledge their transnational distributions. This is the focus of the final part of this report.

Summary

Polynesia's populations, like those in Micronesia, have been heavily impacted by international migration and declining fertility since the 1950s. Their age–sex structures reflect these impacts with variable, but generally higher median ages and increasing shares of their populations aged 50 years and over. Two thirds of the nine PICTs in Polynesia had populations under 50,000 at their last census, and the prevailing trend in all of them is towards decline rather than growth in numbers. Net migration losses are not being compensated for by natural increase, despite fertility being above-replacement level in most of the populations and average life expectancy at birth in Polynesia (75.5 years) being higher than in either Micronesia (72.0 years) or Melanesia (66.3 years).

Much can be learned from the trajectory of population change since the 1950s in Polynesia when seeking insights into possible future climate (im)mobility in the region. Progressive net migration losses have resulted in significant populations overseas who continue to self-identify with one or more of Polynesia's distinctive ethnic groups. As we show later in the report, the subregion's countries and territories were the places of residence for around 43% of the people who self-identified with a Polynesian ethnicity in recent censuses in the islands and the three main destinations for their migrants on the Pacific Rim. This compares with 75% of Micronesians and 98% of Melanesians residing in their respective subregions. Polynesia's recent demographic history provides a window

[61] See entry on 'Intra-Pacific labour mobility' in the PACER Plus Implementation Unit's e-newsletter for March-April 2023 'Enhancing Pacific labour mobility for sustainable development.' Accessible at: https://pacerplusimplementationunit.cmail19.com/t/y-e-plhuuhk-ikkrluelh-a

into how people in the much more populous subregion of Melanesia especially might respond to more opportunities for movement to and from countries on the Pacific Rim.

The central Pacific subregion: a different configuration of states

Before shifting the focus of discussion to the distribution of Pacific populations within and between countries in the region, as well as in countries on the Pacific Rim, it is useful to challenge the conventional way of grouping PICTs into three "cultural" subregions and to acknowledge that there are other ways of clustering states that may have more relevance in the context of contemporary population dynamics as well as research into climate (im)mobility in the Pacific. One of these clusters is what we have termed the central Pacific subregion comprising four states that are usually included in Melanesia (Fiji), Micronesia (Kiribati, Nauru) and Polynesia (Tuvalu).

Fiji: a Pacific migration hub?

Burson et al. (2021, 42–44) make a case for Fiji as a migration hub in the central Pacific. Drawing on the UN DESA and World Bank matrices of overseas-born migrants, they show that Fiji stands out as both a source of migrants in other countries in the region, as well as being a destination for migrants born in other PICTs (Table 13). Major sources and destinations are shown in red.

One of the reasons for Fiji's quite disparate contemporary Pacific immigrant community[62] is that the country hosts the headquarters for several Pacific regional offices for the United Nations and other international agencies. It is also home to the secretariat of the Pacific Forum and some of the agencies linked with the Pacific Community. Its capital, Suva, one of the largest cities in the region, is the base for the main regional tertiary institution, the University of the South Pacific, which has satellite campuses in many of the countries in Melanesia and Polynesia as well as one in Kiribati. The National University of Fiji, with its large technical and medical training facilities, is also in Suva. For many years, opportunities for work as well as training in these agencies and institutions, and Fiji's manufacturing, retail, marine and commercial agriculture sectors, have attracted migrants from many Pacific countries.

With a population approaching one million, a well-developed hierarchy of urban places and more a diversified capitalist economy than other independent PICTs, Fiji has long been a major destination for short-term and long-term migrants from countries in the region as well as on the Pacific Rim. It has one of the region's oldest and most developed tourism industries and the largest regional airline, Fiji Airways, which provides regular services to several Pacific states as well as a range of destinations on the Pacific Rim.

[62] The major sources of data on migrants by country of origin and destination are the UN DESA and the World Bank. A brief discussion of the characteristics of these data can be found in Appendix 2 in Burson et al. (2021, 89–90). The UN DESA's migrant birthplace data that are cited in Table 13 are drawn from their 2019 database that can be accessed at: https://www.un.org/development/desa/pd/content/international-migrant-stock

Table 13: In-migrant and out-migrant populations for Fiji around 2019

Source/destination country	PICT-born in-migrants resident in Fiji	Fiji-born out-migrants resident in other PICTs
Melanesia	**904**	**489**
Fiji*	n.a.	n.a.
New Caledonia		
Papua New Guinea		160
Solomon Islands	**717**	**100**
Vanuatu	**187**	**229**
Micronesia	**791**	**733**
Guam		
Kiribati	**791**	**514**
Marshall Islands		118
Micronesia (Fed. States of)		
Nauru		101
Northern Mariana Islands		
Palau		
Polynesia	**2,113**	**1,518**
American Samoa		417
Cook Islands	33	127
French Polynesia		37
Niue		40
Samoa	**302**	**156**
Tokelau		
Tonga	**1,359**	**473**
Tuvalu	**419**	**54**
Wallis and Futuna Islands		

Source: Burson, Bedford and Bedford (2021, 44). Note: Fiji's recent censuses do not include detailed lists of birthplaces for their populations. Table 13 underrepresents the diversity of Pacific-born residents in Fiji, especially from countries in Melanesia and Micronesia.

A key reason for Fiji's prominence as a source country for migrants is the role its skilled workers, especially teachers, doctors, nurses, tradespeople, security personnel, retailers, hospitality industry staff and seamen, play in the economies and societies of other Pacific countries.[63] Fiji has been a source of skilled labour in other parts of the region, including Kiribati and Tuvalu, for many years. One of the reasons for this is because until very recently Fiji had a policy of compulsory retirement from public sector employment at 55 years of age.[64] This has meant that there has been a growing pool of

[63] See, for example, Iredale, R.C., Voigt-Graf, C. and Khoo, S.E. (2012) Trends in international and internal teacher mobility in three Pacific Island countries, *International Migration* 53(1), 98–114, and ILO (2019) *Labour mobility in Pacific Island countries*, ILO Office for Pacific Island Countries, Suva, p. 20.

[64] The retirement age for employees in Fiji's civil service has recently been raised to 60 years. See Circular 02/2023 which can be accessed at: https://www.mcs.gov.fj/publication/Circular%20%2002-2023%20-%20Retirement%20Age%20and%20Permanent%20Contracts.pdf

retired but still active skilled labour available for employment in other sectors in Fiji's economy or jobs overseas.

Fiji's involvement in intra-Pacific labour migration initiatives is discussed at some length in the ILO's report on labour migration in the Pacific, including the role of the Fiji Volunteer Scheme that was introduced around 2009.[65] This scheme has seen small numbers of retired Fiji professionals being recruited for employment in a range of skilled occupations in several Polynesian and Micronesian countries. In recent years, Fiji has also become an important source of labour in the tourism and domestic care industries in some Pacific countries, especially the Cook Islands and Samoa.

Looking ahead, Fiji is likely to assume increasing significance as a migration hub in the central Pacific. This role needs to be recognised in any assessment of future intra-regional migration flows, including those that can be linked to the impacts that climate change is likely to have on populations in the region, especially those in the neighbouring countries of Kiribati and Tuvalu.

Fiji's communities from Kiribati and Tuvalu

During the colonial era, Fiji became home to communities from two islands in the former Gilbert and Ellice Islands Colony (GEIC). These communities came from Banaba (Ocean Island), which was incorporated into the GEIC in 1900 after the discovery of phosphate there, and from Vaitupu, one of the islands that now comprise Tuvalu. Histories of these movements to Fiji, by a Banaban and a Vaitupuan, can be found elsewhere.[66] It is sufficient to note here that the resettlement of Banabans on Rabi Island in the late 1940s and the migration from Vaitupu to Kioa Island in the 1950s and 1960s, both off the east coast of Vanua Levu in Fiji, has led to established communities in Fiji of people whose ancestral links are with places in Kiribati and Tuvalu.

Since the early 20th century, Fiji has been the most important gateway for I-Kiribati and Tuvaluans wishing to travel to other Pacific countries as well as to countries on the Pacific Rim. Fiji's hospital and its tertiary institutions have played a major role in the provision of services to their northern neighbours and Fiji Airways is the only regular supplier of air services to both countries. Airports in Nadi and Suva are either the key points of arrival or transit for I-Kiribati and Tuvaluans travelling to Fiji or on to other parts of the region. Fiji's northern island of Rotuma is an important port of call for ships transporting cargo to and from Tuvalu.

The already strong links between Kiribati and Fiji were enhanced further in 2014 when the Government of Kiribati invested in a 2,210 ha block of land (Natoavatu Estate) on Vanua Levu "in a bid to enhance its economic and social resilience in the face of climate

[65] ILO (2019), p. 34.

[66] See, for example, Katarina Teaiwa (2015) *Consuming Ocean Islands: stories of people and phosphate from Banaba*. Indiana: Indiana University Press and Klaus Kock (ed.) (1978) *Logs in the current of the sea. Neli Lifuka's story of Kioa and the Vaitupu colonists.* Canberra: The Australian National University Press.

change."[67] At the time, President Anote Tong "did not rule out Kiribati people moving to Fiji in the future." In 2015, when opening a flood evacuation centre in the village of Welagi, Fiji's Prime Minister, Josaia Voreqe Bainimarama stated that "in 50 years or so [places like Kiribati, Tuvalu and the Marshall Islands] may no longer exist. And we may have to give some of these people homes in Fiji. ... [b]ecause we will never turn our backs on our island neighbours."[68]

These PICTs have colonial histories and contemporary links that could play increasingly important roles in the future international migration of I-Kiribati and Tuvaluans as scenarios for slow-onset climate change in the Pacific region become realities over the next 50 years. While the current governments of Kiribati and Tuvalu are not actively seeking options for resettlement overseas, it is clear from patterns of intra-Pacific mobility in the central Pacific in recent years that Fiji has been playing a major role in the development of their northern neighbours as well as other countries in the region.

All four countries in the central Pacific cluster are participating in temporary labour migration schemes in Australia and New Zealand. Remittances from labour migration are increasingly seen to be one of the key sources of revenue that can support households in adjusting to changing environmental conditions at home in the face of climate change. In the 2020s adaptation to climate change in their own countries, rather than resettlement overseas, is a clear preference for populations throughout the Pacific. However, this does not deny the significance of access to opportunities for education, skills enhancement, and employment overseas in strategies for furthering personal, family and community wellbeing and development aspirations in-country. In this context, an understanding of Pacific population distributions within countries, in other PICTs, and countries on the Pacific Rim is an essential component of the region's contemporary and future demography.

4. Population distribution within and between countries

Diversity in patterns of population change in the Pacific is matched by differences in the distributions of Pacific populations. Four dimensions of population distribution are considered in this section; two relating to where people live within their own countries, and two to where people from the different PICTs live elsewhere in the region and on the Pacific Rim. The two within-country dimensions of distribution relate to the shares of the population living close to the coast or at low altitudes on the one hand, and the shares living in rural and urban areas on the other.

[67] Radio New Zealand International (2014) Kiribati President says Fiji land investment for the future. 4 August. Accessed at: https://www.rnz.co.nz/international/pacific-news/251280/kiribati-president-says-fiji-land-investment-for-future

[68] Cited in Campbell, J.R. and Bedford, R.D. (2023) Climate change and migration: lessons from Oceania., in Anna Triandafyllidou (ed.) *Routledge Handbook of Immigration and Refugees* (2nd edition). London: Routledge, p. 379.

The regional averages for these measures of population distribution are very misleading, just as they are for measures of population change. This is because the shares of the region's total population living in particular types of locations are going to be effectively determined by the distribution of PNG's population. This is clear when it comes to the shares within 5 km of the coast and the shares living in urban areas which are located on coastal sites in most Pacific countries.

With regard to urbanisation, only 21% of the region's 12.5 million people in the early 2020s were living in towns according to SPC's estimates.[69] When PNG's 9.1 million residents (13% urban) are removed from the region's total, the share of the regional population living in urban areas increases to 44%. In the case of the share of the Pacific's total population living within 5 km of the coast (40%), when PNG's population (21% living within 5 km of the coast) is excluded, this rises to 90% with 14 of the 21 PICTs having 100% in this category.[70] In terms of all the measures of population distribution considered in this section, PNG needs to be treated separately.

4.1 Population distribution within countries

The SPC has compiled comparative data for the 21 PICTs relating to three dimensions of population distribution: 1) numbers and percentages living within 1, 5 and 10 km of the coastline; 2) numbers and percentages living 0–10 m and 0–20 m above sea level; and 3) numbers and percentages living in urban and rural areas.

There is a particularly useful paper by Andrew et al. (2019) explaining the methods for deriving the populations living close to the coast and why such estimates are useful in the context of assessments of vulnerability to climate-related hazards.[71] As noted above, most Pacific towns are located very close to the coast and in just over half (11) of the 21 PICTs more than 75% of their populations are living within 1 km of the coast.

Coastal and low-lying populations

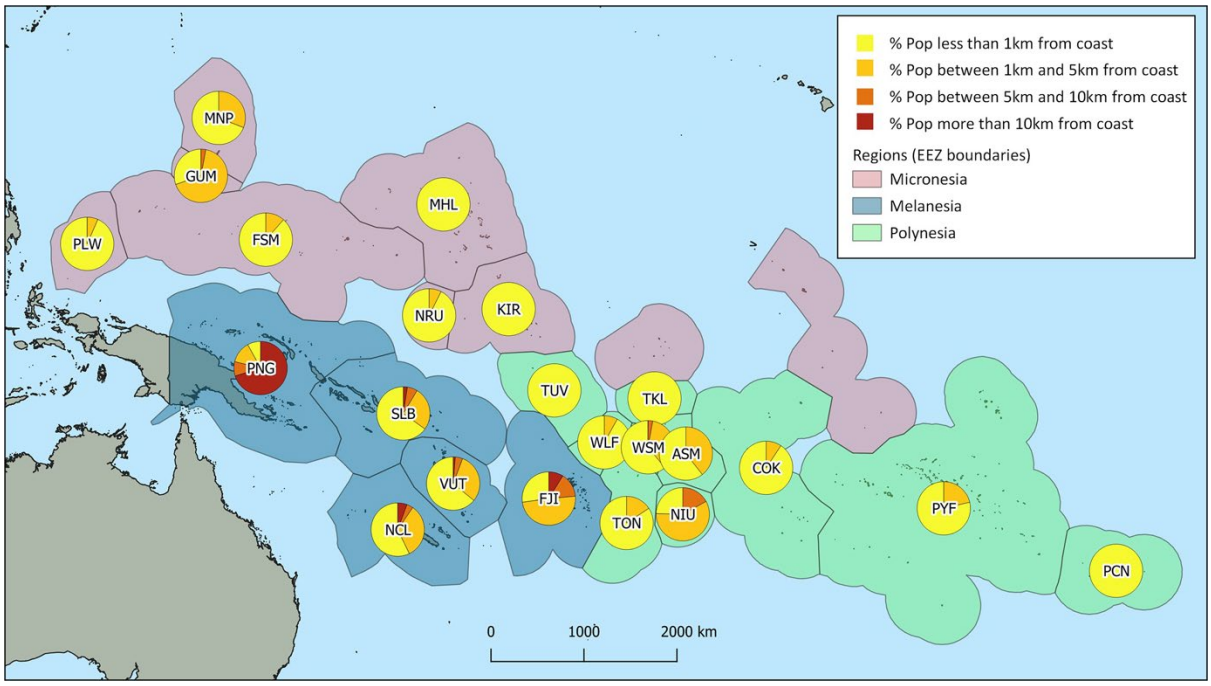
Andrew et al. (2019, 7) have provided a useful map showing the distribution of Pacific populations at different distances from the coast in each of the countries (Figure 19).

[69] SPC's data on degree of urbanisation can be accessed at: https://stats.pacificdata.org/vis?lc=en&df[ds]=SPC2&df[id]=DF_POP_URBAN&df[ag]=SPC&df[vs]=1.0&dq=..POPRFCOU..&pd=2022%2C2022&ly[cl]=URBANIZATION&ly[rw]=GEO_PICT&to[TIME_PERIOD]=false

[70] SPC's data on coastal populations 1, 5 and 10 km from the coast can be accessed at: https://stats.pacificdata.org/vis?lc=en&df[ds]=SPC2&df[id]=DF_POP_COAST&df[ag]=SPC&df[vs]=2.0&dq=..COASTALPOPRF..&pd=2021%2C2021&ly[rw]=GEO_PICT&ly[cl]=RANGE&to[TIME_PERIOD]=false

[71] Andrew, N.L., Bright, P., de la Rua, L., Teoh, S.J. and Vickers, M. (2019) Coastal proximity of populations in 22 Pacific Island countries and territories, *PLoS One* 14(9). e220249. Accessible at: https://doi.org/10.1371/journal.pone.0223249

Figure 19: Proportions of Pacific populations living within 1, 5 and 10 km of the coast



Given the smallness of most islands in Micronesia and Polynesia, they make the obvious point that no people on these islands live more than 5 km from the coast. In Micronesia, only Guam has a very small share (3%) living between 5 and 10 km from the coast. In Polynesia two countries have people living between 5 and 10 km from the coast – the large, raised coral island of Niue (13%), and part of the rugged interior of Savai'i in Samoa (3%). In the other 15 countries and territories in these subregions, all populations live within 5 km of the coast (Figure 19).

In Melanesia four of the five countries have more than 90% of their populations living within 10 km of the coast. PNG is the outlier with only 30% in this category; 70% of their population lives 10 km or more from the coast (Figure 19). In Vanuatu and Solomon Islands just under two thirds of their populations live within 1 km and over 90% within 5 km of the coast. By contrast, in Fiji, just under 30% live within 1 km of the coast with 76% living within 5 km. Except for PNG's population, Pacific peoples in the 21st century live close to the coast. This does not necessarily make all of them vulnerable to storm surges or tsunamis. Many islands have very rugged foreshores with steep cliffs. It is therefore useful to have some idea of the elevations above sea level of human settlements in the region.

The SPC has compiled a database showing the distribution of national populations at two elevations above sea level: 0–10 m and 0–20 m. The database is not complete – there are no data for PNG, Tokelau and Pitcairn. The Tokelau omission is surprising given that the three inhabited atolls are all in the 0–20 m category as they are in Tuvalu, Kiribati and Marshall Islands. Given the absence of data for PNG, there are no averages provided for the Pacific. However, of the countries for which data are available, almost equal shares

in the early 2020s were living below 20 m (51%) and above 20 m (49%). Just over a million (31%) of the region's 3.4 million population (excluding PNG) was living at or below 10 m above sea level. [72]

Five PICTs have 70% or more of their populations living at elevations under 10 m – three in Micronesia (Kiribati, Marshall Islands and Nauru) and two in Polynesia (Tokelau and Tuvalu). These residents accounted for 35% of the population of Micronesia and just over 1% of the population of Polynesia in 2021. When the upper end of the range is increased to 20 m only two more countries are added to the list of those with 70% or more of their residents in the 0–20 m category: Cook Islands (74%) and Tonga (78%). Four of the original five (Kiribati, Marshalls, Tokelau and Tuvalu) had 100% of their residents living at elevations under 20 m.

As Andrew et al. (2019, 11) point out, these data on shares of populations living close to the coast and at low elevations advance our understanding of the vulnerability of Pacific populations to ocean-derived threats but their policy relevance would be greatly enhanced if both dimensions were combined, at the household level, to give estimates of households close to the coast as well as being at low elevations. They go on to note that "elevation is often incorporated in analyses of exposure and vulnerability using the concept of the Low Elevation Coastal Zone (LECZ), which is defined as land area contiguous with the coastline and less than 10 m elevation."

Based on the knowledge they gained from their analysis of the data relating to proximity to the coast, and their appreciation of the topography of the different islands in Melanesia, Micronesia and Polynesia, Andrew et al. (2019, 12) hypothesise that when PNG is excluded from the analysis, around 95% of Pacific peoples live within the LECZ – under 10 km from the coast and under 10 m in elevation. Part of the reason for such a large share being within 10 km of the coast is the fact that most islands in the region are less than 20 km wide. The rugged interiors of many of the volcanic islands are also very lightly populated or have no resident populations in the 2020s. Migration from interior locations towards the coast has been a common trend throughout the region since the 19th century. Only PNG has significant populations living away from the coast, especially in the provinces that comprise the Central Highlands. This is also the only inland region in the Pacific with sizeable towns –the towns in other countries are all located on or near the coast.

It is important to acknowledge that these dimensions of population distribution privilege risk to hazards such as storm surges, tsunamis and flooding at low elevations. There are major climate-related hazards affecting populations in PNG that can occur away from

[72] SPC's data on absolute and relative frequencies for the population living at or below 10 and 20 m above sea level can be accessed at: https://stats.pacificdata.org/vis?lc=en&df[ds]=SPC2&df[id]=DF_POP_LECZ&df[ag]=SPC&df[vs]=1.0&dq=..LECZPOPAF..&pd=2021%2C2021&ly[rw]=GEO_PICT&ly[cl]=ELEVATION&to[TIME_PERIOD]=false and https://stats.pacificdata.org/vis?lc=en&df[ds]=SPC2&df[id]=DF_POP_LECZ&df[ag]=SPC&df[vs]=1.0&dq=..LECZPOPRF..&pd=2021%2C2021&ly[rw]=GEO_PICT&ly[cl]=ELEVATION&to[TIME_PERIOD]=false

the coast at higher elevations including droughts, extreme high and low temperatures, rain-induced landslides and flooding. Analysis of vulnerability to climate-related hazards in PICTS should not just focus on coastal and low-lying areas prone to damage from waves or floods. Drought and extremes in temperature are not restricted by topography or limited to coastal areas.

Rural and urban populations

In 2022 the SPC estimated that 2.73 million (21.3%) of the region's population of 12.8 million were living in towns and cities. When PNG's population of 9.3 million is removed, 1.51 million (44%) of the region's remaining 3.45 million residents were living in towns and cities (Table 14).

Table 14:Rural and urban populations in the Pacific. SPC estimates, 2022

	Population			% of total	
Country/territory	Rural	Urban	Total	Rural	Urban
Melanesia	**9,422,490**	**2,117,670**	**11,540,160**	**81.6**	**18.4**
Fiji	396,700	504,900	901,600	44.0	56.0
New Caledonia	90,530	183,800	274,330	33.0	67.0
Papua New Guinea	**8,101,330**	**1,210,540**	**9,311,870**	**87.0**	**13.0**
Solomon Islands	**602,970**	**141,440**	**744,410**	**81.0**	**19.0**
Vanuatu	230,960	76,990	307,950	75.0	25.0
Micronesia	**213,360**	**336,620**	**549,980**	**38.8**	**61.2**
Guam	10,790	169,110	179,900	6.0	94.0
Kiribati	**57,690**	**65,050**	**122,740**	**47.0**	**53.0**
Marshall Islands	14,160	40,290	54,450	26.0	74.0
Micronesia (Fed. States of) (FSM)	82,670	23,320	105,990	78.0	22.0
Nauru	0	11,930	11,930	0.0	100.0
Northern Mariana Islands (CNMI)	44,450	12,540	56,990	78.0	22.0
Palau	3,600	14,380	17,980	20.0	80.0
Polynesia	**408,160**	**270,580**	**678,740**	**60.1**	**39.9**
American Samoa	6,850	50,240	57,090	12.0	88.0
Cook Islands	**3,850**	**11,550**	**15,400**	**25.0**	**75.0**
French Polynesia	140,430	140,420	280,850	50.0	50.0
Niue	**980**	**550**	**1,530**	**64.1**	**35.9**
Samoa	**162,810**	**38,190**	**201,000**	**81.0**	**19.0**
Tokelau	**1,500**	**0**	**1,500**	**100.0**	**0.0**
Tonga	**76,450**	**22,840**	**99,290**	**77.0**	**23.0**
Tuvalu	**3,990**	**6,790**	**10,780**	**37.0**	**63.0**
Wallis and Futuna Islands	11,300	0	11,300	100.0	0.0
Pacific	**10,044,010**	**2,724,870**	**12,768,880**	**78.7**	**21.3**
Pacific excl. PNG	**1,942,680**	**1,514,330**	**3,457,010**	**56.2**	**43.8**

Note: countries highlighted in red are the in-scope countries

There are big differences in levels of urbanisation between the three subregions as well as between PICTs within subregions. Micronesia has the highest percentage of the population classed as urban (60%), but this is largely because of the impact of Guam's population distribution on the total for the subregion (Table 14). Indeed, Guam's 169,130 urban residents is slightly larger than the combined urban populations in the other six PICTs in Micronesia (167,510). At the other end of the urbanisation continuum, the CNMI and FSM had 78% of their resident populations in rural areas around 2022 (Table 14). But these were the exception; in the other five PICTs in Micronesia, more than 50% of their populations were urban-resident (Table 14).

The shares of residents within particular Pacific countries living in rural and urban areas provide a useful measure of internal population distribution at the national level but it must not be regarded as an indication of the extent of urbanisation of particular Pacific populations. There are significant numbers of people born in the CNMI and FSM living in urban places elsewhere in Micronesia as well as in the USA. Towns within Pacific countries are often the sources of migrants who subsequently move overseas. This is especially the case in countries with large transnational populations. The movement of people living in local towns to urban places overseas means that the share of the country's population that might be classified as urban in a given census is continually being depleted by emigration. This is not a process that has been researched extensively in the Pacific, but it is an important one for understanding the often surprisingly high shares of national populations remaining rural resident, especially in countries in Micronesia and Polynesia.

In Polynesia, the percentages classified as being in rural communities (60%) and urban centres (40%) are the opposite of those in Micronesia. In five of the subregion's PICTs, more than 75% of their residents were living in communities classified as rural in the early 2020s. These included Samoa and Tonga, two of the countries with very large urban-based communities living overseas. The most heavily urbanised populations in Polynesia are in American Samoa (88%), the Cook Islands (75%) and Tuvalu (63%). At the opposite end of the spectrum are Tokelau and Wallis and Futuna where there are no settlements classed as urban and the entire population is living in rural communities. However, according to UN DESA's migration matrices, people born in both Tokelau and Wallis and Futuna were resident in other Pacific countries (especially New Caledonia in the case of Wallis and Futuna), as well as in Aotearoa and Australia in the case of Tokelau.

The subregional average for percentages living in rural (82%) and urban (18%) places in Melanesia reflect a long-standing pattern of low levels of urbanisation prevailing in the three western Pacific states of PNG, Solomons and Vanuatu (Table 14). The very high shares of rural residences in the western Pacific are not just a reflection of population distribution in PNG. Unlike some parts of Micronesia and Polynesia, it is not a reflection of on-migration from local towns to destinations overseas. The populations of PNG, Solomons and Vanuatu have not had access to employment opportunities in local towns

or the opportunities for international migration that residents in Fiji and New Caledonia have had. Over half the resident populations in Fiji (56%) and New Caledonia (63%) were classed as urban compared with PNG (13%), Solomons (19%) and Vanuatu (25%).[73]

Patterns of population distribution within countries have considerable relevance for their ongoing demographic development. In 10 of the 21 PICTs, more than 60% of resident populations are living in rural communities. Future population growth in these countries will continue to be absorbed in households that remain heavily dependent for their livelihoods on the use of the land and, where they are in coastal locations, on resources from the sea. It has been well-established in the research literature that fertility rates tend to remain higher in rural areas than in towns, and there is a persistence of higher IMRs in populations which have limited access to medical facilities.

Urbanisation of populations is measured very crudely by the percentages of people who happen to be living in towns and rural communities at the time of a national census. Missing from time-specific, cross-sectional perspectives on population distribution are the dynamics of mobility between places within countries. There is very rich literature on the circulation of people within rural areas, as well as between rural and urban areas in the Pacific, that is rather dated now.[74] In recent years, patterns and processes of internal migration in PICTs have attracted less attention from researchers than other dimensions of demographic change, including international migration.

There have been few substantive published analyses of data on internal migration, collected in recent censuses, in the region. This is an area that merits greater attention from researchers, especially given the fact that population movement within countries involves far more people than international migration in most countries. Internal migration, much more than movement overseas, will be the dominant process for adapting to changing circumstances linked with global warming at the individual and household levels for the great majority of Pacific residents in the region.

4.2 Pacific populations overseas

Frequent reference has been made in this report to the importance of appreciating transnational dimensions to contemporary population change and development in the Pacific. The trajectories of demographic and economic change in many countries continue to be strongly influenced by the access their citizens have to opportunities to travel, study, work and reside overseas and on the support provided by their kin living in other countries. The importance of the transnational dimension to Pacific population change is only going to increase and intensify in the future so a summary outline of two

[73] For a very useful discussion of urbanisation in the context of climate change in the Pacific see Campbell, J.R. (2019) Climate change and urbanisation in Pacific countries, *Policy Brief no. 49*, Toda Peace Institute, September. This analysis includes UN DESA projections of urban populations in 2050. Melanesia (29%) and Polynesia (49%) still have the majority of their populations living in rural areas (p. 3).

[74] See, for example, Chapman, M. and Prothero, R.M. (1985) *Circulation in population movement. Substance and concepts from the Melanesian case.* London: Routledge Kegan Paul.

of its contemporary components is relevant for this brief review of population distribution.

The first of these transnational dimensions relates to the intra-Pacific population movement and some recent initiatives by the PACER Plus Implementation Unit in Samoa to promote this way of meeting labour needs in the region. The second concerns the substantial communities of Pacific peoples living in three Pacific Rim countries and how some recent developments in Australia's immigration policy have the potential to see significant growth in overseas-resident communities from PNG, Solomons and Vanuatu during the next 2 decades. Some tables from Burson and Bedford's (2021, 34–53) recent analysis of a case for regional harmonisation of approaches to humanitarian entry and stay in the Pacific are used to illustrate aspects of contemporary Pacific transnational populations. That report contains a substantive analysis of international migration to and from PICTS using data drawn from a wide range of sources.[75]

Intra-Pacific mobility

Thirty years ago, in a landmark USP publication on Oceania, the late Epeli Hau'ofa reminded us that Pacific peoples used to range widely across their ocean in search of resources and opportunities for a better livelihood.[76] In his celebrated essay "Our sea of islands" he cautioned that the requirement to request permission to enter a neighbouring country, even for a short visit, and the need for visas and passports are very recent innovations in a region that was home to highly skilled seafarers and navigators. Population movement between islands in the Pacific was extensive before European colonisation of the region and the imposition of boundaries within and between islands. In Hau'ofa's (2008, 33) words:

> Theirs was a large world in which peoples and cultures moved and mingled, unhindered by boundaries of the kind erected much later by imperial powers. From one island to another they sailed to trade and to marry, thereby expanding social networks for greater flows of wealth. They travelled to visit relatives in a wide variety of natural and cultural surroundings, to quench their thirst for adventure, and even to fight and dominate.

Intra-Pacific mobility has continued, albeit in different ways and often for new reasons, notwithstanding the imposition of national boundaries and the need for travellers crossing these boundaries to have passports. Two contemporary examples of this movement can be found in the data relating to international arrivals of short-term visitors to Pacific countries and to the overseas birthplaces of the usually resident populations of the 21 PICTs.

[75] See Appendix 2 in Burson et al. (2021, 89) for information on these sources.
[76] Hau'ofa, E. (1993) Our sea of islands. Reprinted in Hau'ofa E. (2008) *We are the ocean. Selected works.* Honolulu: University of Hawai'i Press, pp. 27–40.

Short-term visitors

The largest documented flows of people into, out of and between countries in the Pacific travel on short-term visas, usually for 3 months or less, as visitors, tourists, entrepreneurs, consultants, members of sports teams or church groups or for a host of other reasons for wanting to spend time in a Pacific country where they do not have rights of residence, employment or citizenship. These short-term flows dwarf the annual flows of temporary labour migrants and long-term residents.

While the great majority of short-term arrivals in the PICTs come from outside the region, especially tourists from countries on the Pacific Rim, in three of the major destinations for short-term arrivals (Fiji, Samoa and Vanuatu) a surprisingly consistent share of visitors came from other Pacific countries during the 4 years before the COVID-19 pandemic (Table 15). Visitors from most Pacific countries have visa-waiver status for short-term stays in most PICTs – they are not subject to the same visa requirements as those seeking approval for work or residence.[77]

In 3 of the 4 years shown in Table 15, arrivals in Fiji from other Pacific countries exceeded 50,000 a year reflecting the status of this country as a regional hub and important transit point for people travelling between Pacific states. While the numbers of short-term arrivals in Samoa and Vanuatu are much smaller than those in Fiji, in all three countries between 4% and 7% of their total arrivals in each of the 4 years were from other Pacific states.

Table 15: Visitor arrivals from other Pacific countries: Fiji, Samoa and Vanuatu

	(calendar years)			
Country and source of arrivals	2016	2017	2018	2019
Fiji				
Total visitor arrivals	792,320	842,884	970,309	894,389
Arrivals from other PCTS	49,741	53,720	51,654	54,369
% from other PICTs	6.3	6.4	5.3	6.1
Samoa				
Total visitor arrivals	140,065	157,515	172,496	151,024
Arrivals from other PCTS	7,760	7,944	7,493	10,892*
% from other PICTs	5.5	5.0	4.3	7.2
Vanuatu				
Total visitor arrivals	95,117	109,170	115,634	120,628
Arrivals from other PCTS	5,705	7,147	6,545	6,560
% from other PICTs	6.0	6.5	5.7	5.4

Source: Burson et al. (2021, 51).

[77] See Bedford, R.D., Burson, B., Bedford, C.E. (2014) *Compendium of legislation and institutional arrangements for labour migration in Pacific Island countries.* ILO Office for Pacific Island countries, Suva. https://www.researchgate.net/publication/274961633_Compendium_of_Legislation_and_Institutional_Arrangements_for_Labour_Migration_in_Pacific_Island_Countries

The visitor flows that are captured in arrival and departure statistics are only part of the short-term intra-Pacific mobility flows. As Burson et al. (2021, 47) note, the region is home to hundreds of fishing boats and small interisland trading vessels as well as extensive recreation sailing and power boats and canoes. The transient populations transported on these vessels cross the invisible boundary lines in the ocean that separate Pacific countries, often without consistent documentation. They merit mention even if they cannot be documented because they are an important part of the fabric of contemporary Pacific societies and economies and the associated mobility within, into and out of the region.

With regard to intra-Pacific mobility, Hau'ofa (2008, 30) reminds us of this "informal" cross-border movement of people when he observed that thousands of people in the region regularly travel to access customary lands, traditional fishing grounds and to maintain their ancestral ties to families and communities in neighbouring countries. In his words, they do this "under the very noses of academic and consultancy experts, regional and international development agencies, bureaucratic planners and their advisers, and customs and immigration officials, making nonsense of all the national and economic boundaries, borders that have been defined only recently, crisscrossing an ocean that has been boundless for ages before Captain Cook's apotheosis."

Intra-Pacific migration: evidence from birthplace data

UN DESA and the World Bank have developed extensive databases showing the birthplaces of the usually resident populations for most countries. Their data for 2019 (UN DESA) and 2017 (World Bank) show that 71,780 (22%) of the 330,460 overseas-born migrants usually resident in the 21 PICTs had been born in Pacific countries. The major sources of intra-Pacific in-migrants in the 21 PICTs in 2019 are shown in Table 16.

It is clear from Table 16 that the primary sources of Pacific-born in-migrants in most PICTs are other countries in their Pacific subregion. These subregional clusters are highlighted in blue. A small number of exceptions to this pattern are indicated in red including Fiji and New Caledonia. Fiji and New Caledonia have larger migrant populations born in Polynesia than Melanesia; in Fiji's case from Samoa, Tonga and Tuvalu, while in New Caledonia's case, the migrants are from France's other colonies in Polynesia – French Polynesia and Wallis and Futuna. Conversely, French Polynesia and Wallis and Futuna have larger migrant populations born in Melanesia (in their case, New Caledonia), as does Tonga (born in Fiji), than migrants born in Polynesia. In the cases of New Caledonia, French Polynesia and Wallis and Futuna this is the result of links between the three French colonies. In Tonga's case, strong cultural and commercial ties with Fiji provide part of the explanation. In Fiji's case, the explanation lies in its role as a subregional hub in the Pacific mobility system.

In every country, except PNG and French Polynesia, more than 10% of their in-migrants had been born in other Pacific countries (Table 16). In eight of the PICTs more than 30%

of their in-migrants were from other parts of the region. If a disaster were to make a return to a particular PICT impossible for some time, there is a high probability that temporary migrants from that PICT would be located in other parts of the region, and they may need some support before they can return to the country where they have full residence rights. As the recent COVID-19 pandemic demonstrated, there is a need for some harmonisation of policy relating to provisions for visa extensions and, possibly, some subsistence support during an extended period of forced stay by Pacific migrants because of events that make it very difficult or impossible to return home (Burson et al., 2021). Such policy harmonisation has real relevance for intra-Pacific migration in the context of highly destructive environmental events linked with climate change.

Table 16: Estimates of Pacific-born in-migrants to PICTs from Pacific sources around 2019

	In-migrants Pacific subregion of birth			Pacific-born	% all in-migs
Country of residence	Melanesia	Micronesia	Polynesia	in-mig stock	to PICTs
Pacific region	**13,110**	**23,460**	**35,200**	**71,780**	**22.3**
Melanesia	**7,970**	**1,080**	**14,510**	**23,560**	**18.4**
Fiji	**910**	790	**2,110**	3,810	20.0
New Caledonia	**5,070**		**12,330**	17,400	24.8
Papua New Guinea	**560**		30	590	1.8
Solomon Islands	**760**	260		1,020	32.2
Vanuatu	**670**	30	40	740	23.8
Micronesia	**810**	**22,290**	**470**	**23,570**	**19.4**
Guam		**15,330**		15,330	18.3
Kiribati	510	**1,530**	300	2,340	78.3
Marshall Islands	130	**570**	70	770	24.3
Micronesia (Fed. States of)		**990**	60	1,050	39.8
Nauru	170	**230**	40	440	39.6
Northern Mariana Islands		**2,740**		2,740	12.0
Palau		**900**		900	17.9
Polynesia	**4,330**	**90**	**20,220**	**24,650**	**34.1**
American Samoa	330		**17,140**	17,470	69.2
Cook Islands	140		**270**	410	19.2
French Polynesia	**2,620**		**30**	2,660	8.8
Niue	40		**130**	170	30.4
Samoa	240	20	**2,090**	2,350	26.6
Tokelau			**240**	240	54.5
Tonga	**690**		**310**	1,000	25.3
Tuvalu	60	70	**10**	140	21.5
Wallis and Futuna Islands	**210**			210	91.3

Source: Burson et al. (2021, 29).

Table 17 contains comparable data relating to out-migrants from the 21 PICTs who were living in other countries in the region. Whereas 22% of all of the overseas-born people who were usually resident in the PICTs around 2019 were from other PICTs, just under 10% of the 743,000 people born in the Pacific who were usually resident overseas around 2019 were living in other PICTs. The great majority (88%) of Pacific-born migrants were living in Aotearoa and Australia (343,930, 46%) and the USA and Canada (311,700, 42%). The large Pacific-born populations and their descendants living in countries on the Pacific Rim are discussed further in the next section – here the focus is on migration to other PICTs, the third largest of the aggregate flows of migrants born in the region.

Table 17: Estimates of out-migrant stocks of Pacific-born residents in other Pacific countries

	Out-migrants				
	Destination subregion			Pacific-born	% all out-migs
Country of birth	Melanesia	Micronesia	Polynesia	out-mig stock	from Pacific
Pacific region	**23,840**	**23,260**	**24,250**	**71,350**	**9.6**
Melanesia	**8,133**	**804**	**3,885**	**12,822**	**4.4**
Fiji	**413**	733	**1,168**	2,314	1.0
New Caledonia	**287**		**2,386**	2,673	38.5
Papua New Guinea	**617**		52	669	1.6
Solomon Islands	**1,060**	71	9	1,140	23.5
Vanuatu	**5,756**		270	6,026	65.0
Micronesia	**1,050**	**22,178**	**85**	**23,313**	**32.9**
Guam		**1,374**		1,374	49.5
Kiribati	**1,050**	**508**	74	1,632	24.4
Marshall Islands		**631**		631	6.5
Micronesia (Fed. States of)		**12,942**		12,942	39.4
Nauru		**1,527**	11	1,538	57.5
Northern Mariana Islands		**2,753**		2,753	27.0
Palau		**2,443**		2,443	41.0
Polynesia	**14,643**	**1,175**	**20,281**	**36,099**	**14.3**
American Samoa		23	**1,812**	1,835	51.2
Cook Islands	33		**10**	43	0.2
French Polynesia	748		**2**	750	18.6
Niue			**19**	19	0.4
Samoa	302	21	**16,297**	16,620	13.2
Tokelau			**106**	106	5.2
Tonga	**1,375**	18	**1,916**	3,309	4.4
Tuvalu	415	**1,113**	**85**	1,613	36.1
Wallis and Futuna Islands	**11,770**		**34**	11,804	99.5

PICTs in Polynesia had almost three times as many Pacific-born migrants living in other parts of the Pacific region (35,210) as the much larger Melanesian countries and populations (12,830). The largest intra-Pacific flows were from Samoa to American

Samoa (around 16,000) and from the FSM to Guam (just under 13,000) (Table 17). The only other out-migrant group that exceeded 10,000 was the Wallis and Futuna-born population in Melanesia (New Caledonia) (Table 17).

As with the in-migrants, there is a strong subregional clustering in the destinations of Pacific out-migrants to other PICTs and this can be seen in the columns highlighted in blue. Only six of the 21 PICTs had people born in their country living in the three subregions: Fiji, Solomon Islands, Kiribati, Samoa, Tonga and Tuvalu. In two of these cases (Fiji and Kiribati) their largest intra-Pacific out-migrant population was in a different subregion – Polynesia in the case of Fiji and Melanesia in the case of Kiribati. In Fiji's case, this reflects its role as a regional migration hub. In Kiribati's case, the Kiribati-born people in Melanesia are partly a legacy of resettlement schemes in Fiji and Solomon Islands in the 1940s and 1960s.

There are major variations between the PICTs in the shares of their out-migrants that were resident in other Pacific countries. In the case of Wallis and Futuna, almost all of the people claiming these islands as their place of birth who were living overseas in 2019 were in New Caledonia. The other PICTs with more than 50% of their migrants living in other Pacific countries were Vanuatu (mainly in New Caledonia, a legacy of the former French colonial connection and migration to work in New Caledonia's nickel industry), and Nauru (mainly in Kiribati, the children of former labour migrants working in Nauru's phosphate industry).

We suspect there are more PICTs with migrants in the three subregions but a trend in recent Pacific censuses to grouping birthplaces with small numbers into the general category 'other countries"' hides their actual distribution across potential sources. A key problem facing policymakers and researchers attempting to document migrants by birthplace is a trend towards aggregating birthplace data in ways which make it very difficult to produce source-destination matrices of the kind that UN DESA and the World Bank have been developing to obtain reasonably consistent estimates of migrants at a national scale.

A recommendation arising from the migration mapping work done by Burson et al. (2021) was that in the 2020/2021 round of national censuses Statistics Offices everywhere are encouraged to produce detailed tables showing the countries of birth for their populations. It is appreciated that there are limits imposed by confidentiality requirements to the levels of disaggregation that can be achieved. However, it is possible to disaggregate the data on birthplace much more than is done in many Pacific censuses without breaching confidentiality requirements. An example of the utility of such disaggregated data for the analysis of transnational Pacific populations is given in the next section with regard to unpublished birthplace and ethnicity data obtained from Tonga's 2021 Census of Population and Housing.

For a third of the PICTs, other Pacific countries were destinations for less than 10% of the out-migrants who had been born in them. In Melanesia, Fiji and PNG had less than 2% of their out-migrants usually resident in other Pacific countries in 2019. In Fiji's case, this is linked with the extensive migration of Indigenous Fijians (I-Tauke) and Fiji Indians to Aotearoa, Australia and North America after the first military coup d'état in 1987. In the case of PNG, the out-migrants are mainly Australians who had been born in PNG during the latter years of Australia's colonial administration or since the country's independence in 1975 and who had subsequently moved to Australia. One of the limitations of birthplace data when defining migrant populations is that the migrants have only one thing in common: they were all born in a country that was different from the one where they were usually resident, in this case, around 2019.[78]

In Micronesia, the two PICTs with very low percentages of their out-migrants resident in other Pacific countries are Guam and Marshall Islands. The main destination for their migrants is the USA. In Polynesia, five PICTs had less than 10% of their migrants living elsewhere in the region in 2019. One or a combination of Aotearoa, Australia and the USA were the main destinations for over 90% of the people born in American Samoa, Cook Islands, Niue, Tokelau and Tonga who were living overseas around 2019. It is to these extensive communities of Pacific-born migrants and their descendants in countries outside the region that the discussion now turns.

Pacific populations outside the region

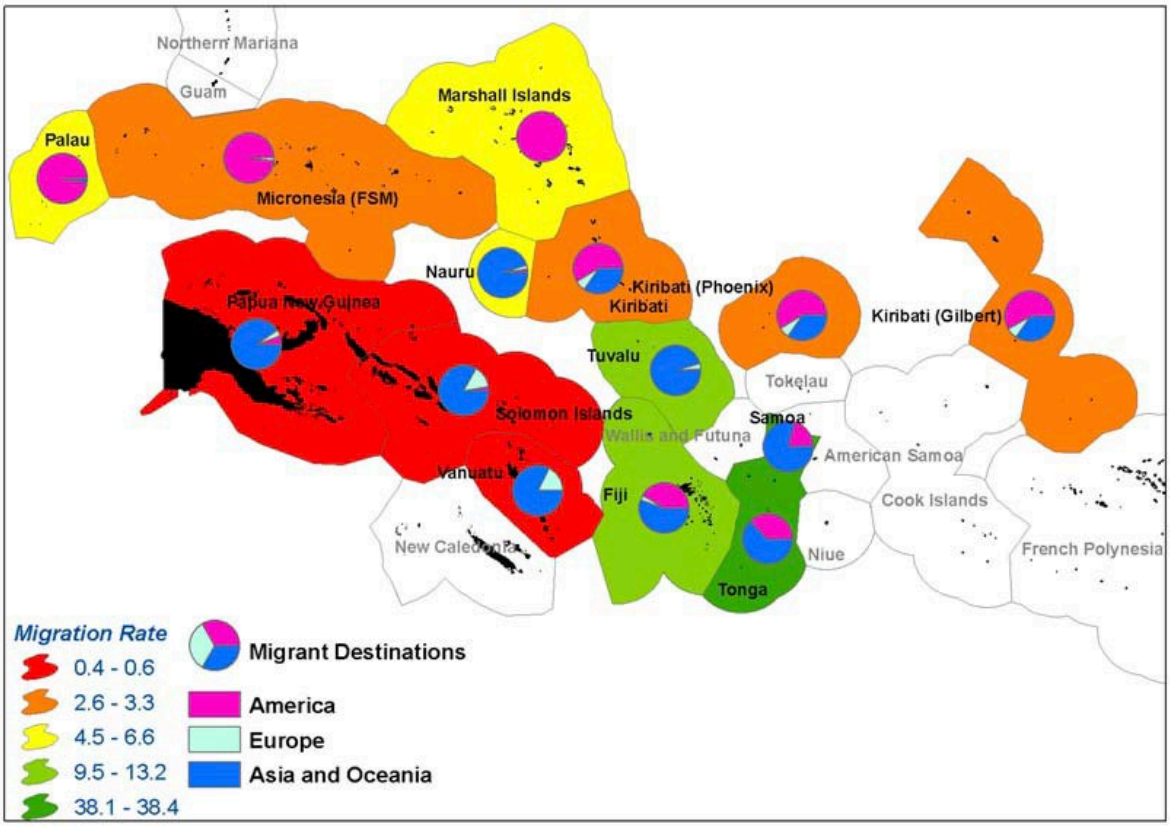
A series of useful maps showing different dimensions of Pacific economies and societies can be found in a provocative chapter by John Gibson and Karen Nero (2008) entitled "Why don't Pacific economies grow faster?".[79] Two of these maps provide interesting insights into contemporary overseas migration from the independent states in the region and are reproduced below (Figures 20 and 21).

Figure 20 illustrates clearly the very low out-migration rates from the three western Pacific independent states (PNG, Solomons and Vanuatu) and shows that the great majority of their overseas migrants are located in Oceania – the Pacific region, including Aotearoa and Australia. The Asian component of this destination group is very small. The three northern Pacific independent countries (Palau, FSM and Marshall Islands) have virtually all their overseas migrants in North America, clearly in marked contrast with the western Pacific's focus on destinations in Oceania (Figure 20).

[78] The UN DESA and World Bank migrant databases include long-term residents as well as a wide range of people on temporary visas. The only groups explicitly excluded are people on short-term visitor visas (usually under 3 months but sometimes for up to 6 months) or short-term work visas (for under 12 months). The migrants could have arrived as children with their parents, or they could have moved independently for a host of reasons including education, work, family reasons, or to find a better life outside their country of birth.

[79] Gibson, J. and Nero. K. (2008) Why don't Pacific economies grow faster? in A. Bisley (ed.) *Pacific interactions: Pasifika in New Zealand – New Zealand in Pasifika*. Wellington: Institute of Policy Studies, pp. 191–244.

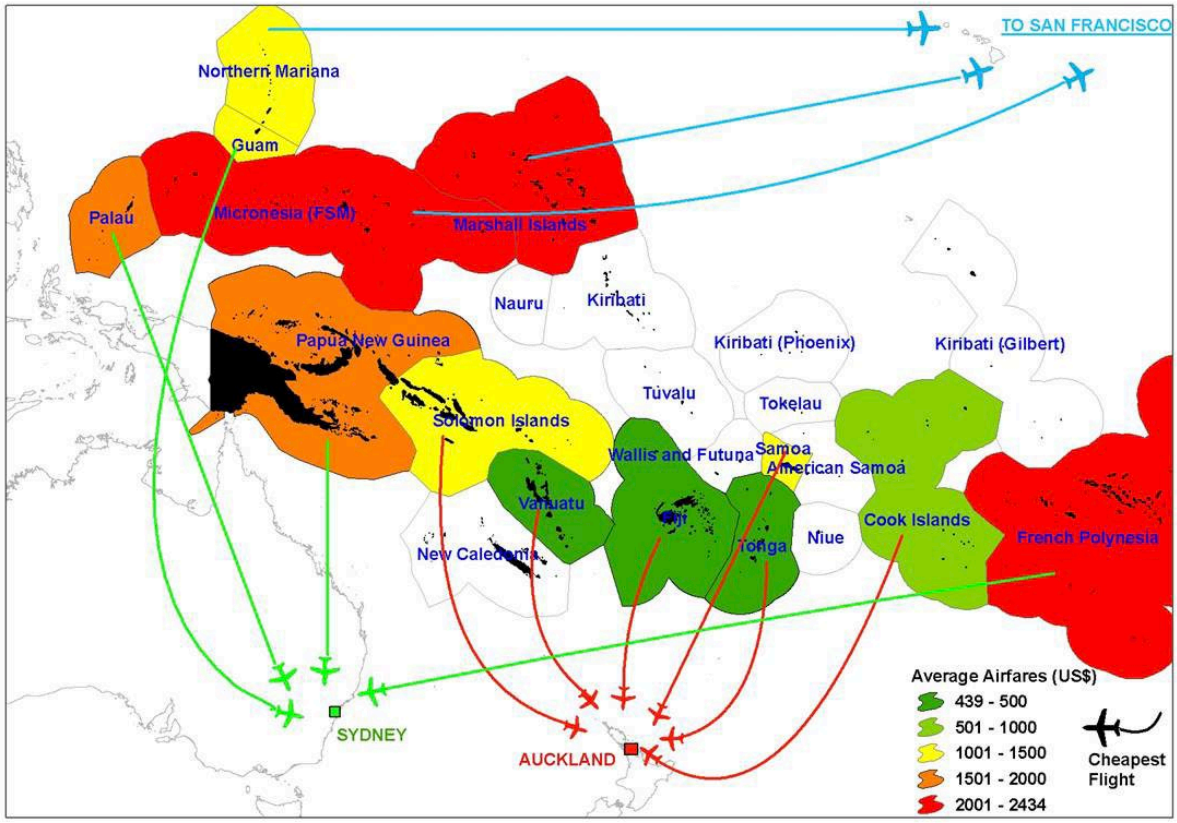
Figure 20: Migrant destinations on a base of migration rates (emigrants per 100 residents)



The central Pacific cluster – Fiji, Kiribati, Tuvalu and Nauru – has a mix of migration rates and destinations with Nauru and Tuvalu having their overseas migrants concentrated heavily in Oceania, while Kiribati and Fiji have, according to Gibson and Nero's data, a significant share of their migrants in North America. Finally, the two eastern Pacific states, Samoa and Tonga, have the highest emigration rates of the independent states in the region, and their migrants are located mainly in Oceania, with quite sizeable shares also in North America, especially from Tonga (Figure 20).

Figure 21 shows some of the air connections different states have with Aotearoa, Australia and the USA and the average costs of air travel around the mid-2000s to these destinations. Not all direct routes are shown. Nauru did have direct links with Australia through its national airline and American Samoa had a link with the USA. Niue also had a link with New Zealand. For Kiribati and Tuvalu, access to Aotearoa and Australia was mainly via Fiji or Nauru, while access to the USA was via the Marshall Islands. The map is useful because it clearly shows the high cost of air travel in many parts of the region – a significant factor when it comes to planning for movement overseas.

Figure 21: Average cost of air travel in the Pacific around 2006



The discussion of Pacific populations outside the region is in two parts. Firstly, we look briefly at the UN DESA and World Bank data on the distribution of people born in the 21 PICTs who were resident in another country outside the region around 2019. These birthplace data are then placed in the context of the populations that identified with a Pacific ethnicity or ancestry in recent censuses in Aotearoa, Australia and the USA.

The second part reviews one aspect of the transnational dimensions of Pacific peoples that can be captured in census data if birthplace and ethnicity data are both collected and analysed in tandem. These data provide some simple demographic evidence of the interconnectedness of contemporary Pacific populations that are distributed across different countries in the region and on the Pacific Rim.

Birthplace and ethnic/ancestry populations

The international migration databases prepared by UN DESA (2019) and the World Bank (2017) recorded an estimated 743,000 people who had been born in a Pacific country or territory living in another country around 2019 (Table 18).[80]

[80] See Burson et al. (2021, 40–42) for a discussion of these data.

Table 18: Estimates of out-migrants from PICTs by major destination areas around 2019

Subregion of birth	Destination (%) Other Pacific Is	Aotearoa & Australia	USA & Canada	Other countries	Total number
Pacific region	**9.6**	**46.3**	**42.0**	**2.1**	**742,920**
All PICTs					
Melanesia	4.5	**63.6**	27.5	4.3	283,990
Micronesia	12.9	2.5	**83.6**	1.0	180,270
Polynesia	12.6	**57.1**	29.8	0.5	278,660
Independent states					
Western Pacific	14.3	**71.5**	6.4	7.8	54,920
Central Pacific	2.6	**61.7**	32.1	3.6	236,140
Northern Pacific	33.2	0.3	**66.0**	0.5	48,260
Eastern Pacific	10.5	**67.0**	21.9	0.6	190,500

Just under 10% (71,350) of these Pacific overseas migrants were resident in another PICT; the great majority of the rest (655,630 or 88% of the total) were in Pacific Rim countries, especially Aotearoa, Australia and the USA. A very small share was in Europe (13,000 or 2%) and an even smaller share in an Asian country (2,140). The numbers of Pacific-born people in Europe and Asia are undercounted in the UN DESA database because many countries no longer publish detailed birthplace data for their populations. This limitation to the birthplace data notwithstanding, the heavy concentrations of Pacific migrants in countries on the southern and north-eastern Pacific Rim is clear in Table 18.

The data in Table 18 are presented by subregion rather than country. The country-specific data are available in Burson et al. (2021, 40). The shares of Pacific-born people resident in each destination category are influenced by the way countries of birth are grouped. But the dominance of Aotearoa and Australia as destinations for migrants from Melanesia and Polynesia, and North America for migrants from Micronesia, is very clear.

The clusters of independent states in the western Pacific (PNG, Solomons, Vanuatu), the central Pacific (Fiji, Kiribati, Nauru and Tuvalu) and the eastern Pacific (Samoa and Tonga) follow the subregional patterns for Melanesia and Polynesia with Aotearoa and Australia the locations of 60% or more of the overseas-resident migrants. The cluster in the northern Pacific had 66% of their migrants in North America following the Micronesia subregion pattern. The importance of Pacific destinations for migrants also varies depending on how PICTs are grouped. Guam in Micronesia is a significant destination for the northern Pacific independent states, New Caledonia features prominently as a destination for migrants from Vanuatu in the western Pacific, and American Samoa and Fiji are the places of residence for sizeable numbers of migrants born, respectively in Samoa and Tonga.

The birthplace data give one measure of Pacific populations living overseas. Another more inclusive measure is the populations identifying as Pacific peoples in the censuses

carried out in Aotearoa, Australia and the USA. These data are not consistent in that the questions relating to identity are not the same in the censuses in the three countries. The data are also difficult to use at a subregional level because of overlapping ethnic populations. For example, in Aotearoa's and Australia's ethnicity/ancestry data people who identify with more than one Pacific ethnicity or ancestry are counted in each of the groups they identify with. This means the specific ethnic/ancestry totals cannot be added together to give a total population for a subregional category. Despite these limitations the data merit brief discussion because they provide a more reliable indication of the populations in the main overseas destinations outside the region who choose to reveal their Pacific heritages.

Based on data derived from Aotearoa's 2018 Census of Population and Dwellings, Australia's 2021 Census of Population and Housing and the 2021 American Community Survey it is estimated that there were around 1.22 million people identifying with Indigenous Pacific heritages living in the three Pacific Rim countries.[81] This is almost double the number of Pacific-born estimated to be in the three countries in 2019 (Table 19).

Table 19: Pacific ethnicity/ancestry groups in three Pacific Rim countries

Ethnic/ancestry group	Aotearoa 2018	Australia 2021	USA 2021	Total in group	% of total all groups
Melanesians	37,800	73,300	36,700	147,800	12.1
Micronesians	3,400	1,900	174,300	179,600	14.7
Polynesians	351,800	177,800	361,300	890,900	73.1
Total Pacific*	**393,000**	**253,000**	**572,300**	**1,218,300**	**100.0**

* Excluding Hawaiians and Fiji Indians

The great majority (73%) of Pacific peoples in the three countries are Polynesians. This is due to the acceleration of migration from American Samoa, Samoa and Tonga to the USA, and from the latter two to Aotearoa, from the 1960s. This was followed by a rapid increase in migration from the Cook Islands and Niue to Aotearoa in the 1970s, and the development of a trans-Tasman movement of Polynesians with New Zealand citizenship to Australia from the 1980s.[82]

[81] Fijians are usually included in Polynesia in Australia's and Aotearoa's census data. For consistency and comparability with SPC and UN DESA data, they have been included in Melanesia's population. In Table 16 Fiji Indians are not included in the data relating to Pacific ethnic or ancestry groups unless they also identified with one of the Pacific's Indigenous groups. The information relating to Australia's Pacific ancestry groups comes from a database Huiyuan Liu and Stephen Howes (2023) developed which can be accessed at https://devpolicy.org/pacific-islanders-in-australia-census-results-20230331/. The data relating to Aotearoa's Pacific ethnic groups comes from unpublished data provided by Robert Didham in Statistics New Zealand. The American Community Survey data for 2021 comes from tabulations relating to what are termed "Polynesian alone," "Micronesian alone" and Melanesian alone" populations that can be accessed at https://data.census.gov/table?q=Polynesians, https://data.census.gov/table?q=Micronesians, https://data.census.gov/table?q=Melanesians

[82] Detailed reviews of these movements can be found in Bedford, R.D. and Hugo, G. (2012) *Population movement in the Pacific: a perspective on future prospects*. Labour and Immigration Research Centre, Department of Labour, Wellington. Accessible at: https://www.mbie.govt.nz/dmsdocument/2750-population-movement-in-the-pacific-pdf and Bedford, R. (2008) Pasifika mobility: pathways, circuits and challenges in the 21st century, pp. 85–134 in A. Bisley

Migration from Micronesia to the USA also began to pick up from the 1970s but the numbers tended to be smaller. Travel to the USA was expensive (see Figure 21). Migration of Micronesians (I-Kiribati and Nauruans) to Aotearoa and Australia gained some momentum in the 1990s but it has never been significant in terms of numbers becoming residents. As noted several times already, Melanesia's Indigenous peoples, other than from Fiji, have never had much opportunity to migrate to any of the Pacific Rim countries. Not surprisingly, their numbers are the smallest of the three groups shown in Table 19, despite this subregion being home to 90% of the region's population in 2021 (Table 20).

Table 20: One measure of the transnational component of Pacific populations around 2021

Subregion	Total pop. 2021 (SPC)	% of total Pacific	Ethnic pops on Pacific Rim	% total on Pacific Rim	Combined population	% combined in subregion
Melanesia	11,320,000	90.3	147,800	12.1	11,467,800	98.7
Micronesia	545,900	4.4	179,600	14.7	725,500	75.2
Polynesia	676,700	5.4	890,900	73.1	1,567,600	43.2
Total Pacific	**12,542,600**	**100.0**	**1,218,300**	**100.0**	**13,760,900**	**91.1**

Polynesians are by far the most 'transnational' of the Pacific populations. Much of the extensive literature relating to Pacific transnationalism deals with Polynesians, especially from Samoa, Tonga and the Realm countries. The links between Polynesian communities in the islands and Pacific Rim countries have remained very strong, and this is clearly demonstrated every year in the significant transfers of resources between Pacific households and communities located in the islands, in Aotearoa, in Australia and in North America.

Hau'ofa (2008, 36) captured the essence of this interdependence when he observed: "Oceania … encompasses the great cities of Australia, New Zealand, the United States and Canada. It is within this expanded world that the extent of the people's resources must be measured." He went on to point out that:

> Islanders in their homelands are not the parasites on their relatives abroad that misinterpreters of 'remittances' would have us believe. Economists do not take account of the social centrality of the ancient practice of reciprocity – the core of all oceanic cultures. They overlook the fact that for everything homeland relatives receive, they reciprocate with goods they themselves produce, by maintaining ancestral roots and lands for everyone, homes with warmed hearths for travellers to return to permanently or to strengthen their bonds, their souls and their identities before they move on again.

(ed) *Pacific interactions. Pasifika in New Zealand, New Zealand in Pasifika*. Wellington: Institute of Policy Studies. Accessible at: https://www.researchgate.net/publication/355335497_Pasifika_Mobility_Pathways_circuits_and_challenges_in_the_21st_century

This is not the place for a detailed discussion about transnational Pacific societies. However, it is important to acknowledge that we cannot appreciate some fundamental characteristics of contemporary demography in the Pacific if we restrict our analyses to national populations or populations in arbitrarily defined subregions. Pacific peoples were never confined to these spaces before the late 19th century. From the late 20th century, increasing numbers of Pacific people are, in Hau'ofa's words, "once again enlarging their world, establishing new resource bases and expanded networks for circulation." Early in the 21st century, seasonal work schemes to support the horticulture industries in Aotearoa and Australia finally opened opportunities for increasing numbers of villagers in Vanuatu, Solomon Islands and PNG to participate in this process of 'world enlargement' – a process that will become increasingly important and relevant as one of many responses to hazards and uncertainties linked with climate change.

Interconnected Pacific populations: an example

Unpublished data relating to birthplace and ethnicity collected in censuses in Tonga (2021) and Aotearoa (2018) yield some interesting insights into the contemporary demography of interconnected Pacific populations. In Tonga's 2021 census, the birthplace question revealed that there were 3,239 overseas-born people in the Kingdom – 3.2% of the country's total population. Over half of these overseas-born (1,804 or 56%) self-identified as Tongans. The distribution of these Tongans by their country/region of birth is shown in Table 21.

Just under half (1,468 or 45%) of the overseas-born were from Aotearoa, Australia and North America and 85% of these people were Tongans. Just under half (441 or 49%) of the 907 born in other Pacific countries were Tongans, especially amongst those born in American Samoa and Samoa. Only a very small share (9%) of the 741 who had been born in a country in Asia were Tongan. Amongst the much smaller numbers of overseas-born from Europe (103) and other countries (20), the shares of Tongans were higher than was the case with those from Asia (Table 21).

It is rare to get cross-tabulations of birthplace and ethnicity data in Pacific censuses, but such data are invaluable for examining one simple demographic measure of transnationalism using census data. The fact that just over half of the overseas-born population present at the time of the Tonga's census in late November 2021 were Tongan is a strong indicator of interaction between Tongan communities offshore and those in the homeland, to use Hau'ofa's term. It would be very useful to have comparable data for other Pacific populations, especially those with a long history of engagement with other countries.

Table 21: Overseas-born Tongans in Tonga, 2021

Area/country of birth	Total overseas-born	% of total overseas-born	Tongan ethnicity	% Tongan ethnicity
Pacific Rim	***1468***	***45.3***	***1249***	***85.1***
New Zealand	722	22.3	640	88.6
Australia	259	8.0	192	74.1
North America	487	15.0	417	85.6
Other Pacific	***907***	***28.0***	***441***	***48.6***
Fiji	560	17.3	201	35.9
American Samoa	141	4.4	121	85.8
Samoa	89	2.7	68	76.4
Other Pacific	117	3.6	51	43.6
Asia	***741***	***22.9***	***69***	***9.3***
China	569	17.6	36	6.3
Philippines	57	1.8	11	19.3
India	45	1.4	13	28.9
Other Asia	70	2.2	9	12.9
Europe	***103***	***3.2***	***35***	***34.0***
Other countries	***20***	***0.6***	***10***	***50.0***
Total	**3239**	**100.0**	**1804**	**55.7**

Another perspective on the interconnectedness of Pacific communities across national boundaries is provided by birthplace and ethnicity data collected in Aotearoa's 2018 census. A crosstabulation of these two variables reveals that 82,392 people were classified as being of Tongan ethnicity and of these, 26,550 (32%) had been born in Tonga (Table 22). Another 819 Tongans (1% of the total) had been born in other Pacific countries, especially Fiji, (249) Samoa (246) and Niue (105). The total number of Tongans born in Pacific countries (including Tonga) was 27,369, a third of the Tongan ethnic population in Aotearoa in 2018.

The 51,975 Tongans born in Aotearoa are equivalent to just under half the Kingdom's population of 100,179 in 2021 and comprised over 60% of the Tongans in Aotearoa. The small number of Tongans born in Australia (711) was less than 10% of the 7,718 Tongans born in Aotearoa who were resident in Australia at the time of their 2021 census.[83] Trans-Tasman migration has played an important role in growth in Australia's Tongan and other Polynesian populations since the 1980s.[84] The flow of Tongans from Australia to settle in Aotearoa has been much smaller than the flow the other way, but there is significant

[83] The data on Tongans in Australia in 2021 is from Liu and Howes (2023).
[84] See Bedford and Hugo (2012, 56–62) for a review of the Trans-Tasman migration of Pacific peoples in the 2000s. Also see Howes, S. and Surandiran (2021) The NZ pathway: how and why Samoans migrate to Australia – part one. *DevPolicy Blog*, 1 February. Accessed at: https://devpolicy.org/the-nz-pathway-how-and-why-samoans-migrate-to-australia-part-one-20210201-1/

short-term mobility across the Tasman in both directions, as there is between Aotearoa and Tonga.

Table 22: Birthplaces of Tongans in Aotearoa, 2018

Area/country of birth	Tongan ethnicity	% of total Tongans	All Pacific ethnicities	% of total Pacific	Tongans as % of Pacific
Pacific region	**27,369**	**33.2**	**118,551**	**31.1**	**23.1**
Tonga	**26,550**	**32.2**	**26,664**	**7.0**	**99.6**
Other Pacific	819	1.0	91,887	24.1	0.9
Pacific Rim	**53,022**	**64.4**	**252,789**	**66.2**	**21.0**
Aotearoa	51,975	63.1	247,635	64.9	21.0
Australia	711	0.9	4,176	1.1	17.0
North America	336	0.4	978	0.3	34.4
Other countries	**345**	**0.4**	**1,791**	**0.5**	**19.3**
Asia	123	0.1	681	0.2	18.1
Europe (incl. UK)	177	0.2	897	0.2	19.7
Africa/ME/LA*	45	0.1	213	0.1	21.1
NEI**	1,656	2.0	8,514	2.2	19.5
Total	**82,392**	**100.0**	**381,645**	**100.0**	**21.6**

* Africa/Middle East/Latin America

** Not elsewhere included

Tongans born in North America also make a small contribution to the growth in Aotearoa's Tongan population. In 2018 there were 336 (0.4%) American-born Tongans (327 born in the USA), again likely to be a much smaller number than the Aotearoa-born Tongans living in the USA. Data on the latter group are not available. Circulation of Tongans between Aotearoa and the USA is likely to be much less intense than the trans-Tasman flow given the costs of travel and visas. That said, Hau'ofa (2008, 38–39) recounts the story of a Tongan friend who lived in California and made regular trips to Fiji to purchase kava to take back to the USA, making side trips to Tonga while in the region. He observed: "There are thousands like him flying back and forth across national boundaries, the international dateline, and the equator … cultivating their ever-growing universe in their own ways, which is as it should be, for therein lies their independence."

In the early 2020s, Tonga's transnational population exceeds 220,000, at least 70% of whom have been born overseas.[85] There are more than twice as many Tongans living overseas as there are Tongans living in the Kingdom. This imbalance in numbers between homeland and away populations, acknowledging the common links they both have to a Tongan heritage and culture, is a feature of many of the smaller PICTs in Polynesia and

[85] This estimate comes from a report on the current demography of Tonga prepared for the Tonga Labour Mobility Supply Management Strategy (TLMSMS) which Tonga's Cabinet approved in April 2023. The report is in Volume 2 "Background information and evidence to support the TLMSMS, 2023," pp. 5–15 and can be accessed at: https://www.mted.gov.to/index.php/2023/07/12/tonga-labour-mobility-supply-management-strategy/https://www.mted.gov.to/index.php/2023/07/12/tonga-labour-mobility-supply-management-strategy/

Micronesia. The contemporary demography of Pacific transnational populations merits much closer examination than has been possible in this report. Detailed community-based field inquiries in several of the in-scope countries will provide rich insights into the dynamics of household and community support for kin at home and away who are grappling with challenges posed by climate change.

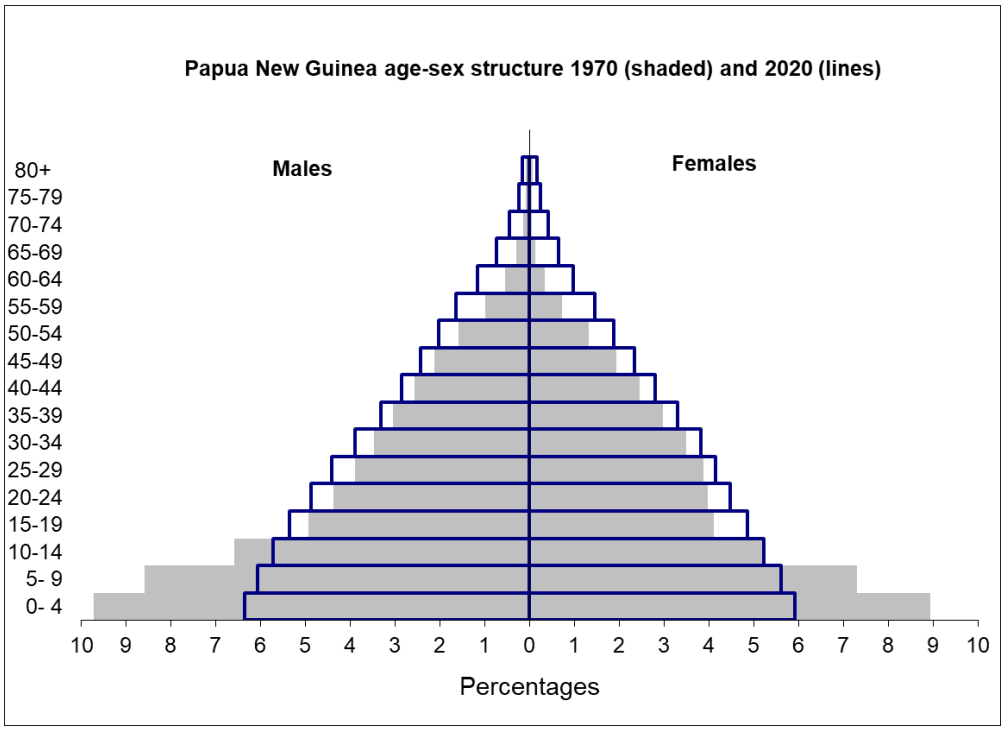
A key finding that has emerged from the regional and subregional analyses of recent and prospective demographic change is that while there is considerable diversity in the sizes and age–sex structures of Pacific populations, they all have two common attributes. The first is in-built momentum for further population growth, and for most of them, this growth will continue for at least the next 30 years. The second is the growth in opportunities for international mobility, especially labour migration, in countries on the Pacific Rim, as well as some PICTs with ageing populations. Momentum and migration are defining features of the contemporary Pacific demographic transitions, and the report concludes with a summary of their role at the regional and subregional levels.

5. Continuity through change in Pacific populations

Populations change slowly in the short term – something that often surprises people after reading about 'record levels of net migration,' or a 'steady decline in the number of births each year,' or 'a spike in death rates' associated with the outbreak of a particular disease. When considering patterns of change in the sizes, structures and distributions of populations at regional, subregional and national scales, it is important to keep in mind that deaths and migration are distributed across all ages in a population, although both tend to favour particular age groups (infants and old people in the case of deaths and young adults in the case of migration). It is hard to see the impacts of slowly changing death rates and NMRs on the age–sex pyramid for a reasonably large population. Much more noticeable in the population pyramid are changes in fertility. This is because births only enter the pyramid in one place, at age zero. If the number of births falls in successive years, then this will become quite noticeable in the shrinking size of the numbers or percentage of the population in the age group 0–4 years.

Continuity rather than rapid change is the norm when it comes to age–sex structures for all but very small populations in the short term; it takes exceptional changes in birth, death and migration rates to change the shape of the pyramid and the momentum of population growth. A comparison of the population pyramids for the Pacific's largest population in PNG in 1970 and 50 years later in 2020 illustrates this point (Figure 22).

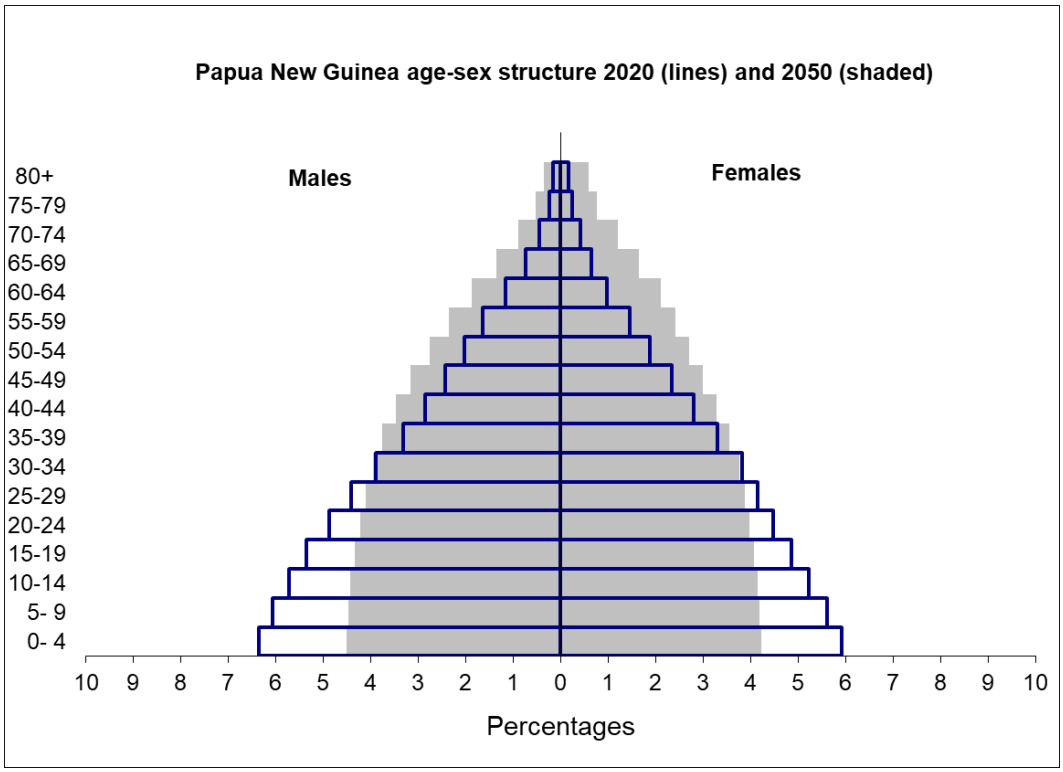
Figure 22: Population structure, Papua New Guinea, 1970–2020



The percentage of the population in the younger age groups has been shrinking due to a combination of declining birth and death rates. More people are living to older ages as can be seen in the increasing percentages above 50 years of age. According to UN DESA's estimates, in 1970 women in PNG had, on average, 6.25 births during their reproductive lives (TFR) and the average life expectancy at birth was around 50 years. By 2020 the TFR had fallen to 3.22 and average life expectancy had increased to 64.5 years. The pyramid had contracted at the base and thickened out through the adult and older age groups. The potential of this population to grow at an average rate of over 2% per annum had persisted throughout the 50 years, despite changes in fertility and mortality. The estimated time for a doubling in PNG's population size had increased by just 5 years between 1970 (29 years) and 2020 (34 years) indicating that the momentum for growth remained very high.

Over the next 50 years, demographic change in PNG is projected to be much more rapid. The doubling time for the population could increase by as much as 38 years from 34 years in 2020 to 72 years in 2050, based on UN DESA's medium projection variant. Average life expectancy at birth could rise by a further 4.5 years to 70 years and the TFR could fall to 2.33 births per woman. The shape of the population pyramid could be very different, with a much narrower base and a much thicker waste and top (Figure 23). But, as shown in the earlier discussion of population change in Melanesia, PNG's population will still be growing according to both UN DESA's and the SPC's projections and will continue to grow through to the end of this century and beyond, according to some speculative UN projections out to 2300.

Figure 23: Population structure, Papua New Guinea, 2020 and 2050



Continuity through change is the key message about population growth in PNG and in most of the larger populations in the Pacific. This can be seen in the estimated annual growth rates and doubling times for the total populations of Melanesia, Micronesia and Polynesia in 1970, 2020 and 2050 in Table 23.

Table 23: Estimated annual growth rates and doubling times in Pacific populations

	Annual growth rate (%)			Doubling time (years)		
Subregion	1970	2020	2050	1970	2020	2050
Melanesia	2.41	1.94	0.97	28.7	35.7	71.7
Micronesia	2.86	0.68	0.22	24.2	102.7	+135.0
Polynesia	2.87	0.82	0.45	32.7	91.0	+135.0
Aotearoa	1.49	0.83	0.23	46.6	82.2	+135.0

Although some of the small populations in Polynesia (Cook Islands, Niue, Tokelau) have experienced periods of migration-led population decline these are the exception rather than the rule at this stage in the Pacific. Several more of the smaller populations are likely to join them in having a migration-led decline in numbers of residents over the next 30 years (Tonga, Tuvalu and Wallis and Futuna in Polynesia; Nauru, Palau, CNMI and Marshall Islands in Micronesia) but the average annual growth rates for all subregions are projected to still be positive at midcentury (Table 23).

5.1 From research evidence to policy implications for Aotearoa

Looking ahead, it would be prudent to monitor population change in five different Pacific population clusters, rather than focussing on the usual three subregions. These clusters are listed below along with some of their defining demographic characteristics:

Western Pacific (PNG, Solomons, Vanuatu): youthful populations with sustained momentum-led population growth; migration outlets increasing, especially in Australia but natural increase remains the key driver of population change; small transnational populations but likely to see considerable growth in these in Australia in the future; low levels of urbanisation (70%+ of population in communities classed as rural).

Central Pacific (Fiji, Kiribati, Nauru, Tuvalu): populations experiencing slower population growth as a result of a combination of declining fertility and external migration; natural increase still the main driver of population change; long-standing migration links with New Zealand (Fiji, Kiribati, Tuvalu), Australia (Nauru and Fiji) and USA (Kiribati, via Marshall Islands, and Fiji); increasing labour migration opportunities in Australia; growing transnational populations; half or more of their national populations are classed as urban; extensive use of Fiji as a hub for services and transit (Kiribati and Tuvalu; Air Nauru at times).

Eastern Pacific (American Samoa, Cook Islands, Niue, Tokelau, Tonga, Samoa): populations growing slowly or experiencing population decline; ageing populations, especially in the Realm countries; extensive migration to the Pacific Rim and proportionately large transnational populations; long histories of migration to Aotearoa (most countries) and the USA (some countries); more recent migration to Australia and increasing migration opportunities there; variable levels of urbanisation of national populations.

Northern Pacific (Guam, CNMI, FSM, Marshall Islands, Palau): populations growing slowly or declining as a result of low TFRs and extensive emigration to the USA; ageing populations in all countries except Guam; variable transnational populations in the USA where these populations have access to work and residence opportunities; variable levels of urbanisation of national populations.

The French territories (French Polynesia, New Caledonia, Wallis and Futuna): variable levels of population growth; a high degree of interdependence where the Indigenous populations have French citizenship and citizens can move freely between the three colonies; limited migration to Pacific Rim; small transnational populations; variable levels of urbanisation in the three colonies.

This report concludes the "region-wide analysis of the contemporary demographic context and dynamics that affect mobility in the region and, where possible, insights into specific countries." An evidence base to inform an associated Thematic Paper, *Pacific*

Population Dynamics in the Context of Climate Change, has now been developed. The Thematic Paper addresses more specifically the implications of climate change through to 2050 for growth and distribution of the region's population. It contains a summary of the key policy implications for Aotearoa of population dynamics at the regional and subregional scales in the Pacific over the next 30 years with reference to some of the anticipated impacts of climate change. The five clusters of PICTs introduced above are reviewed with reference to the policy implications of their different trajectories of population growth and distribution in the context of the IPCC's Sixth Assessment of climate change, with special reference to scenarios and impacts for small islands.

Related Thematic Papers

Bedford, R., Friesen, W., Underhill-Sem, Y., Newport, C., & Ng Shiu, R. (2023). ***Pacific population dynamics in the context of climate change: Thematic Paper 1.*** Bedford Consulting & Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/

Ng Shiu, R., Underhill-Sem, Y., & Newport, C. (2024). ***Perspectives from communities across the Pacific: Navigating vulnerability, continuing resilience: Thematic Paper 2.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Newport, C., Underhill-Sem, Y., & Ng Shiu, R. (2024**). *Relationships: Shifting climate (im)mobility: Thematic Paper 3.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Underhill-Sem, Y., Newport, C., & Ng Shiu, R. (2024). ***Community-level decision making: Dealing with mobility: Thematic Paper 4.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Underhill-Sem, Y., Newport, C., & Ng Shiu, R. (2024). ***Mobilities over time: Ancestral, historical, future: Thematic Paper 5***. Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Ng Shiu, R., Newport, C., & Underhill-Sem, Y. (2024). ***Pacific human security: Health, wellbeing, and resilience: Thematic Paper 6.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Newport, C., Underhill-Sem, Y., & Ng Shiu, R. (2024). ***Community land and marine tenure: Thematic Paper 7.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

Newport, C., Underhill-Sem, Y., & Ng Shiu, R. (2024). ***Climate mobility-associated loss and damage: Thematic Paper 8.*** Waipapa Taumata Rau, University of Auckland. https://pacific-climate-research.blogs.auckland.ac.nz/product-catalogue/

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