Rethinking Logistics in Lagging Regions

TRADE-RELATED INFRASTRUCTURE IN PACIFIC SMALL ISLAND DEVELOPING STATES (SIDS)

BACKGROUND REPORT

Prepared by Matthew Dornan for:

International Trade Department (PRMTR) of the World Bank
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Abbreviations

ADB  Asian Development Bank
AusAID  Australian Agency for International Development (integrated into Australian Department of Foreign Affairs and Trade in 2013)
FSM  Federated States of Micronesia
GDP  Gross Domestic Product
GNI  Gross National Income
MIRAB  Migration, Remittances, Aid and Bureaucracy
Pacific Plan  Pacific Plan for Regional Integration and Cooperation
PASO  Pacific Aviation Safety Office
PFL  Pacific Forum Line
PFTAC  Pacific Financial Technical Assistance Centre
PIASA  Pacific Islands Air Services Agreement
PICTA  Pacific Island Countries Trade Agreement
PNG  Papua New Guinea
SIDS  Small Island Developing States
SOE  State-Owned Enterprise
TEU  Twenty-foot equivalent unit

Currencies

United States Dollars (US$) are used in this report unless otherwise specified. Exchange rates that are used are as follows:

1 Australian Dollar (A$1) = US$0.88
1 Fiji Dollar (FJ$1) = US$0.53
1 New Zealand Dollar (NZ$1) = US$0.83
1 Papua New Guinea Kina (K$1) = US$0.38
1 Samoa Tala (WST$1) = US$0.43
1 Tonga Pa'Anga (TOP$1) = US$0.54
1 Vanuatu Vatu (VT$1) = US$0.01
1. Introduction

Pacific small island developing states (SIDS), generally referred to as Pacific island countries, share a number of common constraints to economic development. Small size and low economic densities limit both the scope for production for domestic markets, and place Pacific island exports at a disadvantage in international markets, given the inability of Pacific island producers to realise economies of scale. Such challenges are compounded by significant freight and transportation costs. Trading costs are high as a result of distance from major markets and the poor state of trade-related infrastructure. There is scope to lower costs through the development of trade-related infrastructure, such as port and airport facilities, but this is difficult. The economic case for investment in trade-related infrastructure is often weak and cost recovery a challenge, given the absence of large trade volumes.

This paper forms part of a broader study being undertaken by the World Bank, entitled: Rethinking logistics in lagging regions. The study recognises that in small island developing states, trade costs are often high due to geographical remoteness, low economic density and underdeveloped logistics services. This hinders the ability of niche export industries to market their products, especially those that are time-sensitive. The study aims to help governments define strategies that can reduce international trade costs; strategies that may include policy reforms, infrastructure investments or private sector innovation. Strategies may target connectivity at the sub-national, national, or regional level.

This paper will contribute to the objective through analysis of trade-related infrastructure in Pacific island countries. It will provide an overview of trade-related infrastructure in the Pacific, including major ports, airports, and roads, detailing the state of such infrastructure and how it is managed in the region. A key objective of the paper is to explore the extent to which structural constraints resulting from low trade volumes prevent the provision of quality infrastructure. The related issue of maintenance and its recurrent funding will also be discussed. The paper will finish with discussion of regional approaches to infrastructure management, and some recommendations for improving the quality of trade-related infrastructure in the Pacific.

2. Scope and objectives

The terms of reference for this paper request that it explore the following points:

a) Approaches to transport infrastructure planning and development, distinguishing between financing by central and provincial governments and the public and private sectors;

b) For core trade related transport infrastructure a review of approaches to maintenance financing and where feasible, estimate the maintenance needs and available resources;

c) Explore the link between infrastructure usage fees and volume of traffic, and resources for maintenance and the stock of infrastructure;

d) Assess the likely impact of adopting a regional approach to infrastructure provision and maintenance; and
e) Make recommendations to enhance the operational and financial sustainability of transport and logistics infrastructure across the South Pacific.

Trade-related transport infrastructure is defined in the terms of reference as including infrastructure that is “related to international trade such as ports (including jetties) and airports”, and “where feasible”, “main roads that are important to moving trade traffic within individual countries.” The paper is therefore concerned with physical infrastructure that is immobile. It does not discuss moveable assets that facilitate trade, such as aircraft or shipping, although it does touch on the airline and shipping industries in discussion of regional approaches to service delivery (shipping is also the subject of other papers being prepared as part of the same study).

The paper will be based on analysis of 14 independent Pacific island countries that form part of the Pacific Islands Forum. These countries include Cook Islands, Federated States of Micronesia (FSM), Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. All are considered small island developing states, although the size and characteristics of these countries varies enormously, as detailed below. The paper will also discuss the state of trade-related infrastructure in some Pacific island territories, where information is available.

This geographical focus is broader than that requested in the terms of reference, which refers to the South Pacific; three of the countries listed above are located in the North Pacific (Palau, FSM, and Marshall Islands). There are pragmatic reasons for extending the area of focus beyond the South Pacific. The majority of reports on trade-related infrastructure in the region consider this broader geographical area. To have excluded the Micronesian states of the North Pacific would have been detrimental to discussion of smaller Pacific island states, given the existing literature on these countries.

The terms of reference ask for “a synthesis paper on transport infrastructure provision and maintenance in the South Pacific.” The paper therefore draws on a considerable body of literature regarding ports, airports, and roads in the region, including reports on infrastructure produced by national governments, development partners, and researchers. It also draws on available corporate information, financial statements, annual reports, feasibility studies, budget documents, national development plans, and national infrastructure investment plans. The broader literature on Pacific island governments, public enterprises, trade, and economic development in the region informs discussion throughout the paper.

Data availability is an issue despite the considerable body of literature that is relevant to trade-related infrastructure in the Pacific. The vast majority of reports in the Pacific present limited data; it is not uncommon for findings to be based on a limited number of case studies, personal communications and anecdotal evidence. This paper has used the data that are available, which include data sourced from international agencies (such as the World Bank *Ease of Doing Business Indicators*), reports from development partners, budget and national planning documents, and the financial statements and annual reports of infrastructure service providers. Some of the data that are used have been collected through personal communication with infrastructure service providers and government officials over a number of years. A full list of documents and sources used for this report is provided in the reference list.
3. Background

3.1 Challenges to economic growth in the Pacific

The economic performance of small island developing states in the Pacific (Pacific island countries) has lagged that of other regions. Between 1995 and 2009, growth in Gross Domestic Product (GDP) averaged 2.3 percent per year in Pacific island countries for which data was available, compared to a global average of 3.8 percent (World Bank data, various years). A number of econometric exercises have arrived at similar results. Sampson (2005) for example finds that the growth of Pacific island states was lower than that of countries in any other region of the world between 1995 and 2005, after controlling for OECD membership and oil exports. Gibson and Nero (2006) also finds that economic growth in Pacific island countries between 1987 and 2003, at 2 percent per annum, lagged that of small island states in other parts of the world (these states averaged 2.7 percent growth per annum).

There are a range of reasons for this poor economic performance. Some authors have pointed, somewhat controversially, to aid dependence in the region (Hughes 2003). Others have blamed poor institutions and governance failures (Chand 2005; Chand 2006; Duncan 2005). More recently, the extreme vulnerability of Pacific island countries to natural disasters and climate change has been highlighted as a barrier to economic development (AusAID 2005). The World Bank has estimated that Cyclone Evan, which struck Samoa in December 2012, caused damages of A$206 million—equivalent to 30 percent of Samoa’s GDP. This came three years after a tsunami that resulted in damages of A$131 million.

It is also widely accepted that Pacific island countries face special constraints to economic development given their small size, low population density, and distance from major markets (Armstrong & Read 2002; Winters & Martins 2004; World Bank 2011). The Pacific islands region is often compared to the Caribbean, given that both regions comprise small island developing states. However, the structural constraints that Pacific island countries face due to size and distance from markets are unique, as can be seen in figure 3.1 (the method for calculating GDP weighted distance is discussed in Gibson and Nero (2006)). Nine of the 25 smallest countries in the world are located in the Pacific, and no other region faces the same combination of both small size and distance from major markets.
The provision of infrastructure services is difficult in these circumstances. Smallness and distance are detrimental to connectivity in the Pacific; it is costly to link small and dispersed communities to major population centres, given the inability to generate economies of scale. The susceptibility of the region to natural disasters further increases these costs given impacts on infrastructure, as do governance issues, such as insecurity of land tenure. In rural areas where cash incomes are low, costs are often prohibitive, and infrastructure service provision proceeds only where subsidised.

However, structural constraints related to geography and size are not the only determinants of infrastructure service provision in the Pacific. The World Bank’s Pacific Infrastructure Challenge report points out that:

“Pacific countries demonstrate worse infrastructure performance than could be expected for their level of GDP”, with “infrastructure performance worse than in comparator countries (such as Caribbean islands) with similar levels of income, and which share some ‘disadvantages’, such as small scale or vulnerability to natural disaster” (World Bank 2006).

Geography, size, income, and natural disasters certainly affect the quality of infrastructure services in the Pacific. But other factors, such as institutional arrangements, are also important. These factors can be influenced by policy, and are a key focus of this paper.
3.2 Differences between Pacific island economies

Although Pacific island countries share many of the same challenges to economic growth, there is also great diversity within the region. Pacific island countries differ in size, remoteness, economic structure, and institutional development. All of these factors have a bearing on the quality and performance of trade-related infrastructure services. An overview is therefore useful, as it can help to explain the state of trade-related infrastructure in different countries.

**Larger resource-exporting economies**

Larger natural resource exporting economies in the region include Papua New Guinea (PNG) and Solomon Islands. The economies of PNG and Solomon Islands have historically performed poorly. Poverty in the Pacific islands region remains concentrated in the two countries, particularly in rural areas that have limited connectivity with population centres. Poor economic performance has in large part resulted from poor political governance. The importance attached to traditional *wantok* (literally, ‘one-talk’, or a group with a common language) relations, coupled with limited sense of nation in both countries, has resulted in clientelist political behaviour, widespread corruption, ineffective government, and civil conflict.

The economic performance of PNG and to a lesser extent Solomon Islands has improved in the last decade as a result of high commodity prices. Both economies have enjoyed high rates of economic growth driven by the export of natural resources such as minerals and timber. The impact of this growth on poverty, however, has been limited. The resources boom has not led to broad-based economic growth or improved economic outcomes for the broader population (the World Bank has found that poverty has actually increased in PNG since 1996). Governments in both countries have failed to generate significant revenue from natural resource exports, given tax holidays provided to investors in PNG, and widespread tax avoidance in Solomon Islands. Skilled positions in the resource industries are often occupied by expatriates, and resource rents distributed inequitably among landowners. Capacity constraints have also meant that the resource boom has caused price inflation in other sectors of the economy, with implications for infrastructure in areas that have not benefitted from natural resource exports. For example, the cost of road construction and maintenance in PNG has risen due to the activities of resource companies.

The poor state of trade-related infrastructure has both hindered and benefited from the resources boom. Limited road networks and inadequate port facilities have greatly increased costs for resource projects, and have prevented marginal projects from proceeding. Poor transport infrastructure has also acted as a barrier to broad-based growth; Gibson and Rozelle (2002) demonstrate that road access has an impact on poverty in rural areas of PNG. However, the resources boom has generated investment in infrastructure. Resource companies have constructed and maintained roads, runways, and port facilities throughout rural areas. The port of Lae, PNG’s largest, is being upgraded with assistance from the ADB, in recognition of the fact it is increasingly a bottleneck for resource-based exports. Transport infrastructure not linked to the resources boom, such as infrastructure for tourism (Port Moresby Jacksons International airport, for example), has not enjoyed the same level of investment.
Relatively diversified Pacific island economies

Fiji, Samoa, and to a lesser extent Tonga, have developed relatively diversified economies since independence, which have performed well compared to other Pacific island economies. Tourism and agriculture have been important for economic development in all three countries, while manufacturing has been significant in Fiji and Samoa. High levels of migration and associated remittance flows have contributed to this positive economic performance.

Transport infrastructure has both supported and developed as a result of tourism, agriculture, and manufacturing. Airport and aviation facilities in all three countries provide the foundation for tourism. The development of airports in outer islands in Fiji and Tonga has spread the economic benefits of tourism to rural areas in both countries. In Samoa, a good road network has facilitated the development of ‘fale’ tourism around both Upolu and Savaii. Road and ferry services are also important for the transportation of agricultural produce from rural areas to market, or to international ports for export.

However, economic growth has slowed in recent years in all three countries. There are a number of reasons. Political instability has been a factor in the poor economic performance of Fiji and Tonga. In Samoa and Tonga, the impact of the 2007-08 financial crisis was significant; both countries experienced sharp declines in remittance flows from developed economies as a result of the crisis. Natural disasters have also had large economic impacts in recent years. Governments in Samoa, Tonga, and Fiji are in a weak fiscal position, given low economic growth, natural disasters and proliferate infrastructure spending. Government debt to GDP is over 50 percent in Samoa, approximately 50 percent in Fiji, and 46 percent in Tonga.

Tourism dependent economies

The economies of Vanuatu, Palau, and Cook Islands are more reliant on tourism than Fiji, Samoa and Tonga. Tourism is the most significant industry in all three countries; in the case of Cook Islands, it is estimated to account for 75 to 80 percent of economic activity. Tourism dependent economies have enjoyed high, although volatile, economic growth in the last decade. This has been driven by expansion of tourism and, in Cook Islands and Vanuatu, aid-funded infrastructure construction.

Transport infrastructure facilities in Vanuatu, Palau, and Cook Islands reflect the importance attached to tourism in these countries. Airport facilities are adequate for international arrivals, although expansion and rehabilitation of Port Vila’s main airport has long been discussed. Airline reform has facilitated growth in tourism in both Vanuatu and Cook Islands, with low-cost airlines servicing both destinations. International air freight services are less developed. Domestic airport infrastructure and aviation services facilitate a significant tourism industry in outer islands in Vanuatu and Cook Islands, as evident in the case of Tanna (Vanuatu) and Aitutaki (Cook Islands), although there is scope for fare reduction and tourism growth in other islands.

1 In Tonga for example, a US$72.14 million China EXIM Bank loan equivalent to 17 percent of GDP has been used to develop a passenger ferry terminal in Nuku’alofa for cruise ships, despite the fact that only one or two cruise ships visit per month. Prospects for growing this market may be limited, given the distance of Tonga from source countries like Australia, relative to competitors such as Vanuatu.
Trade-related infrastructure not directly associated with the tourism industry is less developed. In the case of Port Vila, Vanuatu, container handling facilities at the port are poor, and there is insufficient space for container movement on the narrow wharf. The port is shared with cruise ships, leading container ships to wait at sea while cruise ships dock (there are plans to upgrade the Port Vila wharf with funding from development partners). Port facilities in Rarotonga are also limited. Road development is less important in Palau and Cook Islands, given their small landmass. In Vanuatu, roads near the two international ports are adequate; although maintenance of roads in general is very poor.

**MIRAB Economies**

Other economies in the Pacific closely resemble the MIRAB structure, with living standards supported by Migration, Remittances, Aid and (aid-funded) Bureaucracy (MIRAB) (Bertram and Watters 1985). Pacific island countries with MIRAB-like economies include Nauru, Tuvalu, Niue, Kiribati, Federated States of Micronesia, and the Republic of Marshall Islands. The private sector in these economies is very small. Government provides the main source of employment, and a significant portion of government spending is supported by development partners. Exports are generally limited, although in some countries license fees paid by distant water fishing nation vessels are an important source of revenue.

The poor state of trade-related infrastructure in these countries reflects and partly explains their economic base. International airports are sub-standard; some do not meet ICAO safety requirements, meaning that they are less likely to be serviced by international airline carriers. Ports facilities are also sub-standard. In Kiribati and Nauru for example, containers must be unloaded by barge as large ships cannot dock at the berth. Productivity rates in these ports are among the lowest in the region.

Government involvement in the provision of infrastructure services is also greatest in MIRAB economies. This mirrors the significant role played by government in these economies more broadly. In many of the countries, airport and port facilities are managed by government ministries or statutory authorities with limited independence, although this is gradually changing. Governments in MIRAB economies also commonly play a role in the direct provision of aviation and shipping services. The Governments of Nauru and Kiribati for instance both operate aircraft. Such service delivery has been costly, as demonstrated by the demise of Air Nauru (the predecessor to Our Airline).
4. Trade-related Infrastructure in the Pacific: An Overview

Governments have historically played an important role in the development and management of trade-related infrastructure. In the Pacific, ports, airports, and major roads were often first developed by colonial administrations, or in the case of many runways in the region, by foreign military forces resident during the Second World War. These trade-related infrastructure facilities were, quite rightly, deemed to be essential to Pacific island countries and territories. Ports, airports, and roads provide important linkages between Pacific island communities and the rest of the world, facilitating trade and the movement of people. Colonial administrations and the newly independent governments that followed them saw the potential developmental implications of such infrastructure. Successive national development plans sought, with mixed success, to link productive agricultural or resource-rich areas to global markets through construction of roads and ports by government. Later, the same occurred with the development of international airports and linked road and shipping infrastructure, which was used in countries like Fiji and Samoa to facilitate the development of a tourism industry.

Trade-related infrastructure facilities were therefore understood to generate considerable positive externalities, or benefits beyond those reflected in the price of the infrastructure services themselves. This provided part of the intellectual basis for their provision, and in many cases subsidisation, by Pacific island governments. Trade-related infrastructure facilities were deemed too important to fail; there was a widespread view that only the government could internalise the positive externalities associated with such infrastructure service provision (and equally, the negative externalities of infrastructure failure caused by lack of sound operation or maintenance).

Other characteristics of trade-related infrastructure were also significant. Ports and airports were considered to be natural monopolies, where large fixed costs and resulting economies of scale meant it was most efficient for production to be concentrated in a single firm. There was reluctance to allow private ownership of such monopolies. It was understood that a private sector operator would have an incentive to increase costs, reducing demand, and thereby harming export industries such as agriculture and tourism. Costs for consumers of imported items would also rise as a result of monopoly pricing.2

Roads on the other hand were considered a classic public good, consumption being both non-excludable and non-rivalrous. Someone can travel on a road irrespective of whether they have contributed towards its provision (toll roads being an exception) and this does not prevent another person also using the road. Roads in the Pacific were therefore generally constructed and maintained by government, as elsewhere in the world, although there were some exceptions in agriculture and resource industries (for example, sugar cane farms in Fiji and resource companies in Solomon Islands and PNG).

Government provision of trade-related infrastructure services involved its own costs, which became increasingly evident in the decades following independence. Performance incentives and accountability mechanisms were limited within government ministries tasked with managing

2 Experience with unregulated private sector monopolies in other areas has supported such views. The private ownership of oil importation terminals has led to higher fuel prices in many smaller Pacific island countries (Morris 2005; Sanghi & Bartmanovich 2007). The limited regulatory capacity of Pacific island states to prevent monopoly pricing has contributed to the problem.
infrastructure assets. Operation and, importantly, maintenance, were generally sub-standard as a result. Funding constraints contributed to poor performance of infrastructure. Budget allocations commonly prioritised the development of new infrastructure over maintenance of existing infrastructure, given the political rewards associated with each expense. Lack of routine maintenance resulted in the deterioration of infrastructure, increasing the cost of infrastructure service provision in the long run, as infrastructure assets had to be rehabilitated. These issues are discussed in more detail in section 8.

Within government, provision of trade-related infrastructure services has proceeded under various models. Government ministries responsible for public works are often involved in the provision of transport infrastructure. This is most common for roads, given their public good characteristics. It also occurs for ports and airports, particularly in MIRAB economies, where smallness means that there is less scope for division of responsibilities, the private sector is not so well developed, and there is less interest in investment by foreign companies. In cases where government provides infrastructure that facilitates international trade, it is normally national level government ministries that are involved. However, sub-national level governments are sometimes responsible for certain infrastructure assets, such as for roads in urban areas that service key ports. Funding for ongoing management and maintenance in these cases is normally sourced from consolidated revenue. For ports and airports operated by government ministries, user charges are often subsidised, and are directed toward consolidated revenue.

There have been moves in the last two decades to ‘commercialise’ government provision of trade-related infrastructure services, a trend driven by the poor performance of the public sector in many countries. Commercialisation has had two components. One has involved moving responsibility for service provision away from the civil service toward state-owned entities that are more independent from government and pursue commercial objectives. The majority of port and airport infrastructure services in the Pacific are now provided by corporatised state-owned enterprises as a result of such commercialisation (see table 4.1). Some state-owned enterprises are statutory authorities, established by an act of Parliament and given regulatory powers (which can conflict with commercial objectives). Other state-owned enterprises operate under corporations law and (in theory, if not practice) can have private sector shareholders. The corporatisation of infrastructure service provision by government has achieved mixed success, owing to the varying quality of governance arrangements established in different countries. This is discussed in more detail in the sections that follow.
Table 4.1 Management of trade-related infrastructure in Pacific island countries

<table>
<thead>
<tr>
<th>Resource exporters</th>
<th>Ports</th>
<th>Airports</th>
<th>Roads</th>
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<tr>
<td>PNG</td>
<td>SOE</td>
<td>SOE</td>
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<td>Solomon Islands</td>
<td>SOE</td>
<td>Govt ministry</td>
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<td>Govt ministry</td>
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<tr>
<th>Relatively diversified economies</th>
<th>Ports</th>
<th>Airports</th>
<th>Roads</th>
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<tbody>
<tr>
<td>Fiji</td>
<td>SOE</td>
<td>SOE</td>
<td>Corporatized govt agency</td>
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<tr>
<td>Samoa</td>
<td>SOE</td>
<td>SOE</td>
<td>Corporatized govt agency</td>
</tr>
<tr>
<td>Tonga</td>
<td>SOE</td>
<td>SOE</td>
<td>Govt ministry</td>
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<th>Tourism-dependent economies</th>
<th>Ports</th>
<th>Airports</th>
<th>Roads</th>
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<tr>
<td>Cook Islands</td>
<td>SOE</td>
<td>SOE</td>
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<tr>
<td>Palau (private operator)</td>
<td></td>
<td>Govt ministry</td>
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<tr>
<td>Vanuatu</td>
<td>SOE</td>
<td>SOE</td>
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<th>MIRAB economies</th>
<th>Ports</th>
<th>Airports</th>
<th>Roads</th>
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<tr>
<td>FSM</td>
<td>SOE</td>
<td>SOE</td>
<td></td>
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<tr>
<td>Kiribati</td>
<td>SOE</td>
<td>Govt ministry</td>
<td></td>
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<tr>
<td>Marshall Islands</td>
<td>SOE</td>
<td>SOE</td>
<td></td>
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<tr>
<td>Nauru</td>
<td>SOE/Govt ministry</td>
<td>Govt ministry</td>
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<td>Niue</td>
<td>Govt ministry</td>
<td>Govt ministry</td>
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<td>Tuvalu</td>
<td>Govt ministry</td>
<td>Govt ministry</td>
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*Table shows management arrangements for primary ports, airports and roads that support international trade and tourism. The management of secondary port, airports and roads in many cases differs.

The second component of commercialisation of trade-related infrastructure service provision has involved private sector participation. State-owned enterprises and government ministries across the Pacific outsource functions to the private sector. This often involves separating natural monopoly elements of service provision, such as basic port infrastructure, from those were there is scope for competition, such as in port services (e.g., stevedoring). There has been significant progress toward greater commercialisation of trade-related infrastructure, particularly in ports, although the introduction of competition has been hampered by the small scale of operations in many Pacific island countries (although for ports, the operation of several stevedoring companies in Tonga demonstrates that competition is viable at a small scale of operations – at least in areas where capital outlay is limited). An alternative approach has involved periodic tendering of infrastructure management (i.e.,
a concession model). This introduces an element of competition in sectors where the scale of operations is too small to support more than one company.

The trend toward commercialisation and private sector participation in the provision of trade-related infrastructure services has also extended to the road sector. Outsourcing of road maintenance is now commonplace across the Pacific. Fiji, Papua New Guinea and Samoa have established road management agencies that enjoy considerable independence from government, and which outsource maintenance work to the private sector. In some countries there have been attempts to replicate a user charges system by directing fuel levies or vehicle registration fees towards road maintenance. Papua New Guinea and Samoa have both established such a road fund; in the case of PNG, this has formed part of an effort to address chronic underfunding of road maintenance (the case of PNG’s National Road Authority is discussed in more detail below). Tonga and Vanuatu are considering establishing similar structures.

The state of trade-related infrastructure has been influenced by these policy changes, but at the same time, has reflected (and contributed to) the economic structure of different Pacific island economies. In resource-based economies, governments have prioritised the efficient operation of ports while airport tourism facilities and roads outside of resource-rich areas have been neglected. Similarly, in countries where tourism is important, airport facilities are generally sound, as are road and shipping networks to transfer tourists to resort areas. In countries where exports are not significant, port facilities are generally of lower quality. Trade-related infrastructure is poorest where there is limited export or tourism activity, such as in the MIRAB economies.

A more detailed overview of port, airport and road infrastructure in the region is provided below.

5. Ports

Ports in Pacific island countries can be distinguished on the basis of whether they facilitate international or domestic shipping. Primary ports are used for international trade, whereas secondary ports are used for domestic trade and travel. Primary ports – the focus of this report – are in general operated on a commercial basis and are in a satisfactory state, with adequate capacity to meet demand. The case of secondary ports is a different matter. Secondary ports are rarely able to recover their costs due to both political constraints and the small scale of operations. These funding gaps, in general, are not adequately filled by government subsidies. The lack of a viable funding model for secondary ports adversely affects their maintenance, leading to the premature deterioration of port infrastructure (Asian Development Bank 2007b).

The satisfactory operation and maintenance of primary ports reflects their importance for Pacific island countries. Imports are significant as a proportion of GDP across the region. Ports receive revenue from a range of charges, such as fees for entering the port, wharfage fees (charged for each unit of cargo), and berthing fees (charged for time spent at the berth). These are in some cases

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3 Some smaller Pacific island countries have only one port, such as Nauru and Niue (Pacific Region Infrastructure Facility 2011).
complemented by budget allocations from government, especially in smaller countries. The importance of ensuring the continuation of trade means that port authorities are rarely short of funding for ongoing everyday operations and maintenance, although funding constraints can prevent port expansion and rehabilitation works. Fees and charges are reasonable in most ports. However, there is scope for improving efficiency. Many ports in the region are not equipped nor designed to meet present-day shipping needs. Loading times in the region are low by international standards, and even in large ports such as Suva, there are no shore-based cranes for loading/unloading containers (mobile cranes are used instead).

There are a number of models of port administration in the region (four types of port administration that are commonly recognised are illustrated in table 5.1). More than half the primary ports in Pacific island countries can be classified as landlord ports, although varying degrees of private ownership of superstructure facilities (forklifts etc) mean that some ports more closely resemble the tool port model. Ports in the remaining eight countries can be classified as public service ports, although there is again significant variation within this category. In some cases, a corporatised state-owned enterprise is responsible for port administration, with stevedoring provided by a second state-owned enterprise. This is the model in Fiji. In other cases, such as Tuvalu, a government ministry administers all port services.

Port models in the Pacific are listed in table 5.2. The considerable variation within categories of port administration means that they are not a good predictor of port performance (Asian Development Bank 2007e). There are no private service ports in the Pacific, although some purpose-built facilities are used by companies to export specific goods (such as in the mining sector).

Table 5.1 Port management models

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<th></th>
<th>Infrastructure</th>
<th>Superstructure</th>
<th>Port labour</th>
<th>Other functions</th>
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<tbody>
<tr>
<td>Public service port</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
<td>Majority public</td>
</tr>
<tr>
<td>Tool port</td>
<td>Public</td>
<td>Public</td>
<td>Private</td>
<td>Public / Private</td>
</tr>
<tr>
<td>Landlord port</td>
<td>Public</td>
<td>Private</td>
<td>Private</td>
<td>Public / Private</td>
</tr>
<tr>
<td>Private service port</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
<td>Majority private</td>
</tr>
</tbody>
</table>

Note: Infrastructure refers to ‘below ground’ fixed assets such as breakwaters, channels, and berths. Superstructure refers to above ground equipment and facilities, such as cranes, offices, and warehouses.

Table 5.2 Port management models in the Pacific islands

<table>
<thead>
<tr>
<th>Public service port</th>
<th>Tool or landlord port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solomon Islands, Fiji*, Kiribati, Nauru, Niue, Tuvalu</td>
<td>PNG, Samoa, Tonga, Palau, Vanuatu, FSM, Marshall Islands, New Caledonia, Cook Islands*, New Caledonia</td>
</tr>
</tbody>
</table>

*The categorisation of Cook Islands and Fiji could be considered contentious. Cook Islands Port Authority outsources stevedoring services to the private sector (and hence is considered a tool port in table 5.2), but provides other port services such as container cleaning. Fiji Ports Corporation Limited does not provide stevedoring services, but it outsources these to a second SOE (and hence is considered a public service port in table 5.2).
An additional distinction can be made between ports in economies where exports are more or less significant. In resource-exporting and relatively diversified economies, where exports are important, port facilities are generally more developed. In the majority of these countries, ports are operated by financially stable and corporatised state-owned enterprises, which recover costs through user charges. Some of these ports (Samoa, Tonga, PNG) operate under a landlord model, while others (Solomon Islands and Fiji) are more akin to the public service port model. Performance between these ports varies due to economies of scale and a number of institutional factors, discussed below.

In MIRAB and to a lesser extent tourism dependent economies, where exports are not so important, port facilities are in a poorer state. These ports are often characterised by limited infrastructure. In Nauru for example, there is no berthing area, while in Kiribati, it is too shallow for large vessels. In Tuvalu, containers cannot be stacked due to an inadequate floor in the container storage area (Government of Nauru 2011; Government of Tuvalu 2012). Limited infrastructure contributes to delays in loading and unloading cargo in these countries. It can also create uncertainty for exporters/importers; in Nauru for example, bad weather frequently disrupts loading/unloading at the country’s only port.

There are often no reliable statistics regarding port performance for the smaller MIRAB economies (e.g., Niue, Nauru, Tuvalu). The performance of most primary ports in the Pacific can nevertheless be assessed using data from the World Bank’s Doing Business Indicator series. Figure 5.1 shows the cost and time taken for a dry-cargo, 20-foot equivalent unit (TEU), full container that weighs 10 tons and is valued at US$20,000 to clear the port for export. The figure shows data for the main port of each country (where figures are available), and does not include customs procedures.

Intuitively, there should be a trade-off between cost and time taken to export cargo. This is because as a port invests in time-saving equipment, it incurs costs which must be recovered through higher user fees. Not investing in time-saving equipment involves its own costs: shipping companies must commit their ships to a port for a longer period, incurring costs which are passed on to customers. In some cases, shipping companies must also invest in equipment not available at ports with limited infrastructure, such as ship-based cranes.

The distinction between economies where exports are important and those where they are not is evident. Resource-exporting and diversified economies perform better on average than MIRAB and tourism-dependent economies. For a given cost level, resource-exporting and diversified economies load/unload cargo in less time than MIRAB and tourism-dependent economies. Similarly, for a given level of time it takes to load/unload cargo, costs are lower in resource-exporting and diversified economies. However, figure 5.1 also illustrates considerable variation between countries with similar

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4 Comparisons of cargo handling rates in Pacific island ports with those of other regions can be unfair, given that vessels on Pacific island schedules generally call at many ports, resulting in “stowage that incurs many more double moves, shifts-on-board, and hatch lid movements than would be the case with vessels serving fewer ports and larger cargo volumes. This can result in very slow handling rates even if operations are efficient” (Asian Development Bank 2007d).

5 Measuring port performance is always difficult, given variation in the types of charges levied at each port and in the size and type of cargo. In some cases, studies arrive at different conclusions as a result. The World Bank Doing Business Indicator series is used here given its simplicity, wide coverage, and use of a standard definition for cargo. This is lacking in some other studies. For example, ADB’s 2011 Finding Balance report discusses port costs in five countries, but fails to identify what cargo type or container size is used in the comparison. In general, that report arrives at similar conclusions to this study, but one difference is the finding that port costs in PNG and Fiji are lower than elsewhere in the region. Other studies contradict that conclusion, and support the results presented in this study (Asian Development Bank 2007d; Asian Development Bank 2007e; AusAID 2008).
economic structures. There are a number of other factors that help to explain the performance of ports in the Pacific.

Figure 5.1. Ports and terminal handling, cost and time*

Economies of scale are an important determinant of port efficiency, as measured by the time taken for cargo to clear the port. PNG and Fiji stand out as countries where efficiency is highest. These are the two largest Pacific island economies, and are the location for the largest three ports in the region, as measured on the basis of annual container (TEU) throughput (Lae is the largest Pacific port, Port Moresby is second, and Suva is third). Port throughput would be expected to have an impact on time taken to load/unload cargo. In the short run, high trade volumes could create delays as ports face capacity constraints. In the long run, greater cargo throughput would be expected to increase port revenue and make it financially viable to invest in better equipment, increasing efficiency. Analysis of port efficiency (time taken for cargo to clear the port) and throughput (annual TEU) supports the second, long run, hypothesis. Figure 5.2 demonstrates that there is indeed a statistically significant relationship between the two variables. Port efficiency was also compared to country population (a proxy for port size), given greater data availability, and generated a similar (statistically significant) result, illustrated in figure 5.3.
There is no such relationship between volumes of traffic and port charges; a finding that is consistent with previous studies (Asian Development Bank 2007d; Asian Development Bank 2007e). This is somewhat surprising. One would expect the fixed costs of port infrastructure and associated economies of scale to lower average costs as port size increases. There are a number of explanations. One is the different quality of infrastructure that is installed in different ports. It was noted above that Suva (Fiji) and Lae (PNG) are the most efficiency primary ports in the Pacific when assessed on the basis of time taken for cargo to clear the port. However, costs at both ports are not low by Pacific island standards; a result that is likely due to investment in port equipment (see table 5.3 for details regarding the ports of Lae and Suva, and annex 1 for an overview of other ports in the region).

Table 5.3 An overview of the ports of Lae and Suva
<table>
<thead>
<tr>
<th>Terminal</th>
<th>Daily take off capacity</th>
<th>Equipment</th>
<th>Other features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berthing Depth (max)</td>
<td>Length (max)</td>
<td>600 containers</td>
<td>Mobile cranes; grain elevator; forklifts</td>
</tr>
<tr>
<td>Lae, PNG</td>
<td>11 m</td>
<td>619 m</td>
<td>8 storage sheds provide 14,600 m² of storage; open storage of 39,000 m²</td>
</tr>
<tr>
<td>Suva, Fiji</td>
<td>22.6 m</td>
<td>492 m</td>
<td>6 storage sheds providing 12,200 m² of storage. Total storage capacity of port is 80,000 TEU</td>
</tr>
</tbody>
</table>

Another explanation for the lack of a relationship between volumes of traffic and port charges relates to the variation in financial performance of Pacific ports. A number of port facilities provided by government ministries are not operated on a cost-recovery basis. This is common among smaller ports, where port services are often implicitly subsidised by government, thereby lowering port charges. However it also occurs in some larger ports. The Solomon Islands Port Authority, for example, which legally is corporatised, has low fees in place that mean its revenue does not cover the true cost of capital. The Solomon Islands Port Authority has incurred financial losses over a number of years as a result, although marginal profits have been achieved more recently (Government of the Solomon Islands 2012). Failure to enforce payment among debtors has also contributed to poor performance. This is a significant issue for both the Solomon Islands Port Authority and the Pohnpei Port Authority.

Another practice that influences port charges is the use of revenue from larger ports to cross-subsidise smaller ports. This activity, which inflates charges at primary Pacific, occurs in both PNG and Fiji, as well as in some smaller countries where port authorities are corporatised, such as Cook Islands. In effect, cross-subsidies are used to fund infrastructure service provision in lagging regions at the expense of leading regions. In the case of PNG, revenue-raising ports such as Lae and Port Moresby subsidise the operations of other loss-making ports (the PNG Ports Authority manages 16 ports across PNG).

Institutional arrangements therefore have an important bearing on port costs. There is variation in the regulation of corporatised ports in the region, and in the contractual arrangements with private sector operators of landlord ports. Independent regulation of corporatised port authority only exists in Fiji and PNG, reflecting the considerable fixed costs associated with establishing an independent regulator (although there is a trend toward establishing independent regulators, as has occurred for the power sector in a number of countries) (Dornan 2014). Previous studies have argued that
regulation has not been particularly effective in either country; port fees are not low by Pacific standards, as noted earlier.\(^5\)

What appears to have a greater impact on costs is competition. Samoa and Tonga both have in place a framework whereby stevedoring – the most significant cost for shipping companies – is provided on a competitive basis by a number of private companies. Fees in both ports are among the lowest in the region, although neither port performs well in relation to loading/unloading times, highlighting the impact of low quality port infrastructure on efficiency (in Tonga, there are no mobile cranes available, while in Samoa, the harbour does not protect against swells, which affect docking during bad weather). The presence of competition for stevedoring in Tonga, with a population of only 100,000, shows that competition for port services can thrive in very small markets.

In contrast, there is a lack of competition in the main port of Vanuatu. In Port Vila, the Department of Ports and Harbours outsources operations under a 15-year contract to a company, Ifira Wharf and Stevedoring Limited, which is owned by a community trust. The contract did not go through a tender process, and the Department of Ports and Harbours does not appear to monitor performance at the port. There is no competition for service provision, or independent regulation of port charges. Port Vila has the highest port charges in the Pacific, and efficiency is only average, as a result.

6. Airports

There are approximately 184 airports in Pacific island countries and territories, with the largest number situated in Papua New Guinea (69 in total). Other countries and territories with a large number of airports include French Polynesia (39 in total), Solomon Islands (35), Vanuatu (29), and New Caledonia (11) (Asian Development Bank 2007c). The vast majority of these airports are used for domestic travel and are unpaved. Some small states countries have only one operating airport, including Nauru, Niue, and Tuvalu.

There are significant differences between primary airports, which facilitate international and domestic travel, and secondary airports that are used only for domestic travel. Primary airports are in general maintained at an acceptable standard, although many still have problems in raising sufficient funds for capital works or replacement of infrastructure. The majority of primary airports are audited against International Civil Aviation Organisation (ICAO) standards; something that helps to ensure maintenance of safety equipment, the runway, and other infrastructure that is essential for the safe landing of aircraft (see box 1). Secondary airports on the other hand often have very low quality infrastructure. The absence of an adequate funding model commonly lead to sub-optimal maintenance of runways and other airport facilities. Many of these smaller airports are more akin to landing strips. Some are managed by rural communities and/or small private sector aviation

\(^{6}\) This could have any of a number of causes, including investment in equipment and cross-subsidisation, as previously highlighted. Regulation theory suggests that rate-of-return regulation, used in Fiji and PNG, could encourage over-investment in infrastructure, given guaranteed rates of return. Another issue, particularly relevant in PNG, is the backlog of maintenance that accumulated before the PNG Ports Authority was corporatised (as the PNG Harbour Authority, in 1999). This has increased the Port Authority’s expenses, which must be recovered through higher port charges (Asian Development Bank 2007b; Asian Development Bank 2007e).
companies that utilise them; others are managed by public works departments in national and subnational level governments.

Box 6.1. International Civil Aviation Organisation (ICAO) Rules

The International Civil Aviation Organisation has established rules for a range of activities that impact on the safety of passengers. Four of these rules are listed below:

Civil Aviation Rule 139 – specifies maintenance requirements and performance standards for equipment considered essential to the safe operation of an international airport. Assets covered by this rule range from runway condition to fire fighting equipment.

Civil Aviation Rule 140 – outlines security requirements for international airports, such as passenger baggage screening, secure perimeters, and training of security personnel.

Civil Aviation Rule 171 – stipulates the telecommunications equipment that is required at an international airport. This rule also establishes minimum reliability requirements, with performance of equipment audited by ICAO.

Civil Aviation Rule 172 – covers navigation equipment that international airports must have installed. Again the rule establishes minimum reliability requirements.

Primary airports in the Pacific, which are the focus of this report, are state-owned. Of the principal international airports in 14 independent Pacific island countries, eight are managed by corporatised state-owned enterprises (generally statutory authorities), with the remaining airports operated by government ministries. The French territory of Noumea is an exception: its primary international airport is managed by the Chamber of Commerce, although operations and capital works are subsidised by government through a range of public funding facilities. In 2011, subsidies comprised 38 percent of the Aéroport international Nouméa - La Tontouta’s total revenue (Chambre de commerce et d’industrie de Nouvelle-Calédonie 2011).

Airports that are operated by government ministries are generally not managed on a cost-recovery basis, and receive funding for operation and maintenance through budget allocations from government. These airports tend to be small and the majority are subsidised. Airports managed by state-owned enterprises are corporatised in theory, and must operate on a cost-recovery basis.

Interestingly, this contrasts with the state-owned manager of New Caledonia’s primary port, Port Autonome de la Nouvelle-Calédonie (PANC), which funds its operations and maintenance through user charges (Personal communication with PANC, 2014). The Government of New Caledonia therefore subsidises the private operation of New Caledonia’s primary airport, but not the state operation of its primary port. Capital investment in both the airport and port, which is significant, is heavily subsidised by the French Government. This reflects the broader fiscal relations between France and its territories. Approximately one-sixth of New Caledonia’s budget is contributed by France (Fisher 2013). Additional funding is also provided by France for infrastructure investment and to support provincial governments.

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7 Interestingly, this contrasts with the state-owned manager of New Caledonia’s primary port, Port Autonome de la Nouvelle-Calédonie (PANC), which funds its operations and maintenance through user charges (Personal communication with PANC, 2014). The Government of New Caledonia therefore subsidises the private operation of New Caledonia’s primary airport, but not the state operation of its primary port. Capital investment in both the airport and port, which is significant, is heavily subsidised by the French Government. This reflects the broader fiscal relations between France and its territories. Approximately one-sixth of New Caledonia’s budget is contributed by France (Fisher 2013). Additional funding is also provided by France for infrastructure investment and to support provincial governments.
However, many also deliver community service obligations without compensation, and are prevented from raising fees by governments.

As in other infrastructure sectors, there has been a trend in the last two decades toward the commercialisation of airport management, both in the Pacific and around the world. Objectives behind such reforms are similar to those in the ports sector. Governments have sought to improve airport performance and minimise the fiscal burden of airport management. In the Pacific, reforms aimed at commercialising airport management have not advanced as far as in the ports sector. There have been changes. Most state-owned enterprises responsible for airport management were established in the last 15 years. However, the majority of these state-owned enterprises retain non-commercial functions and obligations, for which they are not compensated by government. Regulatory and management functions have been separated in only a few cases, and results from such reform are mixed (Asian Development Bank 2007c; AusAID 2008). More commonly, airport management retains responsibility for oversight of safety regulations, despite the conflicts of interest this entails. Airport user charges are generally set by airport management, but with the approval of government – a situation that has prevented cost-recovery. Private sector involvement in airport management also remains limited, and is mainly restricted to retail services.

The corporatisation of airports is more common in countries with a larger population, as illustrated in figure 6.1. This is to be expected. A cost-recovery model is not feasible in airports where traffic volumes are low in the absence of government subsidisation. Table 4.1 in section 4 showed that government management of airports in the Pacific is most common in MIRAB economies; four of the six primary airports in the Pacific that are managed by a government ministry are situated in MIRAB economies. Airports in FSM and Marshall Islands are an exception; both countries have in place a unique arrangement where the port authority also manages the airport. Management of primary airports in economies where tourism is important is undertaken by state-owned enterprises in all but one country (Palau). The Government of the Solomon Islands has attempted to outsource management of its airports, although this has not yet proceeded.
The economic base of a country has a bearing on whether its primary airport is operated on a commercial basis. It also affects quality of airport infrastructure. Data on airport quality are extremely limited in the region, but there are available a number of reports from development partners, feasibility studies, and some annual reports from airport authorities, which make broad comparison possible. In general, economies where tourism (and/or air freight) is important have better airport facilities than those where tourism is limited. This is reflected in the positive and statistically significant correlation between passenger movements and measures of airport quality, such as runway length (shown in figure 6.2, below). Major international airports, such as Nadi, have good infrastructure capable of facilitating cargo shipment and the arrival of large aircraft. Infrastructure quality is lower in smaller airports, many of which have limited storage and cargo handling facilities.

Smaller airports also commonly suffer from poor maintenance, increasing the risk that air services may be suspended as a result of safety concerns. In Kiribati, air services to Bonriki International Airport (the primary airport in Kiribati) were suspended for two weeks in 2009 as a result of safety concerns. Air services to the second international airport in Kiribati, situated on Kirimati island (3,300 km from Tarawa), were suspended for 11 months over the same period. This effectively isolated Kiribati from the rest of the world for this two week period. Lack of maintenance can also affect the ability of large aircraft to land. Many runways in Pacific island airports are too small to support very large aircraft. Even in Vanuatu, where passenger movements are significant, the largest plane that can land at Bauerfield airport is a Boeing 767 with restrictions on cargo weight. In Tuvalu, poor maintenance has reduced the landing capacity of the runway from 50 tonnes to 20 tonnes (Government of Tuvalu 2012).
Restrictions on aircraft that can use primary airports are shown in table 6.1. Other airport information is provided in annex 2.

Figure 6.2 Runway length and passenger movements
Table 6.1 Characteristics of primary airports in the Pacific

<table>
<thead>
<tr>
<th>Management</th>
<th>Passenger movements*</th>
<th>Runway length (meters)</th>
<th>Largest aircraft catered for</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource exporters</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PNG SOE</td>
<td>840,000</td>
<td>2,750</td>
<td>B-747</td>
</tr>
<tr>
<td>Solomon Islands Govt ministry</td>
<td>106,467</td>
<td>2,200</td>
<td>B-767 or A-330</td>
</tr>
<tr>
<td><strong>Relatively diversified economies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiji SOE</td>
<td>1,866,638</td>
<td>3,273</td>
<td>A-380</td>
</tr>
<tr>
<td>Samoa SOE</td>
<td>350,439</td>
<td>3,146</td>
<td>B-747</td>
</tr>
<tr>
<td>Tonga SOE</td>
<td>148,276</td>
<td>2,681</td>
<td>B-767</td>
</tr>
<tr>
<td><strong>Tourism dependent economies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cook Islands SOE</td>
<td>130,000</td>
<td>2,328</td>
<td>B-747</td>
</tr>
<tr>
<td>Palau Govt ministry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanuatu SOE</td>
<td>311,000</td>
<td>2,600</td>
<td>B-767 with weight restrictions</td>
</tr>
<tr>
<td><strong>MIRAB economies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSM SOE</td>
<td>1,829</td>
<td></td>
<td>B-737</td>
</tr>
<tr>
<td>Kiribati Govt ministry SOE</td>
<td>22,000</td>
<td>2,011</td>
<td>B-737</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>Govt ministry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nauru Govt ministry</td>
<td></td>
<td>2,150</td>
<td>ATR-42 500. Not capable of landing B-737. 20 tonne landing limit.</td>
</tr>
<tr>
<td>Tuvalu Govt ministry</td>
<td></td>
<td>1,535</td>
<td></td>
</tr>
</tbody>
</table>

*Latest available data, sourced from logcluster.org, annual reports, and national infrastructure plans. Blank spaces indicate that data are not available.

Infrastructure facilities that support airport services are also sometimes inadequate. Re-fuelling in most Pacific island countries is expensive, often causing airlines to carry additional fuel from metropolitan countries, and increasing the cost of travel (Asian Development Bank 2007c). Infrastructure management is sometimes responsible. Poor maintenance has in the past led to the failure of re-fuelling facilities. In Nauru for several months in 2010, the national carrier (Our Airline) had to operate its aircraft at 50 per cent capacity as a result of the inability to store aviation fuel in Nauru, causing a loss of A$50,000 every week. The situation arose due to a leak in Nauru’s fuel storage tank, which was caused by lack of routine maintenance (Government of Nauru 2011; Pacific Region Infrastructure Facility 2013).

The challenge for Pacific island governments is determining the right level of investment in airports. Under-investment can restrict international travel and makes it less likely that international airlines will service a country. This is especially important in economies where tourism or export industries reliant on air freight are significant. Poor airport infrastructure can also result in lost retail opportunities. Over-investment on the other hand will result in excessive costs. These will be borne by either consumers through higher airports fees or airfares (where fees are imposed on airlines, airfares will rise), or by government in the form of subsidies (Findlay, et al. 2005). Subsidising air travel is common in the Pacific, and may be justified where positive externalities from air travel are sufficiently large. However, such subsidies involve transfers from taxpayers toward travellers, which in general are a high income group. It should also be noted that air travel in the Pacific is often subsidised in other forms, such as through the subsidisation of air routes (as occurs for the weekly
flight from Cook Islands to the United States) or national airlines (as has occurred in Nauru, Samoa, Tonga, Tuvalu, and Fiji – with negative results in general). There is rarely rigorous cost-benefit analysis of such subsidies, although the case of Cook Islands illustrated below is an exception.

### Box 6.2 Economic Analysis of Cook Islands Air Route Underwrite Agreements

The Government of the Cook Islands has underwritten two direct air services from Los Angeles and Sydney to Rarotonga since 2010 and 2011, respectively, with the objective of expanding the tourism industry. The underwrite agreements guarantee that Air New Zealand will not make losses on these routes, and in return, will provide a minimum level of service, involving one Boeing 767 flight per week in each direction for each route. Both services currently make a loss, and required underwrite payments estimated at US$6.55 million on LAX-RAR and US$3.74 million on SYD-RAR for 2013/14.

An economic analysis of these subsidies was conducted by Covec Ltd at the request of the Government of Cook Islands in 2013. The study was the first comprehensive analysis of these subsidies, and was based on detailed data regarding visitor arrivals and departures, and survey data on expenditure in Cook Islands. The study found that the LAX-RAR underwrite agreement generates positive net economic benefits for Cook Islands in the order of US$5.1 million per year. Approximately 60 percent of tourists from the United States and Canada travel direct from Los Angeles; the vast majority being ‘new’ tourists that would not have travelled to Cook Islands in the absence of the LAX-RAR route. This finding was robust to sensitivity analyses where the GDP multiplier and travel patterns were varied.

In contrast, the SYD-RAR underwrite agreement was found to generate net economic losses of US$0.1 million per year for Cook Islands. Only one-third of tourists from Australia used the SYD-RAR flights, with visitors from outside of New South Wales preferring to travel to Rarotonga via Auckland. The study concluded that only 40 percent of passengers on the SYD-RAR were ‘new’ tourists, with the remainder substituting flights through New Zealand for the direct SYD-RAR route. The marginal nature of these losses meant that the finding was not robust to changes in assumptions regarding the GDP multiplier and travel patterns.

The study is circumspect in its support for the underwrite agreements, despite the finding that underwriting the LAX-RAR route generates net benefits for Cook Islands. It criticises the underwrite agreements in their present form, as they do not provide Air New Zealand with an incentive to lower costs, and apply to all passengers on the two flights, regardless of whether or not they would have travelled to Cook Islands without the subsidy. The study argues for changes to the contractual arrangements with Air New Zealand as a result. It also recommends that the government explore putting the provision of underwritten services out for public tender, which would have the effect of generating competition for the subsidy. The study concludes that alternative ways of promoting tourism in Cook Islands should also be explored. Potential options include the use of better targeted subsidies, such as the direct subsidisation of airfares in the off-peak season.

1. Previous economic analysis in support of these routes was based on unrealistic assumptions and was seriously flawed. For details, see Covec (2013) *Economic Analysis of Cook Islands Air Route Underwrite Agreements* available on the Cook Islands Ministry of Finance website.
Limited financial data are available for airports in the Pacific. The data that are available, presented in figure 6.3 and summarised in the annex, suggest that cost recovery in the Pacific is more limited among primary airports than in the ports sector. Only two airports made a positive return on assets, and in the case of one (Pohnpei Port Authority, discussed below), the positive financial return was due to port revenue rather than airport operations. More financial data are needed for rigorous analysis.

Figure 6.3 Return on assets (percent), ports and airport in selected Pacific island countries

Airports recover costs through various fees and charges, which include:

1. Landing and parking fees – charged every time an aircraft lands, generally on the basis of aircraft weight. These fees are supposed to recover an airport’s cost for all the services it provides to that aircraft on the ground.
2. Navigation charges – charged for navigational services provided to that aircraft on entering the country’s airspace.
3. International terminal fees – charges on every arriving passenger for the use of the the country’s airspace passenger terminal. These fees are meant to cover the cost of providing baggage conveyor systems, air conditioning, lighting and the cleaning and maintenance of the terminal building.
4. Commercial rents – paid to airport management by businesses that operate within the terminal building.

Cost recovery is difficult for small airports where passenger movements are limited. The Cook Islands Airport Authority for example is reported to have in place among the highest user charges in the
world. However, with only 130,000 passenger movements per year, revenue is insufficient to cover costs. The airport authority instead relies on annual budget allocations from government for one quarter of its revenue (Cook Islands Airport Authority 2012). The case of the Cook Islands is illustrative of the challenges faced by many other Pacific island countries. Passenger movements in Rarotonga (Cook Islands) are lower than in larger countries such as Fiji, PNG, Vanuatu, Samoa, and Tonga. But they are higher than in small economies where tourism is not significant, such as Nauru, Kiribati, Tuvalu, and Niue. The case of the Cook Islands Airport Authority suggests that full cost-recovery is difficult in these smaller airports without very significant airport charges. Pacific island governments are likely to resist increasing user charges, given concerns about affordability and tourism. Analysis of user charges in Kiribati, presented in section 9, supports this argument.

The importance of economies of scale for cost-recovery suggests that larger airports are likely to enjoy better financial performance (assuming no government subsidies). An analysis of the relationship between financial performance (measured by return on assets) and passenger movements among the five airports for which such data are available shows that there is a correlation. Figure 6.4 suggests that as passenger movements increase, return on assets also improves. This relationship is to be expected, although more data is needed for rigorous analysis.

Figure 6.4 Financial performance and passenger movements

As noted, it is common for Pacific island governments to purposefully set airport charges below cost, given positive externalities associated with travel and tourism. Airports must also often meet a number of non-commercial obligations. In the Cook Islands for example, the only fire service on Rarotonga is provided by the airport authority. This is a situation shared by many other airports in smaller Pacific island countries. Another non-commercial obligation borne by a number of airport

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8 Personal communication with Cook Islands Airport Authority, December 2012.
9 The challenge of providing basic services such as fire fighting equipment on a small island was highlighted in late 2013 when a fire destroyed a school on Rarotonga. The fire service was unable to attend to the fire when it broke out, as ICAO rules required that fire fighting equipment be present during the landing of aircraft. There was an incoming flight at the time.
authorities is cross-subsidisation. In Fiji, PNG, Vanuatu, Samoa, Tonga, and Cook Islands, state-owned enterprises are required to manage both the principal airport and other, loss-making airports. Profits from the principal airport are used to fund operations in smaller, loss-making airports. In Kiribati, airport revenue from international passengers is used to subsidise airport services provided to domestic passengers (who do not pay airport fees) (Pacific Region Infrastructure Facility 2009). These losses are not refunded (except in the case of Fiji, where compensation is provided by government) (Airports Fiji Limited 2011; Asian Development Bank 2007c; Asian Development Bank 2010; Asian Development Bank 2011). As for ports, cross-subsidisation can be understood in terms of leading regions funding infrastructure service provision in lagging regions.

Cross-subsidies are also present in Marshall Islands and FSM, although in a different form. In both countries, the port authority manages the international airport, and uses port revenues to subsidise airport operations. In FSM, only 23 percent of port authority revenue comes from the airport, but it receives 61 percent of total expenditure (Pohnpei Port Authority 2010a; Pohnpei Port Authority 2010b). In Marshall Islands, the airport accounts for 74 percent of net assets, but generates only 39 percent of revenue (Asian Development Bank 2007c).

Airport managers in the Pacific therefore face a number of constraints that make it difficult to operate profitably. These include the absence of economies of scale, inability to raise user charges to reflect costs, and the unfunded provision of non-commercial obligations. The majority of airports in the region have relied on government subsidisation as a result. In cases where airport fees cover operation and maintenance costs, these fees are rarely sufficient to cover the replacement cost of capital. Development partners have generally funded the cost of major airport rehabilitation or replacement. The impact of aid dependence is discussed in more detail in sections 8 and 9.

7. Roads

Roads most approximate a public good among the trade-related infrastructure discussed in this report. As a result of the inability to cost-effectively charge a fee for road access, the vast majority of roads around the world are funded and managed by governments. The Pacific is no exception. In most Pacific island countries, governments have funded road construction and maintenance using consolidated revenue. This most commonly occurs at the national level, although in some countries sub-national governments are also involved in the provision of roads.

Road management in the Pacific, in general, has not been adequate. Governments have consistently allocated insufficient funding towards maintenance through the budget process, with negative implications for road conditions. It is common for existing roads to deteriorate at the same time that new roads are constructed. An Asian Development Bank report notes that in the Pacific:

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10 Not all roads are strictly public goods. It is possible to charge for access through the establishment of tolls on major highways. There is very limited experience with this in the Pacific. Local roads are closer approximations of a public good; however in the Pacific, customary land ownership can result in land owners charging vehicles an informal (and sometimes illegal) toll.
“The roads sector is, in general, poorly maintained and under the care of entities that are under-equipped and under-financed to do the job properly. Government-owned heavy equipment for roads maintenance is often in short supply, due to chronic maintenance problems. Lack of awareness of the economic importance and priority of well-maintained roads is commonly observed at the top levels of government” (Asian Development Bank 2007b).

Roads in the Pacific are poorly maintained in comparison to international ports and airports. Data on road conditions in Pacific island countries are extremely limited. This makes assessment difficult, although government and donor-funded databases, surveys, reports and feasibility studies allow for a general overview of road conditions. Pacific island governments themselves are often unaware of the conditions of particular sections of road; only several countries use road asset management systems or databases that detail road conditions, and even in these cases, databases are normally incomplete or not up to date.

The terms of reference for this study outline a focus on ‘main roads that are important to moving trade traffic within individual countries’. It should be noted, however, that feeder roads are also important to movement of trade within countries. The highlands highway in PNG, the country’s most important road, provides an example of this. Although sections of the highlands highway are in poor condition, more problematic is the abysmal state of feeder roads that link communities to the highlands highway. The poor condition of these secondary roads represents a significant barrier to the export of agricultural produce (and even to domestic trade), and contribute to low levels of agricultural productivity. Unlike the highlands highway, which is the responsibility of the national government, feeder roads that connect to the highlands highway are maintained by provincial authorities with limited financial and human resources.

Roads are of varying importance to different Pacific island countries and territories. In some countries with limited landmass, such as Tuvalu or Nauru, road maintenance is easier given the small scale of the road system. Most of the MIRAB economies fall into this category. Road infrastructure is more important in other economies, given its role in linking rural areas, which are potential sources of agricultural or resource exports, to international ports and airports. Road infrastructure is especially important in Pacific island countries and territories with a significant landmass, such as PNG, Fiji, Solomon Islands, New Caledonia, and to a lesser extent, Samoa and Tonga.

Main roads that facilitate trade, and which are the focus of this report, are generally the responsibility of national governments. In larger countries where both national and sub-national level governments provide road infrastructure, national governments manage main roads whereas sub-national level governments manage smaller ‘local roads’. However, there are exceptions. In Fiji and PNG for example, roads in Suva and Port Moresby that provide access to the main port are administered by municipal councils. This is problematic given that limited funding is available to sub-national governments for maintenance of infrastructure. As the ADB notes:

“local governments ... responsible for road maintenance within their jurisdictions ... often have lesser technical and financial resources for carrying out road maintenance than central government” (Asian Development Bank 2012).
There are many other reasons for the poor state of roads in Pacific island countries. Government ministries responsible for road infrastructure commonly lack the capacity to manage road assets. This is demonstrated by the lack of up to date road asset management systems in the Pacific. Staffing is another problem faced by government ministries. Trained staff can find more lucrative employment overseas or in the private sector, and in smaller countries, there is often a very limited number of people with the relevant technical or financial/accounting skills. Management of road infrastructure can also be problematic given incentive structures within the public service (an issue that also affects government ministries responsible for port and airport management).

Outsourcing of maintenance work has sometimes compounded the problem. Force accounting that is prevalent across the Pacific does not provide incentives for the contractor to perform work efficiently. The commercialisation of road management in Samoa and PNG, discussed below, has had as an objective moving away from force accounting and toward performance-based contracts, where payments to companies involved in maintenance work are made on the basis of road conditions. Anecdotal evidence regarding the impact of these changes is promising, although broader barriers to commercialisation have hindered movement away from force accounting. Another issue relates to procurement rules, which can cause significant delays in establishing contracts for maintenance work. The PNG Department of Works and Implementation estimates that, on average, it takes 50 weeks in order to establish a contract for road maintenance and rehabilitation (Pacific Region Infrastructure Facility 2013).

Funding is also important. Funding dedicated toward maintenance of roads has been inadequate across the Pacific, with only Samoa and more recently PNG and Fiji allocating sufficient funding toward routine maintenance. Many Pacific island governments provide no funding for routine maintenance, with budget allocations used instead for emergency repairs. The resulting deterioration of roads across the Pacific has led to a significant maintenance backlog; many roads require costly rehabilitation before they can benefit from routine maintenance.

PNG provides an illustration of the challenges facing Pacific island countries. It is a convenient case study, as one of the few countries where data on road conditions and maintenance spending are available. The road network in PNG has suffered from a lack of maintenance over many years. This is reflected in government funding for infrastructure more broadly, which halved between 1975 and 1980 in real terms, and declined by another third in the 1990s (Kwa, et al. 2009). Maintenance funding remained at this level until recently, notwithstanding increases in traffic volumes and the scale of the road network. The consequence has been a dramatic deterioration in the condition of the road network. In 2007, almost 32 per cent of the national road network was in “poor condition”, meaning that it was not passable by a two wheel drive vehicle in any weather conditions; and 27 per cent was in “fair condition”, meaning it was passable by a two wheel drive vehicle in dry but not wet weather. Only 35 percent of the national road network was in good condition, passable by two wheel drive in all weather (Pacific Region Infrastructure Facility 2013).11

11 These figures do not sum to 100 percent, as data are not available across the national road network. The figures refer only to national roads, which are managed by the national government and include most major roads in PNG. Other roads are the responsibility of provincial governments. Although information and statistics are extremely limited, it is widely acknowledged that provincial roads are in worse condition than the national road network.
The Government of Papua New Guinea has dramatically increased funding for maintenance of national roads in recent years (contributions from development partners have remained stable). This is shown in figure 7.1. Although a development welcomed by road users, funding remains insufficient to meet the ambitious target set in the Medium Term Development Plan (2011-15) of having 65 percent of PNG’s national road network in good condition. PNG Department of Works and Implementation modelling suggests that an annual allocation of 1.2 billion kina over five years would be required for that figure to be met.

Figure 7.1 PNG Government Funding for Maintenance and Rehabilitation of National Roads

Source: PNG Department of Works and Implementation; Medium Term Development Plan (2011-15); PNG Government Budget documents, various years.

Actual spending on road maintenance and rehabilitation is also much lower than budget allocations would suggest, although this is changing, as illustrated in figure 7.1. There are several reasons. Delays in the procurement process in PNG were already discussed, and can potentially lead to the loss of unspent funds that are allocated to the Department of Works and Implementation for road maintenance. Procurement rules are another factor. Procurement rules require that Cabinet must approve contracts of over 10 million kina (approximately US$5 million) in value. This can often result in the redirection of budget allocations toward other areas, as Cabinet can alter maintenance contracts so that they include unrelated road construction activities.

The serious lack of capacity for implementing large contracts, both among government agencies responsible for road management and in the private sector, is another challenge. Most provinces in the country only have one or two private sector contractors capable of undertaking road maintenance on a large scale. Poor subcontracting arrangements and lack of competition often result in delays and in an inability to spend allocated budgets. Capacity constraints are made worse by the difficult topography of PNG, and by the need to negotiate road works and sourcing of raw materials with landowners (Pacific Region Infrastructure Facility 2013). Despite such challenges, anecdotal evidence
suggests that capacity is increasing as a result of greater and more regular funding allocations for road maintenance activities.

In response to sub-optimal road maintenance, a number of Pacific island countries are moving to commercialise road management. Commercialisation in the Pacific has involved two aspects. One is reform of road management agencies, which in countries like Samoa, have been transformed from public service delivery agencies into asset management organisations that outsourced maintenance to the private sector. The extent of reform has differed between countries. It has been most pronounced in Samoa. In PNG, reform of the Department of Works and Implementation has achieved mixed success. Reforms in Fiji remain incomplete.

The second aspect of reform has involved the establishment of road funds, where revenue is earmarked for maintenance. Road funds have been used around the world to ensure that adequate resources are directed toward maintenance of road infrastructure. The objective behind hypothecation of revenues from road user charges, such as vehicle registration fees and petrol levies, is to create a link between road users and the funding of road maintenance. In the Pacific, road funds have been established in Papua New Guinea and Samoa, and there is discussion of their establishment in Tonga and Vanuatu.

The experience with commercialisation of road management in the Pacific is mixed. In several cases, reforms are at an early stage and evaluation is premature. In Samoa, reforms are generally considered to have been a success. Road maintenance funding in Samoa remains at its 2002 level, but is sufficient to manage a road network that has increased in size by 15 per cent due to cost savings. The experience with establishment of the National Road Authority in PNG is less positive. The establishment of the PNG Road Fund and National Road Authority have been undermined by a lack of political commitment, and the organisations remain marginal to road maintenance as a result. This is discussed in the box below.

**Box 7.1. Road management reforms in Samoa and Papua New Guinea**

**Samoa**

Reform of the Public Works Department (PWD) in Samoa demonstrates how institutional change can improve infrastructure asset management. In the early 1990s, road maintenance in Samoa had deteriorated due to a decline in overall funding levels, the loss of professional staff, ageing equipment, and increases in the length of the road network. The Government of Samoa sought to address the challenge by reforming the PWD, which was responsible for road maintenance.

There were several aspects to reform. A key element of the strategy involved reducing the size of the PWD, which in the early 1990s had salary overheads equal to 45 per cent of total costs. The reforms saw road works outsourced to private sector contractors, with PWD transitioning from a service delivery agency into its present asset management role. The World Bank and AusAID provided support for the reforms through technical assistance and advice, and through the development of asset...
management capacity within PWD. PWD processes for outsourcing improved as a result of this assistance, with maintenance of road sections advertised through public tender.

The reforms are considered to have been a success. Funding from government remains at its 2002 level, but is sufficient to manage a road network that has increased in size by 15 per cent. Cost savings have been achieved through downsizing of the PWD, and the transfer of 80 per cent of non-core activities to the private sector. Many former PWD staff now work for these private sector contractors. A road fund has also been established, which directs revenue from vehicle user charges toward maintenance of the road network.

Papua New Guinea

The PNG experience with reform is less positive than in Samoa. It was noted earlier that road maintenance in PNG has been underfunded for decades. In response, the government in 2003 established the PNG Road Fund, through which user charges would be channelled in order to maintain the national road network. The objective was to address underfunding of road maintenance by government, and to improve on the poor performance of the Department of Works and Implementation – which continued to rely on force accounting in its road maintenance activities. An agency called the National Road Authority (NRA) was to be established along with the Road Fund in order to organise road maintenance activities funded by the user charges. Both organisations were to be governed by an independent board controlled by members from the private sector.

Establishment of the Road Fund and NRA did not proceed as envisaged, with their creation delayed by several years. Although the necessary legislation was passed in 2003, it was not until 2009 that segments of road were placed under the responsibility of the NRA, and there continues to be confusion regarding the role of the NRA and Department of Works and Implementation. Funding arrangements have also not proceeded as planned. The PNG Road Fund would require a considerably broader revenue base before it can fund maintenance of the 9,000 km national road network. Annual deposits into the fund, which emanate from the 4 toea/litre levy on domestically produced diesel fuel, range from 11 to 26 million kina, or less than 3 percent of total government funding for national road maintenance and rehabilitation.

The slow establishment of, and limited funds provided to, the Road Fund and NRA point toward an absence of political support for the organisations. This has undermined their effectiveness. But there has been limited success nonetheless. The PNG Road Fund has protected funds earmarked for road maintenance from misdirection. The reallocation of budget resources by ministers is a common occurrence in PNG, with recurrent funding especially susceptible. The protection of these funds by the independent NRA Board is a small feat in itself. But political support will be needed for the proper establishment of the NRA, and for the NRA to improve road maintenance in PNG.

Source: Adapted from background case studies prepared by Matthew Dornan for *Infrastructure Maintenance in the Pacific: Challenging the build, neglect, rebuild paradigm* (Pacific Region Infrastructure Facility 2013)
8. Management of Trade-related Infrastructure

Pacific island countries share common challenges in the provision of trade-related infrastructure. Low trade volumes and the sparsely populated nature of island states in the region make it difficult for countries to recover costs through user charges. However, experience varies across the Pacific and between sectors. Cost recovery was shown in earlier sections to be more common among international ports than international airports. The roads sector was shown to be in particularly poor condition, given almost universal reliance on government budget allocations for maintenance.

In all sectors, the quality of management influences the provision of infrastructure services. Reform of management arrangements has been shown to have the potential to lessen the structural constraints faced by Pacific island countries as a result of low trade volumes. Competition in stevedoring has enabled Samoa and Tonga to lower port charges below those of considerably larger countries, such as PNG and Fiji. Corporatisation of airport management has improved service provision, such as in the case of Fiji, although it has not always guaranteed cost-recovery. Reform of road management arrangements has produced cost savings in Samoa. Management of infrastructure is therefore important, with appropriate reforms having the potential to lower trade costs for Pacific island countries.

8.1 Infrastructure asset management and maintenance

Infrastructure asset management covers a broad spectrum of activities that occur over the life-cycle of an infrastructure asset, including: (i) planning, budgeting and design of new infrastructure, (ii) acquisition and construction of new infrastructure, (iii) operation of infrastructure, (iv) maintenance of infrastructure, and (v) disposal or decommissioning of infrastructure. These activities are interrelated. For instance, poor construction quality increases maintenance needs over the life of an infrastructure asset. Similarly, failure to plan for infrastructure asset management at the design phase, or to establish an adequate funding model, is an important reason for the lack of maintenance in the Pacific island region.

Good asset management requires organisations to consider the ‘whole life-cycle’ of infrastructure. This means that decisions relating to investment, operation and maintenance of assets should be made with consideration for their benefits and costs over the whole life-cycle of an infrastructure asset. The importance of a whole life-cycle approach to infrastructure asset management can be illustrated with reference to typical costs at each stage of the life-cycle. Life-cycle costs, which include the cost of construction, operation, maintenance and disposal of infrastructure, are much higher than construction costs alone. Generic life-cycle costs for infrastructure assets are illustrated in figure 8.1 and table 8.1.\textsuperscript{12}

\textsuperscript{12} Fay and Yepes (2003) develop estimates of funding requirements for routine maintenance of infrastructure in different sectors. They estimate that annual routine maintenance should cost two per cent of the replacement cost of the capital stock for electricity generation, railways and roads; three per cent for water and sanitation; eight per cent for mobile and mainline telecommunications; and five per cent for buildings. No figures are provided for ports and airports.
Table 8.1 Indicative Life-cycle Costs of an Infrastructure Asset per $100 of Investment

<table>
<thead>
<tr>
<th>Stage</th>
<th>Rate (%)</th>
<th>Construct/ Supply only ($)</th>
<th>+ Other Up-front ($)</th>
<th>20 year Maintenance $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept &amp; planning</td>
<td>2-5</td>
<td>2-5</td>
<td>2-5</td>
<td></td>
</tr>
<tr>
<td>Detailed Design Specification</td>
<td>5-10</td>
<td>5-10</td>
<td>5-10</td>
<td></td>
</tr>
<tr>
<td>Construction/ Supply</td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Contingency/ escalation</td>
<td>10</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Contract supervision</td>
<td>2-5</td>
<td></td>
<td>2-5</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance – Routine</td>
<td>0-5</td>
<td></td>
<td>0-100</td>
<td></td>
</tr>
<tr>
<td>Maintenance – Periodic</td>
<td>5-10</td>
<td></td>
<td>10-20</td>
<td></td>
</tr>
<tr>
<td>Disposal &amp; Decommissioning</td>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>120-130</td>
<td>10-120</td>
<td></td>
</tr>
</tbody>
</table>

Notes: a. Varies from zero (e.g. for buried pipes) to 20% p.a. for mobile plant and equipment
b. Varies from close to zero (e.g. for buried pipes) to 5% p.a. for routine maintenance of assets such as gravel roads.
c. Based on 20 year asset life with periodic maintenance every 7 years.
d. Varies from close to zero to 100% (e.g. clean-up of toxic chemical sites)
e. Varies based on the infrastructure in question and across sectors.

Source: National Infrastructure Investment Plans, various.

Maintenance has been highlighted as an activity where Pacific island countries perform especially poorly, leading to the premature deterioration of infrastructure assets (Pacific Region Infrastructure Facility 2013). A 2007 study of infrastructure asset management by the Asian Development Bank noted that:
“Poor maintenance limits the capacity of the region’s considerable investment in assets to provide the sustained services for which the investments were designed… (and) is most acute among service providers that lack an explicit commercial orientation” (Asian Development Bank 2007a).

Premature deterioration of infrastructure comes at considerable economic and social cost. De Sitter’s Law of Fives estimates that in the case of concrete structures, “every dollar of routine maintenance that is deferred will end up costing $5 in repairs, or ultimately, $25 in rehabilitation or replacement as the asset declines overtime” (De Sitter 1984). Modelling of PNG road maintenance costs suggests that the periodic rehabilitation of a 1km stretch of paved road so that it remains in good condition is 96 percent more expensive than where the road is maintained on a routine basis (Pacific Region Infrastructure Facility 2013). The economic and social cost of premature deterioration of infrastructure is also significant. The Asian Development Bank has estimated that for roads that are left to deteriorate, on average, every $1 of maintenance not performed results costs to road users in the vicinity of $3 (Asian Development Bank 2003). The premature deterioration of infrastructure leads to fewer people having access to health clinics, schools, and markets; and results in higher prices for goods and services that must be transported.

8.2 Reasons for sub-optimal maintenance

The reasons for poor management and lack of maintenance in Pacific island countries are both complex and varied. A recent study of infrastructure maintenance in the region by the Pacific Region Infrastructure Facility identified three inter-related reasons for sub-optimal maintenance.13

(i) Incentives are an underlying reason for poor asset management. It is well established that development assistance has the potential to create perverse incentives and moral hazard. The Nobel prize winning economist, Elinor Ostrom, argued that development assistance for new infrastructure reduces incentives among recipients for maintenance of that infrastructure (Ostrom, et al. 1993). It can be rational in a narrow financial sense for recipients of development assistance to underfund maintenance, where they bear the full cost of maintenance but not new infrastructure (but such decision-making ignores broader economic costs associated with lack of maintenance).

Moral hazard is a problem in the Pacific, given that the bulk of infrastructure investment is funded by development assistance. However, its importance varies across countries and sectors. The problem is essentially one of capital being undervalued by recipients of development assistance. The undervaluation of capital is more likely to occur in countries and sectors where development assistance as a proportion of income is highest, and where a significant portion of the budget is funded by development agencies. Moral hazard is most evident in MIRAB economies such as Nauru and Tuvalu, where a substantial portion of government expenditure is funded by development partners. In extreme cases where governments are very reliant on development assistance, the moral hazard problem can result in a situation where there is no funding of routine maintenance. This has been

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13 The Pacific Region Infrastructure Facility (PRIF) is a multi-donor coordination mechanism that includes the World Bank Group, Asian Development Bank, Australian Aid, the New Zealand Aid Programme, European Union, European Investment Bank, and the Japan International Cooperation Agency.
labelled the “build-deteriorate-rebuild” paradigm, given the absence of a culture of routine or preventative maintenance among infrastructure managers (Pacific Region Infrastructure Facility 2013).

Political incentives also influence infrastructure management. It has long been recognised that there is greater political reward associated with new infrastructure than maintenance of existing infrastructure (Ostrom, et al. 1993). Reducing ongoing maintenance funding enables governments to allocate budget resources to other more politically rewarding areas, such as investments in new infrastructure. There is therefore often a mismatch between short-term political incentives, and asset management and maintenance activities that focus on the long run sustainability and performance of infrastructure. Political incentives can also affect corporatised infrastructure service providers. Many ports and airports have their user charges approved by government. Such organisations sometimes struggle to fund adequate levels of maintenance, as governments prevent them charging user fees that reflect service provision costs.

Private sector participation in infrastructure service provision is often advocated as a means of addressing perverse incentives. In the Pacific, private sector provision of trade-related infrastructure remains limited. The private sector is generally restricted to delivery of specified tasks, such as occurs with stevedoring services at ports, retail services at airports, and road construction and maintenance. It is worth emphasising that private sector participation, on its own, is an insufficient condition for improving both infrastructure maintenance and performance. Concessional arrangements that grant a private sector company a monopoly, as are in place in the main ports of Vanuatu and Palau, have an adverse impact on performance. Landlord arrangements can also be problematic where private sector operators of public infrastructure are not provided with incentives to maintain infrastructure. Regulatory arrangements that encourage competition and create incentives for maintenance are therefore important. In the roads sector, performance-based contracts linked to outputs have potential to improve road maintenance, as discussed earlier. Force accounting, where companies are paid on the basis of labour and materials used, are generally regarded as having led to poor performance in Pacific island countries.

(ii) Poor planning and limited organisational capacity also explain sub-optimal maintenance in the region. Infrastructure in the Pacific is often constructed without the development of a funding model for maintenance of that infrastructure. In other words, there is limited consideration of how the recurrent financial liabilities created by new infrastructure assets will be met. This is to some extent the result of moral hazard resulting from high levels of development assistance. The majority of infrastructure in most Pacific island countries is constructed with the support of development partners; national infrastructure investment plans for five Pacific island countries confirm that development assistance will be used to fund the majority of planned infrastructure projects. The ‘free’ or subsidised nature of capital in these projects reduces the incentive for Pacific island governments to consider future funding requirements, as discussed earlier. There is often an implicit belief that development partners will fund the rehabilitation or replacement of infrastructure in the future – a belief that is based on past experience.

The incentives of development partners also contribute to lack of planning. It is common for development agencies to prioritise short-term objectives linked to annual funding cycles over the
long-term sustainability of infrastructure (Ostrom, et al. 2001). In the case of infrastructure development, there is also often a widespread assumption that core economic infrastructure will ‘pay for itself’ by generating economic growth. The economic literature demonstrates that such an assumption is problematic in the case of Pacific island countries (Bertram & Watters 1985; Gibson & Nero 2006; Winters & Martins 2004; World Bank 2011). This is explored in more detail in the next section.

Poor planning can also result from a ‘disconnect’ between long-term planning and short- to medium-term budgeting. Governments frequently fail to fund infrastructure plans or take into consideration the implication of long term national development plans for recurrent budgets. A 2012 report from the Pacific Islands Forum Secretariat, *Tracking the Effectiveness of Development Efforts in the Pacific*, noted the need for further “strengthening the links between plans and budgets” (Pacific Islands Forum Secretariat 2012). An example is the PNG Government’s historical record in allocating funding towards road maintenance. Medium and long-term planning documents recognise the importance and priority of road maintenance, but the government for decades has nonetheless failed to allocate sufficient funding towards road maintenance. This has changed only in recent years.

The capacity of organisations that provide trade-related infrastructure are another factor that affect infrastructure management. Capacity constraints at the level of the organisation can include limited technical capacity and human resources; weak internal systems and processes, including procurement and financial systems; and lack of accountability and unclear roles and responsibilities. The limited availability of data on infrastructure performance and maintenance – especially in the roads sector – is itself an indicator of limited capacity among infrastructure service providers. It is common for organisations responsible for infrastructure management to fail to produce annual reports or financial statements. Even among better performing organisations, timely release of such information is rare, despite normally being required under legislation.

The limited data on infrastructure performance and maintenance reduces accountability, and in doing so, lessens the incentives for managers to ensure maintenance is adequate. Incentives are already weak in some cases due to poor governance. The ADB’s *Finding Balance* report notes that in the ports sector of Marshall Islands and Solomon Islands:

“there is no effective ownership monitor, no performance targets set by the shareholder ministers, and generally weak governance practices. It is, therefore, not surprising that operational and financial performance of the port SOEs in these two countries has been comparatively poor” (Asian Development Bank 2011).

In many organisations there is no asset register. The lack of such data reduces the likelihood that government ministries responsible for infrastructure receive funding through the budget process. This has historically been a problem for the PNG Department of Works and Implementation, and goes some way toward explain the underfunding of road maintenance in PNG. In smaller countries, it is not uncommon for budget submissions from ministries responsible for roads to rely on anecdotal evidence when arguing for maintenance funding. A similar argument applies to corporatised entities when seeking compensation for non-commercial obligations.  

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14 The calculation of uncompensated non-commercial obligations by the Fiji Electricity Authority for many years eventually led the Fiji Government to formally reimburse it for these costs (Dornan 2014). In contrast, state-owned enterprises in
(iii) Resource constraints form the most recognisable barrier to effective asset management in the region. Resource constraints can arise where governments fail to allocate sufficient funding toward maintenance through the budget process, or where user charges are set below the cost of service provision. The underlying cause is often poor planning and a lack of prioritisation of maintenance – both issues discussed above.

A related reason for underfunding of road maintenance in the Pacific is the division of responsibilities between national and sub-national level governments. A 2008 review of local government in Pacific island countries found that:

“Current levels of funding for local government, particularly when expressed in per capita terms, are not sufficient if Pacific cities and towns are to provide adequate levels of service and infrastructure development in the short-medium term. For example, expenditure in the Fiji national capital, Suva, is just FJD239 per citizen per year. Similar low per capita expenditure is found in Kiribati, where just AUD42 per annum is spent in the main urban centre, Betio” (Hassall & Tipu 2008).

The lack of funding available to local governments is apparent in the condition of local roads and bridges in the two largest urban centres of the Pacific: Port Moresby and Suva. Similar problems affect provision of services in rural areas, where the condition of local roads is commonly worse than that of national or urban roads. Improving funding arrangements between federal and state (or provincial) authorities is not easy. Federal-State relations are blamed for infrastructure problems in many countries of differing income levels, such as the United States, Nigeria, and Australia.

In small island developing states of the Pacific, resource constraints are also the result of structural factors. Low trade volumes present a challenge in small Pacific island countries, where provision of a minimum level of infrastructure may be beyond the financial capacity of an economy. Such arguments, which are closely associated with the MIRAB model, are worth exploring in more detail. The next section discusses structural constraints to infrastructure provision at both the macroeconomic level and from the perspective of infrastructure managers.

9. Structural Constraints to Recurrent Funding of Infrastructure

The operation and maintenance of trade-related infrastructure involve recurring costs. Previous sections have highlighted how recurrent funding for trade-related infrastructure in the Pacific is sourced from consolidated revenue, user charges, or commonly, a mixture of the two. Funding the recurrent cost of infrastructure service provision using consolidated revenue effectively means that infrastructure is paid for by taxpayers, or by development partners in cases where budget support is

PNG continue to provide non-commercial obligations without compensation. The costs of these non-commercial obligations are often not calculated or publicised (Asian Development Bank 2010; Asian Development Bank 2011; Asian Development Bank 2013).

15 This is also relevant to secondary ports and airports in many Pacific island countries, and to the main ports of three of the four states in FSM.
provided. Where user charges fund the provision of infrastructure, the funding burden of that infrastructure lies with its direct beneficiaries.

### 9.1 Recurrent funding at the macroeconomic level

There are legitimate concerns about the ability of small Pacific island countries to pay for the recurrent costs of infrastructure in the case of either funding model. In small economies, the recurrent costs of infrastructure can be beyond the capacity of an economy, or an infrastructure sector, to meet. A study conducted in 1999 by the Australian Agency for International Development noted that:

“Most development models assume that ... (asset management and maintenance) costs are supportable within the general budget in countries where aid projects represent a low proportion of government investment. This is not so for most of Australia’s aid recipients: put simply, *many of these countries do not have the revenue base to maintain a basic level of infrastructure*” (AusAID 1999, emphasis added).

The limited capacity to fund ongoing liabilities associated with infrastructure operation and maintenance is evident at the macroeconomic level. Pacific island countries are among the most aid dependent in the world, as shown in figure 9.1. Aid dependence is especially visible for micro-states that are MIRAB economies (statistics for Nauru and Niue are not provided in the dataset, although the aid to Gross National Income (GNI) ratio of both countries would presumably be among the highest in the world).

Figure 9.1 Aid to GNI ratios of top 20 aid dependent countries, 2009-11

<table>
<thead>
<tr>
<th>Country</th>
<th>Aid to GNI Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timor-Leste</td>
<td>48%</td>
</tr>
<tr>
<td>Micronesia, Fed. Sts.</td>
<td>42%</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>36%</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>25%</td>
</tr>
<tr>
<td>Guinea-Bissau</td>
<td>25%</td>
</tr>
<tr>
<td>Mozambique</td>
<td>15%</td>
</tr>
<tr>
<td>Eritrea</td>
<td>15%</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>14%</td>
</tr>
<tr>
<td>Palau</td>
<td>13%</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>11%</td>
</tr>
<tr>
<td>West Bank and Gaza</td>
<td>11%</td>
</tr>
<tr>
<td>Malawi</td>
<td>10%</td>
</tr>
<tr>
<td>Mauritania</td>
<td>10%</td>
</tr>
<tr>
<td>Rwanda</td>
<td>9%</td>
</tr>
<tr>
<td>Mongolia</td>
<td>9%</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>7%</td>
</tr>
<tr>
<td>Cape Verde</td>
<td>7%</td>
</tr>
<tr>
<td>Burundi</td>
<td>7%</td>
</tr>
<tr>
<td>kiribati (23rd)</td>
<td>5%</td>
</tr>
<tr>
<td>Samoa (25th)</td>
<td>5%</td>
</tr>
<tr>
<td>Vanuatu (27th)</td>
<td>5%</td>
</tr>
<tr>
<td>Solomon Islands (35th)</td>
<td>4%</td>
</tr>
<tr>
<td>Tonga (40th)</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: World Bank data

A high aid to income ratio has a number of implications. First, it means that a country may require development funding in order to deliver essential services, including trade-related infrastructure.
Analysis of Pacific island government budget documents confirms this is the case for MIRAB economies, where a significant portion of government spending is funded by development partners. Development assistance regularly accounts for over 30 per cent of government expenditure in Kiribati, approximately 50 per cent in Nauru, and 65 per cent in Tuvalu. Government services, including infrastructure services, would be severely curtailed in the absence of developing funding. In 2011, recurrent spending (which does not income investment or construction works) by the Government of Tuvalu was equal to 148 per cent of domestic revenue; the balance was met by development partners.

Such a situation can be problematic for maintenance of infrastructure. Development assistance is notoriously variable, as illustrated for the Pacific in figure 9.2. It is also pro-cyclical, declining in times when domestic government revenue is likely to be lowest. Maintenance of infrastructure, to be effective, must be provided on a routine basis to prevent asset deterioration. But when funding is scarce, maintenance activities are commonly among the first items to be cut. Unlike other spending, the impact of sub-optimal maintenance is not felt immediately, and there is not the same level of political opposition to reducing maintenance spending as there is in other areas (such as, for example, reducing public sector employment) (Ostrom, et al. 2001; Ostrom, et al. 1993).

Figure 9.2 Development assistance received by Pacific island countries

High levels of development assistance are also problematic given their tendency to focus on new infrastructure investment rather than maintenance of existing infrastructure. It is not uncommon for development partners to fund new infrastructure that Pacific island countries cannot afford to manage (and maintain). Analysis of the national infrastructure investment plans of five Pacific island countries demonstrates the financial liabilities created by new and planned infrastructure in the region. The estimated operation and maintenance costs of this new infrastructure, calculated as part
of the planning exercise and presented in table 9.1, comprise a very significant portion of government revenue. In the case of Tuvalu, the operating and maintenance costs associated with new infrastructure are in excess of 40 percent of domestic government revenue. Were this planned investment to proceed, it would result in an oversupply of infrastructure relative to that justified by traffic volumes in Tuvalu.

The significant liabilities created by new infrastructure, to which the recurrent funding needs of existing infrastructure must be added, raise the question of whether countries will be able to fund maintenance without additional support from development partners. Some of these costs will be met by revenue from user charges. Some will be met by tax receipts associated with higher economic growth that results from new infrastructure. However, in smaller Pacific island countries where financial liabilities associated with infrastructure are highest as a proportion of government revenue, the absence of economies of scale limit the potential economic benefits from new infrastructure, and make cost recovery difficult. This suggests that such infrastructure investment may be excessive, at least insofar as development funds are used only to fund new infrastructure and not to support its ongoing management and maintenance. Cost recovery is discussed in greater detail in the next subsection.

Table 9.1 Financial liabilities generated by planned infrastructure investments (US$ million)

<table>
<thead>
<tr>
<th></th>
<th>Nauru</th>
<th>Samoa</th>
<th>Tonga</th>
<th>Tuvalu</th>
<th>Vanuatu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital cost</td>
<td>64.34</td>
<td>216.72</td>
<td>74.47</td>
<td>62.74</td>
<td>471.11</td>
</tr>
<tr>
<td>Total life-cycle cost</td>
<td>175.09</td>
<td>393.17</td>
<td>123.77</td>
<td>332.53</td>
<td>0.00</td>
</tr>
<tr>
<td>Estimated annual operation &amp; maintenance (O&amp;M) costs</td>
<td>5.54</td>
<td>6.04</td>
<td>5.82</td>
<td>6.85</td>
<td>9.63</td>
</tr>
<tr>
<td>Annual government revenue *</td>
<td>16.42</td>
<td>89.29</td>
<td>43.56</td>
<td>17.11</td>
<td>117.15</td>
</tr>
<tr>
<td><strong>Est. annual O&amp;M costs as a % of govt revenue</strong></td>
<td><strong>33.72</strong></td>
<td><strong>6.76</strong></td>
<td><strong>13.36</strong></td>
<td><strong>40.02</strong></td>
<td><strong>8.22</strong></td>
</tr>
</tbody>
</table>

**Notes:** Based on Nauru 2009/10 budget (actual budget expenditure, which is 66 per cent of the budget estimates); Samoa 2011/12 budget; Tonga 2011/12 budget; Tuvalu 2011 budget.

### 9.2 Cost recovery

User charges provide an important source of revenue for meeting the recurrent costs associated with trade-related infrastructure that is not a public good. The discussion of ports and airports in the region noted that user charges are sometimes set below costs, especially in MIRAB economies. This can occur as part of an effort to maximise service provision, given the considerable positive externalities associated with infrastructure. However it can also occur in order to ensure the delivery of infrastructure services that are considered ‘essential’. In some cases, trade-related infrastructure would not be provided without government or donor subsidisation.\(^\text{16}\) Full cost recovery also has the

\(^{16}\) This is commonly the case for secondary ports and airports. It is less common for primary ports, although appears to be the case for a large number of primary airports.
potential to make essential services unaffordable for low income households, although there are pricing models available to address this.\textsuperscript{17}

The main international airport in Rarotonga, Cook Islands, is an example of a trade-related infrastructure facility that attracts government subsidisation. As noted earlier, user charges at the airport are already high by international standards, but are not sufficient for the airport authority to fund its operation and maintenance costs. The Cook Islands Airport Authority relies on budget allocations for one-quarter of its revenue. This form of \textit{ad hoc} subsidisation does not take place under a clear performance-based framework. The reason that user charges cannot fund operations is due to the absence of economies of scale. Rarotonga airport, with only 130,000 passenger movements each year, does not generate sufficient revenue for operations through user charges alone, even with existing, and significant, user charges. The Airport Authority has argued unsuccessfully for a share of the departure tax that government charges international passengers in order to recoup costs associated with tourism infrastructure (including roads, sewage etc).

There is very limited information available regarding what prices would facilitate full cost recovery by Pacific ports and airports. The task is further complicated by the use of multiple port and airport charges; management of various ports/airports by responsible authorities; government subsidies (some of which are hidden) and taxes; and limited information regarding passenger and cargo movements, as well as the capital cost of infrastructure.

Estimates of user charges necessary for full cost recovery in the primary airport of Fiji, Cook Islands, and Kiribati are presented in table 9.2. The analysis is based on annual reports, personal communications, and studies by development partners. Given that the data for different countries are not directly comparable (even financial years differ), the analysis should be treated with caution. Nonetheless, it does provide an indication of the importance of economies of scale in achieving full cost recovery.

Table 9.2 demonstrates that full cost recovery is difficult in the two smaller airports. In Kiribati, where the main airport sees only 22,000 passenger movements per year, it is estimated that a user charge of US$84 per international passenger would be needed to achieve full cost recovery (or US$168 per departing passenger, as proposed in a donor-funded study) (Pacific Region Infrastructure Facility 2009). For the purpose of comparison, average user charges paid by passengers in secondary Australian airports range between approximately US$17.60 in the Gold Coast and US$31.70 in Cairns (Darwin International Airport 2014). The difference demonstrates the extent of the challenge faced by MIRAB economies in providing trade-related infrastructure.

\textsuperscript{17} In Tuvalu, cross-subsidisation has been used in the past in the shipping industry, with foreign passengers charged more than Tuvalu nationals. In Kiribati, airport fees are only charged to passengers on international flights, not domestic flights. Other pricing models are also available, such as subsidisation of domestic travel by students or the elderly.
Table 9.2. Estimated user charges necessary for cost recovery in selected PIC international airports

<table>
<thead>
<tr>
<th></th>
<th>Bonriki Airport, Kiribati</th>
<th>Rarotonga Airport, Cook Islands</th>
<th>Nadi Airport, Fiji</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent costs (annual)</td>
<td>1,848</td>
<td>7,084</td>
<td>25,713</td>
</tr>
<tr>
<td>($US, thousands)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International passenger movements (annual)</td>
<td>22,000</td>
<td>130,000</td>
<td>1,686,217</td>
</tr>
<tr>
<td>Revenue not linked to user charges (retail, concessions etc) ($US, thousands)</td>
<td>0</td>
<td>1,453</td>
<td>11,616</td>
</tr>
<tr>
<td>Government subsidies ($US, thousands)</td>
<td>440</td>
<td>1,694(^3)</td>
<td>704</td>
</tr>
<tr>
<td>- Government subsidies ($US per international passenger)</td>
<td>20</td>
<td>13.03</td>
<td>0.42</td>
</tr>
<tr>
<td>- Government subsidies ($US per capita)(^2)</td>
<td>4.76</td>
<td>110.55</td>
<td>0.84</td>
</tr>
<tr>
<td>User charges needed for full cost recovery (no subsidisation) ($US per international passenger)</td>
<td>83.60(^4)</td>
<td>43.31</td>
<td>8.34</td>
</tr>
<tr>
<td>Current user charges ($US per international passenger)</td>
<td>10.00</td>
<td>22.90</td>
<td>11.72</td>
</tr>
</tbody>
</table>

1. The table uses the latest available figures. For Kiribati, these are for 2006-09. For Fiji and Cook Islands, 2011 data are used. Domestic passengers are excluded from analysis due to data constraints. In Kiribati this is justified, given that user charges are only paid by international passengers. For Fiji, separate financial data for domestic airports are not available. However, both passenger movements and user charges associated with domestic travel are small in comparison to international passenger movements.

2. Calculated on the basis of country population.

3. Figure of 1,694 includes only government transfers to the airport authority. It does not account for the government’s collection of departure tax from passengers, which is in excess of the airport subsidy amount, and is charged in order to recoup general costs associated with tourism infrastructure (including roads, sewage etc).

4. In the case of Kiribati, user charges required for full cost recovery are in excess of current funding received by the Ministry of Communication, Transport and Tourism Development (MCTTD), both in the form of subsidies (over US$440,000) and user charges (US$220,000).

It is not possible to estimate user charges that are required for full cost recovery in Pacific ports, given data constraints. However, analysis of the ports sector does suggest that it is possible to recover costs where trade volumes are small, provided investment in port infrastructure that could improve efficiency is limited. This was evident in the case of Pohnpei Port in FSM. Pohnpei Port has very low trade volumes, with container throughput (TEU) estimated to be only 2,900, or less than half that of the main port in Kiribati. The Pohnpei Port Authority is nonetheless able to recover its costs through user charges, albeit, very high user charges (US$600 per container TEU, which is the second highest in the region, according to the World Bank’s Ease of Doing Business dataset). Indeed, not only does the Pohnpei Port Authority recover its costs through user charges at the port, but it also uses that revenue to subsidise the loss-making international airport, for which it is also responsible (Pohnpei Port Authority).
Authority 2010b). Equity considerations aside, this comes at a cost: the port is unable to invest in equipment, resulting in low levels of efficiency (as measured by terminal handling time).

Kiribati provides another example of a port that is able to recover its costs through user charges despite very low trade volumes (equivalent to approximately 6,600 TEU per year). Reasonably low fees are possible due to the sub-standard infrastructure at the port. Like in Pohnpei, this reduces efficiency; as demonstrated by data on terminal handling time that was presented in figure 5.1. In both Kiribati and FSM, low levels of efficiency increase the cost of trade (which is not reflected in port fees).

The inability of ships to berth in Kiribati results in considerable terminal handling time – 12 days according to data from the World Bank’s *Ease of Doing Business* indicators. The cost to exporters of such delay depends on the nature of each vessel and its cargo shipment. In Kiribati, one study estimates that a typical vessel operator carrying 500 TEU loses A$10,000 in revenue for each extra day of voyage time. The 12 days that it takes to handle a container in Betio Port, Kiribati equates to A$240 per container (TEU) (US$211) that vessel operators pass through to customers in the form of higher fees; an amount that is in addition to the US$310 paid in port charges. If terminal handling time were reduced by 3 days, to that of Samoa or Palau (9 days), the savings to customers would amount to A$60 per container (TEU) (US$53). A simple cost-benefit analysis of a proposed A$2.1 million (US$1.85 million) port upgrade in Kiribati, designed to reduce terminal handling time by 1 day, found that the net benefit of the investment was negative.\(^{18}\) Cargo volumes in Kiribati are simply too low to justify such an investment in port infrastructure (Pacific Region Infrastructure Facility 2009).

The case illustrates the challenges faced by small Pacific island countries, and in particular MIRAB economies, in improving trade-related infrastructure. In some cases, it is appropriate to maintain only a basic level of infrastructure; present and potential future trade volumes do not justify significant investment in upgrading trade-related infrastructure. This is clearly the case in Kiribati, and is likely to be true for many other MIRAB economies. However, it is not the case in larger Pacific island economies, where present and (in some cases) potential future trade volumes warrant investment in port and/or airport facilities. The structure, size and natural resource endowments of Pacific island economies therefore inevitably influence what level of investment in infrastructure is appropriate.

\(^{18}\) The net present value of the investment would be positive over a 20 year period when a social discount rate of 1 percent is used, but at a 2 percent discount rate the return is negative.
10. Regional Approaches

10.1 Regionalism: An overview

Regionalism has been promoted for decades in response to the challenges faced by small island developing states in the Pacific. Regional cooperation, integration, and service delivery are considered strategies through which Pacific island countries can address capacity constraints and lower costs through the generation of economies of scale. The 2005 Pacific Plan for Regional Integration and Cooperation (the Pacific Plan), the ‘master strategy’ agreed to by Pacific island leaders for advancing regionalism, explicitly identifies economies of scale as an objective of regionalism:

“Regionalism can reduce the costs of providing a service if the number of people benefiting from the service is increased. These ‘economies of scale’ can occur in both the public and private sectors” (Pacific Islands Forum 2005).

Political island leaders have also highlighted the potential for regionalism to address capacity constraints. The Auckland Declaration, issued by Pacific island leaders in 2004, states that: “the serious challenges facing countries of the region warrant serious and careful examination of the pooling of scarce resources to strengthen national capabilities” (Pacific Islands Forum 2004).

Three types of regionalism are commonly identified.

i. **Cooperation** involves dialogue between countries, and can result in the harmonisation of legislation, policies and standards. Cooperation is the most basic type of regionalism, and is a necessary foundation for “deeper” forms of regionalism advocated in the Pacific Plan.

ii. **Integration** involves enhancing trade and labour linkages between Pacific island countries. A common market and free movement of labour, such as exists in the European Union, has been advocated as an objective toward which Pacific island leaders could work.

iii. **Regional service delivery** consists of countries pooling resources in order to jointly provide a service that would normally be provided (or be expected to be provided) at the national or sub-national level. Pooling can occur in a range of areas, such as fisheries management, higher education, transportation, policing, procurement, and central banking.

Regionalism in the Pacific has historically focused on enhancing cooperation between countries. The Pacific’s “network of cooperative institutions” have been described as “unmatched elsewhere in developing economies in terms of effectiveness” (Rolfe 2000). There has been less progress in the areas of integration or service delivery at the regional level.

Integration in the form of trade and labour migration between Pacific island countries remains limited, despite initiatives such as the Pacific Island Countries Trade Agreement (PICTA) and the Melanesian Spearhead Group’s skilled labour migration scheme. There are structural reasons for limited trade and labour mobility within the Pacific islands region. The economies of Pacific small island states produce agricultural goods and raw commodities, and have abundant supplies of low-skilled labour. There is limited scope to trade such goods and services within the region (Asian Development Bank &
Poor transport linkages are also a factor. Limited sea and air linkages between Pacific island states often result in the need to transit through metropolitan countries, increasing costs (Asian Development Bank 2007c; Asian Development Bank 2007d; AusAID 2008).

Regional service delivery, the third type of regionalism promoted in the Pacific Plan, has also achieved mixed success. A recent review of service delivery at the regional level found that ongoing dependence on development funding, as well as limited ownership and conflicting objectives among partner countries, contributed to failure in over half of the 20 regional service initiatives that were identified. Initiatives that had failed or only partly met their objectives included the bulk procurement of fuel and medicines, service provision by a regional airline (Air Pacific) and shipping line (Pacific Forum Line), and the establishment of the Pacific Aviation Safety Office (Dornan & Newton Cain 2013). Some of these cases are discussed in more detail below.

The limited progress in advancing regional integration and service delivery has led to criticism. An influential report published in 2005 by the Asian Development Bank and Commonwealth Secretariat, *Toward a New Pacific Regionalism*, argued that only “deeper” forms of regionalism, such as integration and regional service delivery, could generate benefits sufficient to make regionalism sustainable. The report was critical of the overwhelming focus of Pacific island leaders on regional cooperation, which although easier, was considered to be a costly endeavor with uncertain net benefits. The report considered it significant that the bulk of cooperation in the region is funded by development partners.

**10.2 Regionalism and trade-related infrastructure**

Trade-related infrastructure, and the transport linkages that it supports, are fundamental to Pacific regional integration. Sir Ratu Kamisese Mara, one of the founding fathers of the Pacific Islands Forum, recognised the importance of regional measures aimed at linking Pacific island countries with the rest of the world in 1974, when he argued that: “the Forum will stand or fall on civil aviation ... civil aviation will be the real test of Pacific regionalism” (Guthrie 2013). But regionalism, in the form of regional cooperation and service delivery, also has the potential to facilitate provision of trade-related infrastructure. Regional approaches can lower costs through the generation of economies of scale, and can address capacity constraints faced by small organisations that provide trade-related infrastructure.

**Cooperation** between organisations that provide infrastructure services can generate economies of scale. The harmonisation of legislation, policies, and service standards, for example, spreads the fixed costs associated with the development of these institutional arrangements across countries, or enables countries to ‘free-ride’ on the work of one another. Cooperation among infrastructure management organisations in sourcing training and advisory services also has the potential to reduce unit costs and address capacity constraints. The use of common systems for data management achieves similar objectives.
Cooperation can be used to address capacity constraints through sharing of experience and information. The trend toward commercialisation of infrastructure provision in the ports, airports, and roads sectors was discussed in previous sections. The Asian Development Bank (2007a) argues that the experience of countries where reform is advanced can inform developments in countries where reform is lagging:

“Regional coordination can assist the replication of good models of reform in different countries and thus improve on the effectiveness of various national actions taken in parallel.”

Reports made to the Pacific Islands Forum Economic Minister’s Meeting have advocated the establishment of model regulatory rules for each infrastructure sector, which could be adopted by countries on a case by case basis (Castalia 2007).

Existing regional cooperation among infrastructure providers in the Pacific is facilitated by regional meetings, workshops, and training events. Staff in government ministries responsible for road management, for example, meet through training events organised by development partners. Twinning performs a similar function. In the aviation sector, air traffic controllers from Solomon Islands are trained by Airports Fiji Limited in Nadi. The Regional Maritime Programme of the Secretariat of the Pacific Community enhances cooperation through technical assistance and training in the shipping sector, and through external auditing in some areas (Guthrie 2010). It also facilitates the work of organisations specifically established for cooperation, such as the Pacific Countries Ports Association, which holds an annual conference and offers training to port authorities.19

Providing such opportunities to facilitate cooperation is expensive, given the cost of travel between countries in the region. As a result, the vast majority of regional cooperation, in the form of conferences and workshops, is funded by development partners. Such activities can be organised directly by development partners or by regional organisations which they fund, such as the Secretariat of the Pacific Community or the Pacific Islands Forum Secretariat (both organisations receive 90 percent of their revenue from development partners). Reliance on funding from development partners influences the focus of regional cooperation. There has been considerable expenditure in training for enhanced port and airport security – an international concern – but less expenditure in more basic areas that require attention, such as asset management (Fry 2005; Guthrie 2013).

Regional cooperation in the transport sector can facilitate regional integration. Access arrangements that restrict routes that can be flown by different airlines are a barrier to connectivity between countries. The Pacific Islands Air Services Agreement (PIASA), established in 2007, has sought to address this by enhancing airline accessibility to member countries; the end objective being the establishment of a single aviation market. However, the agreement has been of limited benefit given that key hub destinations, such as Fiji, have refused to participate. Such restrictions are less of an issue for the shipping industry. International shipping routes in the Pacific are primarily determined on

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19 Examples of other organisations that facilitate cooperation in the shipping and aviation sectors include: the Pacific Islands Maritime Association, the Pacific Women in Maritime Association, the Pacific International Maritime Law Association, the South Pacific Regional Civil Aviation Council, and the Association of South Pacific Airlines (which includes some airport authorities as members). These organisations are commonly linked to regional institutions with a broader mandate, such as the South Pacific Tourism Organisation and the Secretariat of the Pacific Community.
economic grounds, although the sub-regional regulatory commissions, discussed below, have been established in order to improve the consistency and reliability of shipping services.

There is scope to facilitate provision of trade-related infrastructure in the Pacific through enhanced integration – in the form of greater trade in services between Pacific island countries. In small economies such as Tuvalu, where management of trade-related infrastructure involves high fixed costs, management could feasibly be outsourced to larger organisations. Thus, Airports Fiji Limited could manage Funafuti airport, which receives only two flights per week. This would not in itself address the structural constraints to cost recovery discussed in section 9 – trade volumes would not change – but it would lower management overheads. In such cases, it would be crucial for contractual arrangements to clearly state performance standards and any government subsidies.

Similar arrangements already exist in niche areas. For instance, air traffic control in the airspace of Nauru and Solomon Islands is outsourced to Air Services Australia. Certain runway maintenance activities are outsourced by the Cook Islands Airport Authority to Auckland International Airport Limited. Such arrangements are managed and driven at the national level. The outsourcing of general management functions would similarly need to be driven, and require reform, at the national level. Ongoing state ownership and management of primary ports and airports in the Pacific prevents such outsourcing at the present time.

Regional service delivery has featured prominently in discussions of Pacific regionalism and transport linkages. One of the first areas examined by the Pacific Islands Forum Secretariat (formerly the South Pacific Bureau for Economic Co-operation) after its establishment in 1973 was civil aviation. The focus on air services was a reaction to the introduction of jet aircraft, with long-haul trans-Pacific flights threatening air services to Pacific island countries, which had provided re-fuelling facilities to earlier propeller aircraft (Guthrie 2013).

Air Pacific was officially established as a regional airline in 1971. Various Pacific island governments had bought stakes in the airline, then called Fiji Airlines, during the 1960s. Air Pacific’s shareholders included seven Pacific island governments: Fiji, Tonga, Western Samoa, Nauru, Solomon Islands, Kiribati, Tuvalu; as well as New Zealand TEAL, Qantas, and British Overseas Airways Corporation. By 1974 the airline was beset with financial difficulties. Air Pacific was not operating at full capacity, partly as a result of its inability to secure landing rights in New Caledonia, French Polynesia or American Samoa from the French and United States governments.

Fijian calls for Air Pacific to be given a monopoly over regional air services received the support of Australia and New Zealand, but not that of other Pacific island governments. Concerns that Air Pacific was disproportionately benefitting Fiji made other government shareholders reluctant to provide additional capital to the airline:

“Fiji controlled the employment of airline staff and required all routes to be flown through Fiji, thus curbing its usefulness to other island nations” (Shibuya 2004).

Solomon Islands was especially critical when Air Pacific cut services to Honiara in 1974, as part of an effort to restore profitability. The Government of Solomon Islands argued that Air Pacific’s decision had been made without its input, and had effectively left the country isolated from the rest of the Pacific islands region. At the same time, Nauru and Western Samoa expressed their intention to
continue to operate their own national airlines, Air Nauru and Polynesian Airlines, despite the establishment of Air Pacific as a regional carrier. Tonga also announced that it would establish a national carrier to provide it with direct services to the region, without the need to travel through Fiji (although establishment of this airline was delayed until 1985) (Guthrie 2013).

The establishment of national airlines to service international routes proceeded in the late 1970s and 1980s. Papua New Guinea operated its own airline from 1973, Air Niugini, which in 1976 commenced international flights. Kiribati established Air Tungaru in 1977, which provided Kiribati with direct services to the United States and Tuvalu (which formed part of the Gilbert and Ellice Islands with Kiribati until the two colonies were separated in 1975). Air Vanuatu was established in 1981, and in the late 1980s, Cook Islands International commenced operations with the support of the Cook Islands Government (Kissling 1989).

The continuing operation, and indeed expansion, of national airlines led to a saturated market, with adverse consequences for all involved. Many national airlines went bankrupt, such as Air Nauru, Royal Tongan Airlines, Air Tungaru, and Cook Islands International. Others continued to operate, but at significant cost to government (Asian Development Bank 2007c). Air Pacific was able to survive and later prosper with good management and a commercial focus, but not as a regional entity. The airline in the 1980s effectively became a joint venture between the Fiji Government and Qantas, ending the regional airline experiment (Asian Development Bank 2007c; Vitusagavulu 2005). Fiji increased its shareholding in the company between 1977 and 1980, with assistance from the Australian and New Zealand governments (which sold their shares over the same period). Other Pacific island government chose not to increase their shareholding. Air Pacific changed its name to Fiji Airways in June 2013.

Shipping services were also the subject of efforts to promote Pacific regionalism in the 1970s, and technological change was again an important factor. It was widely believed that the ‘containerization’ trend within the international shipping industry threatened services to Pacific island countries with low freight volumes. Pacific Forum Line (PFL) was established as a partnership between Pacific island governments in 1978, with the objective of providing Forum island member states with essential shipping services. As in the case of Air Pacific, PFL suffered from conflict between government board members, which demanded that PFL service non-commercial routes but were reluctant to provide necessary funding. This resulted in financial difficulties for PFL, which survived only due to funding provided by New Zealand, and by abolishing services to non-commercial routes (including member countries) (Dornan & Newton Cain 2013). PFL also survived as a result of innovative management. It reduced its capital base by chartering ships from member states, thereby facilitating indirect investment by shareholder nations (Guthrie 2013). Despite these reforms, PFL continued to oscillate between being a profitable and a loss-making company. It was sold by its shareholders to the Government of Samoa in 2012 following continued financial troubles. In 2013, the Government of Samoa announced it would sell a 50 percent stake in PFL to the private sector, which would retain existing services (Fairfax NZ 2013). This raises the question of whether government ownership was required in the first place to guarantee shipping services to Pacific island countries (Dornan & Newton Cain 2013).

The limited success of Pacific Forum Line or Air Pacific as regional entities has reduced support in the Pacific for the direct provision of transportation services on a regional basis. However, regional service delivery continues to be advocated in a different form. A key rationale behind the ‘new Pacific
regionalism’ advocated in the 2005 Pacific Plan was for countries to pool resources in order to overcome challenges associated with smallness (Asian Development Bank & Commonwealth Secretariat 2005; Pacific Islands Forum 2005). The approach received considerable support from Australia – the largest member of, and primary source of funding for, the Pacific Islands Forum Secretariat. The Prime Minister of Australia, John Howard, argued at the time that: “Pacific states needed to share resources if they were to overcome the constraints imposed by their small size and lack of capacity ... referring to the absurdity of each island country trying to train its police ... when (this) could be done through pooling resources” (Fry 2005).

Regional service delivery was advocated by the Pacific Plan in a range of areas beginning in 2005, including: bulk procurement of fuel, aviation safety, shipping between small island states, and vocational education. The Pacific Plan also identified five areas for further analysis of whether pooling would be appropriate: bulk procurement of pharmaceuticals, a regional audit service, a regional sports institute, regional ombudsman and human rights mechanisms, and a regional intellectual property rights organisation. The two initiatives most relevant to trade-related infrastructure were shipping to small island states and aviation safety. Both were focused on regional approaches to policy making and regulation that support service delivery; these proposals did not involve the direct provision of transport services, as had been attempted in the past by Air Pacific and Pacific Forum Line.

The Small Island States Shipping Initiative pursued by the Secretariat of the Pacific Community, still in its infancy, builds on the Micronesian experience with the Micronesian Shipping Commission. The Micronesian Shipping Commission is an inter-governmental agency established in 1997 for the coordination and regulation of international shipping services to FSM, Marshall Islands, and Palau. It controls access to these markets, with the objective of preventing cherry-picking, disruptive and cartel-like behaviour among shipping operators. There are mixed reports about its effectiveness. Shipping services to all three countries are adequate, although whether this is the result of the activities of Micronesian Shipping Commission is disputed (Asian Development Bank 2007d; AusAID 2008; Pohnpei Port Authority 2010b). The Small Island States Shipping Initiative has sought to establish a similar organisation, called the Central Pacific Shipping Commission, which will safeguard services to Kiribati, Nauru, Tuvalu, and Marshall Islands. Its evaluation is premature. The Commission began services on 1 January 2014, following an interim period from 2009 during which time Kiribati, Nauru, Tuvalu were serviced by Kiribati Shipping Services Limited.

The Pacific Safety Aviation Office (PASO) is another example of a regional organisation established to provide services in the transport sector. PASO aims to improve aviation safety and security standards in the Pacific, with a view to assisting Pacific island countries meet International Civil Aviation Organisation (ICAO) standards. PASO commenced in 2003, and was to have operated on a self-sustaining basis, funded through user charges, following a large capital injection from development partners for its establishment. However, the organisation has faced financial difficulties. Take-up of its services has been lower than anticipated, with some countries opting to instead procure services from outside of the region. Receipt of payment from countries for services rendered has also often been late (Guthrie 2010). PASO is currently being restructured with the support of development partners.
10.3 Prospects

Pooling of resources for regional service delivery remains an intuitively appealing response to smallness. Advocates of regional service delivery argue that, where countries are unable to cost-effectively provide a service due to small size, they can pool resources for the regional provision of that service. However, historically the same constraints that make regional service delivery attractive have also made it a challenge. The small size and limited capacity of Pacific island countries increase the cost of regional service delivery, making it difficult to achieve net benefits from pooling resources. High travel and communication costs, and limited support from governments, are all challenges. Regional service delivery is complicated further by diversity within the region. Regional ‘solutions’ must be tailored for different contexts; requirements in Nauru (with a population of 9,200) are vastly different to those in Fiji (with a population of 837,000).

There are also significant political economy challenges to regional service delivery. Benefits must accrue to each country if it is to participate in regional service provision, and the distribution (or perceived distribution) of benefits is important. In the area of procurement, smaller Pacific island states are likely to benefit most from generating economies of scale, but benefits will not be realised without the participation of larger Pacific island states. Larger states, however, have limited incentive to move away from national procurement models. In the case of transport services, benefits are likely to accrue disproportionately to larger countries that serve as hubs in a network, reducing support for such schemes among smaller countries.

Such problems have hampered efforts to promote regional service provision in the past. The bulk procurement of fuel initiative, pursued since 2005 with the goal of lowering unit costs, was only ever agreed to by smaller Pacific island states. This had the effect of making it economically unviable. There has also been constant tension regarding the distribution of benefits from regional service delivery among partner countries. In negotiations to establish bulk fuel procurement, there has been disagreement about where the fuel storage hub for such an arrangement would be based; a number of Pacific island countries sought to host the storage facility, given the economic benefits that this would entail. In the case of Air Pacific and Pacific Forum Line, smaller states critical of the focus on commercial routes refused to provide capital to the organisation.

Despite such challenges, there are areas where regional approaches have potential to facilitate the provision of trade-related infrastructure. Some promising proposals are highlighted below.

**Regional cooperation** can spread the fixed costs associated with management and regulation across a number of countries. The “replication of national-level reforms” that has been advocated by the Asian Development Bank could include: (i) duplication of regulatory arrangements and processes, (ii) corporate governance arrangements (including enabling legislation and regulations), and (iii) the development of community service obligation frameworks that govern how subsidies are provided for trade-related infrastructure. The establishment of model regulatory rules for each infrastructure sector, for adoption by Pacific island countries on a case by case basis, could provide the basis for such cooperation. In countries with weak regulatory or governance frameworks, reforms may have the added benefits of improving accountability and providing management with incentives for good performance.
There are other areas also where cooperation can facilitate the provision of trade-related infrastructure. The standardisation of equipment and procedures could potentially lessen maintenance costs by reducing the cost of spare parts and training, although short-term harmonisation costs must also be considered. AusAID’s *Pacific Survey 2008* goes further by recommending that Pacific island countries consider “subregional or even regional bulk purchasing of some commodities.” It is unlikely the same recommendation would be made again, given the negative experience with bulk procurement of fuel and pharmaceuticals since 2005 (Dornan & Newton Cain 2013). However, there could be scope for cooperation among countries in sourcing specialist training and advisory services.

There are other areas, not directly linked to management of trade-related infrastructure such as airports and ports, where cooperation is likely to be especially beneficial. Better coordination and liberalisation of air access arrangements would improve connectivity in the region. Such an agreement could help to clarify the respective role of airport facilities in each country as part of a wider network of air services. Indeed, better coordination between Pacific island countries in relation to both air and sea routes would facilitate appropriate investment in airport and port facilities. However, the political challenges to better coordination, and to liberalising access arrangements in the aviation sector in particular, are significant. There has been limited progress in both areas.

Reform in other areas would also be beneficial. Harmonising customs procedures and reducing the time taken to clear customs would lower trade costs. The Pacific Island Countries Trade Agreement (PICTA) has in recent years facilitated the harmonisation of customs laws and regulations. There is scope to build on such achievements. There is also considerable potential to improve the collection and dissemination of statistics in the region. This will help governments to identify areas where performance can be improved, and could facilitate better management across a range of areas (including management of airport and port facilities).

**Regional service delivery** is relevant to many of the proposals already discussed. Pooling resources for training, and for the (outsourcing of) design and implementation of asset management systems/databases, could reduce unit costs, but only where there is necessary standardisation of equipment and procedures. Pooling resources for the purchase (or outsourcing) of services, such as specialist training and advisory services, could have a similar impact. Indeed, such examples of regional service provision are evident to some extent in the regional fora already discussed, such as the Regional Maritime Programme of the Secretariat of the Pacific Community.

Regional service delivery has yet to be attempted in other areas. Price regulation, for instance, is a complex task with significant fixed costs. Some larger Pacific island countries have sought to address this by establishing multi-sector regulators, such as the Independent Consumer & Competition Commission in PNG, the Commerce Commission in Fiji, and the Utilities Regulatory Authority in Vanuatu. In Fiji and PNG, these multi-sector regulators are responsible for setting prices in the ports sector (there is currently discussion in Vanuatu about moving price determination for ports to the Utilities Regulatory Authority). An alternative for smaller countries where multi-sector regulation is not feasible is to pool resources and establish a regional regulator. A regional Fair Trading and Price & Access Authority has been proposed in the past (Castalia 2007). The establishment of such an organisation would require significant political commitment at the national level; both to commercialise infrastructure management and transfer responsibility for management to regional or
non-state actors. An appetite for such reform is yet to be seen among governments in the region. Exploration of more ambitious proposals, such as port or airport administration at the regional level, is even more premature.

One area where a regional approach is promising is in the provision of advisory services for trade-related infrastructure providers. Experience in other sectors suggests that such a service could be beneficial. The Pacific Financial Technical Assistance Centre (PFTAC) has effectively driven reform of Public Financial Management systems in the Pacific. A similar proposal has been made in the past for infrastructure, with the argument that a regional advisory service could:

"(i) facilitate the replication throughout the region of good models of infrastructure service improvement developed for certain sectors by some Pacific countries, and
(ii) mobilize specialist expertise and training resources quickly and as needed by the countries to help initiate and then strengthen and maintain momentum in ongoing reform efforts” (Asian Development Bank 2007a).

There is no reason that such a service need be limited to providing advice in the area of reform. Civil servants in the Pacific often lament the absence of short-term advice from (development funded) specialists in areas such as contract negotiation. A regional advisory service could fill that gap, providing expert advice at short notice to organisations responsible for trade-related infrastructure. However, the proposal for a regional advisory service also contains some caveats. Importantly, the advisory service would be designed to “help countries get on with national strategies”. It would not provide infrastructure services at a regional level nor decide on contract or investment proposals.

The focus on using a regional approach to support national provision of infrastructure is appropriate. It draws on the lessons from past experience with direct service provision by Air Pacific and Pacific Forum Line, and recognises the significant political economy challenges to establishing and managing a regional provider of infrastructure services. The focus on supporting national provision of trade-related infrastructure is also consistent with the Secretariat of the Pacific Community’s Framework for Action on Transport Services, which “acknowledges that national transport policies and plans are the principal means for achieving improved transport services.” The focus of Pacific regionalism, therefore, can be seen to have changed as a result of experience in the last few decades.

In summary, there is potential for regional approaches to support the provision of trade-related infrastructure in Pacific island countries. However, the limits to regional cooperation and service delivery also need to be recognised. There are significant costs associated with regional cooperation, currently borne primarily by development partners. Whether such activities provide ‘value for money’, or whether funds could be better spent at a national level, are questions that need to be explored on a case-by-case basis. What is clear is that cooperation is most likely to generate net benefits where it results in changes to national infrastructure provision, such as through harmonisation/duplication of institutional arrangements or processes which reduce unit costs. Cooperation that does not influence infrastructure provision is of limited benefit.

Development partners have argued that regional service delivery has the potential to generate greater net benefits than cooperation (Asian Development Bank & Commonwealth Secretariat 2005). However, the political and economic challenges associated with regional service provision are very significant. Experience in the Pacific suggests that pooling initiatives should focus on the provision of
technical services closely linked to areas of cooperation, and target areas of poor performance such as asset management. There is also scope at the regional level for the provision of advisory services. More ambitious schemes, including regulation or management at a regional level, are best not promoted until there is commitment among governments to commercialise infrastructure management, and a willingness to transfer functions traditionally overseen by the state to regional or non-state actors. Such appetite for reform is not visible in the Pacific at the present time.

11. Recommendations

This report has provided an overview of trade-related infrastructure in Pacific island countries, including primary ports, airports, and roads. In doing so, it has identified and discussed common issues and challenges faced by small island developing states in the region in providing such infrastructure. A key argument of the report is that low trade volumes and the absence of economies of scale are significant obstacles to infrastructure service provision in the Pacific. Among both ports and airports, performance is closely linked to scale: port productivity was shown to improve with higher cargo throughput, while the financial performance of airports improves with increases in passenger movements. The state of trade-related infrastructure is therefore influenced by the economic structure of each country. Port facilities are generally more developed in countries where exports are significant, and airport facilities are better in countries where tourism is important.

But the report also argues that institutional arrangements are important determinants of infrastructure performance. The performance of ports and airports is influenced by traffic volumes; however, it also varies as a result of policy and regulatory frameworks in each country. For example, port charges in Nuku’alofa, Tonga are considerably lower than in Port Vila, Vanuatu, despite lower cargo throughput. This is due to stevedoring arrangements that promote competition in Tonga, which contrast with the government-sanctioned private sector monopoly that is in place in Vanuatu.

The maintenance of trade-related infrastructure is also influenced by institutional arrangements. Sub-optimal infrastructure maintenance is widespread in the region, with adverse economic implications for Pacific island countries. The report argued that underlying reasons for sub-optimal maintenance include: poor planning, the failure to establish funding models (appropriate user charges, subsidies, and government budget allocations), limited accountability for performance, and linked to this, lack of institutional capacity for asset management. Responsibility for poor planning and the failure to establish appropriate funding models does not reside only with Pacific island governments. Development partners have also not adequately considered sustainability when funding new infrastructure. The report argues that in smaller Pacific island countries, both governments and development partners should be cautious when considering the development of new infrastructure. In some cases, operation and maintenance of existing infrastructure will require ongoing external subsidisation. It is important that this is recognised from the outset.
The report concluded with a discussion of regional approaches that could facilitate the provision of trade-related infrastructure. Regional cooperation and service delivery have been widely advocated on the grounds that they can help Pacific island countries address capacity constraints and lower unit costs through the generation of economies of scale. However, experience is mixed. Many attempts to pool resources in order to directly deliver services at a regional level have failed. Air Pacific, Pacific Forum Line, and more recently, the Pacific Safety Aviation Office, are all examples of regional organisations that have not lived up to expectations. The experience with regional cooperation is also mixed: the reticence of Pacific island countries to pay for cooperation, the continued reliance on donor funding, and limited progress in relation to harmonisation of institutional arrangements, all suggest that regional cooperation has not met expectations. As a result, the report recommends that Pacific island countries and development partners adopt a cautious approach toward regionalism. There certainly is scope for regional approaches to facilitate and support the national provision of trade-related infrastructure. Regional provision of infrastructure, however, is unlikely to succeed without considerable reform and greater willingness to cede control to regional or non-state actors.

A full list of recommendations is provided below under four headings:

**Institutional arrangements and management**

1. Organisations responsible for the management of trade-related infrastructure must be provided with clear objectives and performance targets.

   - Management of trade-related infrastructure should not be influenced by day-to-day political imperatives. To this end, management and policy functions should be separated where feasible (recognising that this may be difficult in the smallest Pacific island countries).
   - Management should be held accountable for performance against established objectives/targets. Ministries of Finance can play an important role in ensuring that line agencies are held accountable for performance.
   - For corporatised entities, objectives must be specified in legislation. Community service obligations should be identified and reimbursed separately, so as to avoid confusion between commercial and non-commercial objectives.
   - Information on the performance of infrastructure management organisations against objectives/targets should be made public wherever possible. Corporatised entities must be required to produce timely annual reports and financial statements.

2. Commercialisation and the introduction of competition should be considered in certain areas.

   - Port and airport facilities can benefit from commercialisation, with subsidies provided where necessary (see recommendations below in relation to subsidies).
   - The introduction of competition should be considered where feasible, provided that its benefits outweigh those associated with vertical integration. The following steps can assist in this process:
     - Separating natural monopoly elements of infrastructure (e.g., port infrastructure) from those where competition is feasible (e.g., stevedoring services).
In cases where only one operator is feasible, establishing concessions that are awarded through periodic competitive tender.

- The use of public-private partnerships can be advantageous, especially in cases where the performance of the public sector in infrastructure management is weak. However, sound contractual arrangements are necessary for the benefits of public-private partnerships to be realised.

3. **There must be external oversight of prices and access arrangements in the case of monopoly.**

- Oversight of prices set by monopoly firms should not be the responsibility of political leaders, given short-term political incentives to set prices at unsustainably low levels.
- Multi-sector regulators have been established in a number of countries and can regulate access arrangements and prices for airports and ports, with external advice provided where necessary. Periodic price regulation by independent boards, which are in turn advised by external technical bodies, may be more appropriate in smaller countries.

### Funding

4. **Funding models must be developed when planning new infrastructure.**

- Funding models must detail how ongoing costs associated with the operation and maintenance of new infrastructure will be met.
- Cost of capital must also be considered. There should be rigorous analysis of the financial implications for borrowing entities where commercial or concessional loans are used to fund infrastructure development/improvement.

5. **For smaller Pacific island countries, it is likely that the provision of some infrastructure will require ongoing external financial support.**

- This should be made explicit when developing funding models for infrastructure.
- Financing infrastructure development through grants is preferable to loans in such cases.
- Development partners should consider providing funding for the ongoing operation and maintenance of new infrastructure that they finance, where such activities cannot be funded without external assistance.

6. **Governments must allocate sufficient funding toward ministries/agencies responsible for maintaining infrastructure that is a public good, such as roads.**

- Budgeting should be informed by good data on infrastructure assets, including information on the condition of infrastructure and the scope and cost of maintenance work to be completed. Better communication between ministries/agencies responsible for infrastructure and budget decision-makers is needed.
- In cases where trade-related infrastructure is provided by sub-national agencies/governments, it is important that these entities have available adequate funding to fulfil their responsibilities. Revenue sharing between national and sub-national governments
needs to be improved in many countries. One way of facilitating this is through the preparation of better national budget submissions by sub-national level governments.

7. User charges must be adequate to cover the cost of managing infrastructure that is a private good, such as international ports and airports, less any government subsidy.
   - This can be facilitated by external oversight of prices by an independent board or organisation that operates with appropriate external technical advice (see above).

8. Subsidisation of trade-related infrastructure should be measured and made explicit.
   - Subsidies that are provided for private good infrastructure should be the subject of rigorous cost-benefit analysis.
   - The value of community service obligations provided by commercialised entities should be measured and reimbursed.

**Maintenance**

9. Recognition among political leaders of the economic benefits of maintenance is required to address underfunding of maintenance in the region.
   - Political support can ensure adequate budget allocations for maintenance, and can generate support for other recommendations outlined above.
   - The following tasks can help to improve awareness of the economic benefits of maintenance:
     - Better budget submissions from infrastructure managers.
     - Estimates of future maintenance costs when planning new infrastructure (these can be developed in the process of establishing a funding model for new infrastructure).
     - Assessment of maintenance liabilities associated new infrastructure by development partners involved in funding that infrastructure.
     - Technical assistance from development partners in the area of infrastructure asset management.

10. Clear roles and responsibilities in relation to infrastructure management are required.
    - The roles and responsibilities for infrastructure service provision of different organisations, including sub-national and national level governments, must be clearly specified in legislation.
    - At the level of the organisation, responsibility for management of different infrastructure assets should be allocated to specific sections/teams, which should be held accountable for the performance of those assets.

11. An asset register is an essential first step in improving infrastructure asset management, for both private and public good infrastructure.
    - Over time, an asset management system that details the condition of infrastructure assets should be developed. In the roads sector, this would involve the establishment of a road asset management system.
• Smaller operations may benefit most from simple systems using commonly available software solutions (e.g. Open Office or Microsoft Excel).

12. Developing the capacity of organisations responsible for infrastructure management is important.

• Managers should explore how best to attract staff with appropriate skills. The commercialisation of organisations responsible for infrastructure management can be beneficial, given that it enables organisations to offer salaries at a market rate, outside of civil service processes.
• Development partners should continue to provide technical assistance for asset management in areas where capacity is weak.

13. Outsourcing should be considered in some areas.

• Outsourcing can improve infrastructure management where capacity is weak, but only under certain conditions (such as those below).
• Contracted entities must have the requisite skill-base and incentives (specified in the contract) for outsourcing to succeed.

Regional approaches

14. There is scope to reduce unit costs associated with infrastructure provision through harmonisation and duplication of: (i) regulatory arrangements and processes, (ii) corporate governance arrangements, (iii) community service obligation frameworks.

• The establishment of model regulatory rules for each infrastructure sector, for adoption by Pacific island countries on a case by case basis, can support such cooperation.

15. The standardisation of equipment and procedures can also reduce unit costs, by generating economies of scale in the provision of spare parts, technical support, and training.

• Pooling resources for specialist training, advisory services, and for the design and implementation of asset management systems/databases, could reduce unit costs where equipment, systems and processes are standardised.
• Short-term costs associated with standardisation must also be considered.

16. In areas not directly linked to management of trade-related infrastructure, cooperation can also be beneficial.

• Better coordination and liberalisation of air access arrangements could improve regional connectivity.
• Better coordination between Pacific island countries in relation to both air and sea routes would facilitate appropriate investment in airport and port facilities.
• Harmonising customs procedures could lower trade costs and reduce the time taken to clear customs.
• Improving the collection and dissemination of statistics in the region would help governments identify areas where performance can be improved, and could facilitate better management of roads, airports and ports.

17. Explore the provision of regional advisory services for national providers of trade-related infrastructure.

• A regional advisory service could provide expert advice at short notice to national organisations responsible for trade-related infrastructure in the areas of contract negotiation, investment advice, and financial management. The highly successful Pacific Financial Technical Assistance Centre or the Secretariat of the Pacific Maritime Programme could be used as models.

• Such an advisory service would be designed to support the national provision of infrastructure. It would not provide infrastructure services at a regional level nor decide on contract or investment proposals.

• More ambitious proposals for regional regulation or direct service delivery are premature at the present time, given political obstacles.
References


### Annex 1. An Overview of Primary Ports in Selected Pacific Island Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Main Port</th>
<th>Operator</th>
<th>Regulatory arrangements</th>
<th>Ports and terminal handling (exports, days)</th>
<th>Ports and terminal handling (exports, cost $US)</th>
<th>Container throughput (TEU)</th>
<th>Berthing depth (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>Rarotonga</td>
<td>Cook Islands Port Authority</td>
<td>Corporatised SOE that is financially self-sufficient.</td>
<td></td>
<td></td>
<td></td>
<td>5.8</td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Pohnpei</td>
<td>Pohnpei Port Authority (PPA)</td>
<td>Corporatised SOE. PPA controls both Pohnpei International Airport and Pohnpei International Port. Port revenues subsidise airport operations; only 23 percent of PPA revenue comes from the airport, but it receives 61 percent of PPA expenditure.</td>
<td>12</td>
<td>600</td>
<td>2,900</td>
<td>10.5</td>
</tr>
<tr>
<td>Fiji</td>
<td>Nadi</td>
<td>Fiji Ports Corporation Limited</td>
<td>Corporatised SOE. Stevedoring is provided by Ports Terminals Limited in a monopoly arrangement. Ports Terminals Limited is owned by Fiji Ports Corporation Limited.</td>
<td>3</td>
<td>315</td>
<td>56,290</td>
<td>22.6</td>
</tr>
<tr>
<td>Kiribati</td>
<td>Betio</td>
<td>Kiribati Port Authority</td>
<td>Corporatised SOE that is financially self-sufficient.</td>
<td>12</td>
<td>310</td>
<td>6,600</td>
<td>6</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>Majuro</td>
<td>Marshall Islands Ports Authority (MIPA)</td>
<td>Corporatised SOE. MIPA controls both the international airport and port on Majuro. Port operations cross-subsidise airport operations. Majuro airport, which accounts for 74% of net assets, but only 39% of revenue.</td>
<td>11</td>
<td>250</td>
<td>n/a</td>
<td>10</td>
</tr>
<tr>
<td>Nauru</td>
<td>Nauru</td>
<td>Nauru Ports Authority</td>
<td>A government entity that falls under the Ministry of Transport. Facilities and costs are both high compared to other ports in the region.</td>
<td></td>
<td></td>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>Country</td>
<td>Region</td>
<td>Operator</td>
<td>Description</td>
<td>Yr</td>
<td>Revenue</td>
<td>EBITDA</td>
<td>Margin</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------</td>
<td>----------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----</td>
<td>---------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Palau</td>
<td>Koror</td>
<td>Koror State Government</td>
<td>The principal marine port for the country is owned by Koror State government, and operated by a private company, Palau Transfer/Commercial Port (PTCP). User charges are reported to be set unilaterally by the private sector contractor.</td>
<td>9</td>
<td>310</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>Lae</td>
<td>PNG Ports Corporation Limited (PNGPCL)</td>
<td>A corporatised SOE, PNGPCL operates 16 large ports, only two or three of which recover operating costs. Stevedoring is provided by private sector companies.</td>
<td>3</td>
<td>360</td>
<td>130,682</td>
<td>11</td>
</tr>
<tr>
<td>Samoa</td>
<td>Apia</td>
<td>Samoa Port Authority</td>
<td>Corporatised SOE. SPA employs the landlord model under which port infrastructure is leased to private operators, who provide superstructure (e.g. forklifts). SPA itself operates a number of port services, including pilotage and towage services.</td>
<td>9</td>
<td>70</td>
<td>20,000</td>
<td>12</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>Honiara</td>
<td>Solomon Islands Port Authority (SIPA)</td>
<td>SIPA directly operates the port at Honiara, providing all port services.</td>
<td>7</td>
<td>150</td>
<td>13,300</td>
<td>10.5</td>
</tr>
<tr>
<td>Tonga</td>
<td>Nuku'alofa</td>
<td>Ports Authority Tonga Ltd</td>
<td>Corporatised SOE that is financially self-sufficient.</td>
<td>10</td>
<td>170</td>
<td>8,530</td>
<td>12</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>Funafuti</td>
<td>Department of Marine and Port Services</td>
<td>Government department, which directly provides all port services</td>
<td></td>
<td></td>
<td>117</td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>Port Vila</td>
<td>Department of Ports and Harbours</td>
<td>Government department owns the port, which is managed under a 15-year concession by a private company.</td>
<td>7</td>
<td>750</td>
<td>12,600</td>
<td>10.5</td>
</tr>
</tbody>
</table>

66
### Annex 2. An Overview of Primary Airports in Selected Pacific Island Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Main Airport</th>
<th>Operator</th>
<th>Regulatory arrangements</th>
<th>Separation of management and regulatory functions</th>
<th>Passenger movements (latest available)</th>
<th>Return on assets (%), 2010</th>
<th>Return on assets (%), average 2002-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>Rarotonga</td>
<td>Cook Islands Airport Authority</td>
<td>Corporatised SOE. Fees are approved by government, and do not cover expenses. The government provides an annual budget allocation in recognition. Revenue from Rarotonga airport is used to cross-subsidise Aitutaki airport, which CIAA also manages.</td>
<td>No</td>
<td>130,000 (2012)</td>
<td>-1.9</td>
<td>-0.75</td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Pohnpei</td>
<td>Pohnpei Port Authority (PPA)</td>
<td>Corporatised SOE. PPA controls both Pohnpei International Airport and Pohnpei International Port. Port revenues subsidise airport operations; only 23 percent of PPA revenue comes from the airport, but it receives 61 percent of PPA expenditure.</td>
<td>No</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiji</td>
<td>Nadi</td>
<td>Airports Fiji Limited</td>
<td>Corporatised SOE. AFL owns and operates Nadi International Airport and manages 14 other airports on behalf of the Government. Revenue from Nadi airport operations are used to cross-subsidise other loss-making airports.</td>
<td>Yes</td>
<td>1,866,638 (2010)</td>
<td>4.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Kiribati</td>
<td>Bonriki</td>
<td>Ministry of Communication, Transport and Tourism Development</td>
<td>Government department operated at a significant loss, funded by consolidated revenue.</td>
<td>No</td>
<td>22,000 (est, based on international departures)</td>
<td>-12 (est)</td>
<td></td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>Majuro</td>
<td>Marshall Islands Ports Authority (MIPA)</td>
<td>Corporatised SOE. MIPA controls both the international airport and port on Majuro. Port operations cross-subsidise airport operations. Majuro airport, which accounts for 74% of net assets, but only 39% of revenue.</td>
<td>No</td>
<td>0</td>
<td>-3.4</td>
<td></td>
</tr>
<tr>
<td>Nauru</td>
<td>Nauru</td>
<td>Department of Civil Aviation, Ministry of Transport</td>
<td>Government Department. The Department of Civil Aviation both operates and regulates Nauru International Airport. There are approximately 2 departures per week. The infrastructure and operations are subject to safety oversight audits by the International Civil Aviation Organisation (ICAO).</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>Port Moresby Jacksons</td>
<td>National Airport Corporation</td>
<td>NAC was established as a corporatised SOE in 2009, with regulatory functions retained by the civil aviation authority. It is responsible for 22 airports in PNG. Financial statements have not been made public.</td>
<td>Yes</td>
<td>840,000 (2001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>City</td>
<td>Operator</td>
<td>Description</td>
<td>Outsourcing</td>
<td>PAX 2010/11</td>
<td>PAX %</td>
<td>PAX % change</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>-----------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------</td>
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<td>--------------</td>
</tr>
<tr>
<td>Samoa</td>
<td>Faleolo</td>
<td>Samoa Airport Authority</td>
<td>Corporatised SOE. All commercial airports in Samoa are owned and operated by SAA</td>
<td>No</td>
<td>350,439</td>
<td>-2.7</td>
<td>-2.0</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>Honiara</td>
<td>Ministry of Communication and Aviation</td>
<td>Government Department. Reforms aimed at outsourcing airport management through a concession have been underway since 2012.</td>
<td></td>
<td>106,467</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>Fua'amotu</td>
<td>Tonga Airports Limited</td>
<td>Corporatised SOE. Established in 2007, TAL operates the 6 airports of Tonga.</td>
<td>No</td>
<td>148,276</td>
<td>-2.4</td>
<td>-1.5</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>Funafuti</td>
<td>Department of Civil Aviation, Ministry of Transport and Communications</td>
<td>Government Department. There are approximately 1-2 departures per week.</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>Bauerfield</td>
<td>Airports Vanuatu Limited</td>
<td>Corporatised SOE responsible for the 3 most significant airports in Vanuatu. The Civil Aviation Authority of Vanuatu (CAAV) is responsible for regulatory functions.</td>
<td>Yes</td>
<td>311,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 3. An Overview of Primary Road Management in Selected Pacific Island Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Service Provider/s</th>
<th>Private sector participation in construction/maintenance</th>
<th>Road/Transport fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>Public Works Department</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Pohnpei Transport Authority (PTA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Kosrae State Department of Transportation and Public Works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Chuuk State Division of Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federated States of Micronesia</td>
<td>Yap State Public Works Department (PWD)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Fiji</td>
<td>Fiji Roads Authority</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Kiribati</td>
<td>Ministry of Public Works – primary roads</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Island Councils – secondary roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nauru</td>
<td>Department of Transport</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Niue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palau</td>
<td>Bureau of Public Works</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>National roads – Department of Works and Implementation; National Road Authority</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Provincial and Local roads – Provincial Governments and city councils</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Republic of the Marshall Islands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>Public Works Department</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>Ministry of Infrastructure Development</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tonga</td>
<td>Ministry of Works (MOW) responsible for primary roads. Secondary roads are managed by communities with government funding</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>Department of Public Works</td>
<td>Yes (donor-funded construction)</td>
<td>No</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>Public Works Department</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>