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CLOSING THE DISTANCE

PARTNERSHIPS FOR SUSTAINABLE AND RESILIENT TRANSPORT SYSTEMS IN SIDS

UNITED NATIONS

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Partnerships for sustainable and resilient transport systems in SIDS

UNITED NATIONS

NEW YORK AND GENEVA, 2014

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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

FIGURES

TABLES

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ABBREVIATIONS

ADB	Asian Development Bank
AfDB	African Development Bank
CARICOM	Caribbean Community and Common Market
CCA	Climate change adaptation
CDB	Caribbean Development Bank
CISRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DRM	disaster risk management
DRR	disaster risk reduction
DWF	distant water fleets
EAC	entry assurance certificate
ECE	Economic Commission for Europe
ECLAC	United Nations Economic Commissions for Latin America and the Caribbean
ECSA	East Coast of South America
EEDI	Energy Efficiency Design Index
EEZ	exclusive economic zone
GATS	General Agreement on Trade in Services (World Trade Organization)
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GNI	gross national income
IFC	International Finance Corporation (World Bank)
IOC	Indian Ocean Commission
IMF	International Monetary Fund
IMO	International Maritime Organization
IPCC	International Panel on Climate Change
JICA	Japan International Cooperation Agency
JNAP	Joint National Action Plan
LSCI	Liner Shipping Connectivity Index (UNCTAD)
MSC	Micronesian Shipping Commission
NAPA	National Adaptation Plan of Action
ODA	official development assistance
OPEC	Organization of the Petroleum Exporting Countries
PIANC	World Association for Waterborne Transport Infrastructure
PICTA	Pacific Island Countries Trade Agreement
PNA	Parties to the Nauru Agreement
PNW	Pacific North West
PPP	public-private partnership
SARUA	Southern African Regional Universities Association
SDGs	sustainable development goals
SEEMP	Ship Energy Efficiency Management Plan
SIDS	Small Island Developing States
SOE	state owned enterprise
SPC	Secretariat of the Pacific Community
SSI	Sustainable Shipping Initiative
TEU	twenty-foot equivalent unit
UNFCCC	United Nations Framework Convention on Climate Change
WCNA	West Coast of North America
WCSA	West Coast of South America
WTO	World Trade Organization

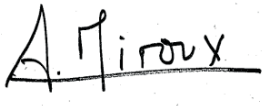
Message from the Director

The Third International Conference on the Small Island Developing States was held on 1-4 September 2014, in Samoa (Samoa Conference). The Samoa Conference provided a timely opportunity for the international community to renew its commitment to addressing the transport and trade logistics challenges facing the Small Island Developing States (SIDS). In this context and against the background of the 2014 "International Year of SIDS" and the ongoing negotiations of the post-2015 development agenda, this report is intended as an UNCTAD contribution to the Samoa Conference and, more generally, to the broader sustainable development agenda of SIDS. The report informs about the maritime transport situation in SIDS and underscores the strategic importance of this economic sector for SIDS economies and communities. The overall objective is to help raise awareness about the role of sustainable and resilient maritime transport infrastructure and services for the sustainable development prospects of SIDS.

The SIDS grouping includes nations that vary in land, topography, population, resources, and levels of development. However, their transport systems face common obstacles that undermine their global, regional, and local connectivity to communities, markets and services. Latest data and developments in transport underscore the disadvantages facing SIDS and their inability to keep pace with ever larger vessel sizes, industry consolidation and globalized liner shipping networks that are driven by scale economies. The transport hurdles and vulnerabilities faced by SIDS are inherent to their economic, social and environmental make up. The complexity and intertwined nature of these challenges are further compounded by rising economic and environmental concerns. Together, economic, financial and energy crises and, more critically, environmental degradation and climate change threaten the very existence of SIDS, world hotspots of natural biodiversity and marine resources.

Drawing from their resources and experience and with the support of development partners, SIDS can take action to alleviate their transport related constraints by promoting sustainability and enhancing resilience to shocks and disruptions including from climatic factors and natural disasters. Sustainable and resilient transport systems in SIDS can have broader economic effects given the underlying linkages between transport and key sectors such as tourism, fisheries and agriculture. Relevant action may include building the climate resilience of transport systems through adequate adaptation action and promoting sustainability through enhanced energy efficiency as well as greater use of alternative energy sources and clean technologies. For these efforts to materialize, scaling up investment levels, earmarking funds for transport and diversifying sources of funding including through private and public partnerships is of the essence. Building the capacity of SIDS to tap into existing as well as emerging and innovative financing sources and mechanisms is equally important.

This report provides an overview of the maritime transport situation in SIDS and presents data on relevant aspects, including shipping connectivity levels, direct and indirect shipping services, port issues, as well as trade structure and patterns. Relevant cross-cutting concerns such as SIDS high dependency on fossil fuel energy imports, exposure to climate change impacts and natural disasters as well as financial and human capacity constraints are also addressed. The report points to relevant opportunities which could be capitalised upon to support SIDS sustainable development and “blue growth”. Finally, and drawing largely upon insights gained at the UNCTAD’s Ad Hoc Expert Meeting on "Addressing the Transport and Trade Logistics Challenges of the Small Island Developing States (SIDS): Samoa Conference and Beyond” held on 11 July 2014 in Geneva, the report concludes with a number of suggestions and recommendations for the way forward.



Anne Miroux
Director, Division on Technology and Logistics
Geneva, 6 May 2015

EXECUTIVE SUMMARY

By their very nature, Small Island Developing States (SIDS) are heavily dependent on transport for access, trade and mobility. Maritime transport in particular, is the lifeline sustaining the survival of SIDS, given their size, geography, economic structure and high dependence on maritime transport-intensive imports for much of their consumption needs.

This report aims to improve the understanding of the key issues at the interface between maritime transport, sustainability and resilience. It identifies gaps and needs facing the maritime transport sector in SIDS and highlights potential response measures with a view to more sustainable and resilient maritime transport systems. By providing a snapshot of the current situation of the maritime transport in SIDS and presenting original maritime transport-related data that cover all SIDS, the report is helping to fill an important information gap resulting from insufficient and fragmented information and data pertaining to the maritime transport situation of SIDS.

Following a general introduction, Chapter II provides an overview of SIDS profiles, including relevant factors driving their vulnerability. Chapter III describes the maritime transport situation in SIDS and underscores the strategic importance of the sector not only as an economic sector in its own right, but also as a critical component that can determine the performance of other productive activities such as trade, tourism and fisheries. Relevant cross-cutting concerns, including climate change and disaster risks in Chapter IV, energy efficiency and sustainability in Chapter V and cross-sectoral inter-linkages in Chapter VI are highlighted. Drawing largely from the expert discussions at the UNCTAD Ad Hoc Expert Meeting on "Addressing the Transport and Trade Logistics Challenges of Small Island Developing States: Samoa Conference and Beyond" held on 11 July 2014, Chapter VII concludes with some suggestions and recommendations on the way forward and identifies some priority areas for action. It further notes potential opportunities that may arise as SIDS initiate a shift towards an "ocean-based" and" blue growth" development path.

SIDS specific features

The specific features that drive SIDS unique economic, social and environmental vulnerability and undermine their transport and trade are grouped into five categories. The first feature is smallness. SIDS are unable to benefit from economies of scale, have small land areas, economies and markets and low trade volumes, and suffer from insufficient economic base for manufacturing processes. Remoteness means that SIDS are positioned at significant distances from markets and sources of supply and are marginalised from the main shipping routes and networks. Insularity heightens SIDS dependency on maritime and air transport for access, trade and mobility. SIDS are also acutely vulnerable to external factors and environmental threats, including natural disasters, climate change impacts and global economic shocks. Many SIDS are confronted with constraints related to their ability to access finance. The challenges resulting from these features are further amplified by a number of emerging trends, including (a) ever larger ship sizes, especially container carriers which raise scale issues; (b) more stringent requirements for faster, safer, more reliable and cost effective logistics; (c) fuel costs and energy price volatility; (d) heightened fossil fuel energy dependency; and, (e) climate change.

As the challenges are multiple and multi-faceted, SIDS national development strategies need to focus on a portfolio of measures that address the transport-related challenges of SIDS while at the same time capitalising on existing synergies and complementarities involving other sectors such as trade, tourism and fisheries. Relevant response measures should aim to reduce transport costs, improve transport infrastructure and services, build climate preparedness and resilience and promote affordable and low-carbon maritime transport systems that are energy efficiency and less fossil fuel dependent. Overcoming these challenges requires that adequate levels of funding be mobilised and that more diversified sources of finance, including innovative financing solutions be promoted.

Maritime transport and trade logistics

Smallness, insularity, remoteness and vulnerability to external factors and environmental threats translate into high transport costs, low shipping connectivity including liner shipping connectivity, infrequent shipping services, delays at ports and heavy reliance on indirect connections that often require several transhipment moves. Together, these elements undermine the trade competitiveness of SIDS, raise their import costs, drain their national budgets and constrain their strategic productive sectors such as fisheries and tourism. Concentrated markets that raise shipping and port services together with low trade volumes and imbalances in flows are also undermining SIDS transport and trade competiveness. To address low trade volumes and imbalances national governments and the international community may need to intervene by subsidizing shipping and port services to ensure a minimum service frequency and quality. Meanwhile, liner shipping connectivity can be improved and cargo imbalances reduced through better linkages between national cabotage services and regional and international liner networks. Sometimes, an international line could also help connect different islands within a country island if cabotage services are not reserved for national carriers. Promoting the containerization of a greater selection of export cargoes can also help reduce imbalances affecting containerized trade.

Maritime, port and competition authorities in SIDS need to monitor the level and costs of services provided by maritime transport providers. SIDS need more effective means of monitoring the level and adequacy of shipping and port services as well as freight rates, ancillary charges and port charges. Port pricing, private sector participation, infrastructure investments, trade facilitation and Customs reforms are important tools that can help enhance seaports' attractiveness for shippers and shipping lines.

Climate change adaptation and disaster risk reduction

Challenges facing the transport and trade logistics of SIDS are compounded by environmental vulnerabilities and threats including climate change and the associated need to adapt and build the resilience of transport infrastructure and services. SIDS need to invest in the resilience of coastal transport infrastructure, including through mainstreaming climate change adaptation and disaster risk reduction into national development plans, policies, legislation and budgeting. Equally, policy makers need to monitor and assess geophysical and climate change risks and incorporate them into their development planning.

Relevant information on natural disasters and climate change need to be collected and analysed for informed decision making. Efficient risk management strategies require reliable information, including accurate data on economic loss and probabilistic modelling for future disasters. Priority should be given to risk management strategies that combine adaptation to climate change and risk reduction measures.

The international community and regional organizations can help SIDS establish accurate risk assessments and enable relevant technology transfer. They can also help in the development of guidelines, checklists, and other tools in support of disaster risk reduction and climate change adaptation, including through the compilation of existing best practices. They can promote dialogue, cooperation, information-sharing and partnerships among all stakeholders and interested parties.

Energy efficiency and sustainability

Saving on energy expenditure and promoting more sustainable transport systems are of particular importance for SIDS. Various strategies can enable sustainable transport systems generally and maritime transport in particular. For instance, investing in transport infrastructure and improving connectivity can help linking remote/rural areas and small islands to national and regional markets while, at the same time, improving efficiency and reducing fuel consumption. Fuel efficiency can also be improved by promoting sustainable shipping and ports, enabling energy efficient vessels, fostering efficient freight transport operations and logistical systems, and investing in clean and energy efficient technologies. Promoting sustainable maritime transport will create spillover effects by reducing costs and dependency on imported fossil fuels as well as alleviating SIDS vulnerability to shocks arising from adverse energy market developments and price volatility. To be successful, sustainable maritime transport strategies need, however, to take into account SIDS underlying local and regional conditions, challenges and opportunities.

Collaborative efforts at national and regional levels should aim to advance sustainability and energy efficiency in transport and maritime transport, in particular through robust policies and strategies, spanning various areas, including finance and capacity building.

Funding levels and access to finance

Addressing the transport and trade logistics challenges facing SIDS requires significant investments and financing. At the same time, however, many SIDS are confronted with the additional challenge of limited access to finance. In this context, national development strategies will need to examine the financing situation of SIDS, including their ability to access concessional and blending loans with a view to developing their transport infrastructure and services.

SIDS need to promote collaborative approaches between public and private investment partners while multilateral and regional development banks need to establish new long-term financing instruments and mechanisms that are tailored to meet SIDS requirements, including for example by ensuring their suitability for smaller and medium-sized developers and for smaller scale projects. SIDS should also draw on new financing sources, such as remittances and climate finance, and novel mechanisms, such as the Green Climate Fund, infrastructure bonds, green bonds, public private partnerships (PPPs) and blended finance.

Regional, sub-regional and national development banks can play an important complementary role to that of governments. Development banks in particular are better positioned to respond to national and regional needs and can play an effective role in providing financing or risk mitigation mechanisms especially for projects that require large initial investments and regional coordination mechanisms.

Many SIDS receive little development aid and have limited access to affordable finance from multilateral lenders due to their classification as middle-income countries. In view of the acute vulnerability of SIDS and the specific transport/maritime transport challenges facing these small island countries, the use of the GDP per capita criteria needs to be revisited.

The role of development partners

The specific transport and trade logistics challenges facing SIDS are yet to be fully understood and require urgent attention. Experts at the UNCTAD Ad Hoc Expert Meeting held in Geneva, on 11 July 2014, agreed that addressing the transport and trade logistics challenges facing SIDS and their marginalisation from relevant transport and trading networks required a set of policies at national, regional and international levels. They also agreed that that SIDS needed capacity building in different areas including transport connectivity, infrastructure development and maintenance. Acquiring the relevant know-how, knowledge and having access to requisite financial resources are also key. Actions spanning the transport sector as well as other areas such as trade, finance, energy efficiency, environmental protection, and climate resilience are needed. A new framework where SIDS could effectively integrate into relevant regional and international transport and trading networks should be promoted. This requires SIDS to work together, pull their resources and maximize value and share gains. But it also requires the commitment and active involvement of development partners in providing technical assistance and finance.

Experts at the Ad Hoc Expert Meeting further agreed that while the Samoa Conference was an important milestone for advancing the transport agenda of SIDS, there was also a need to set the ground work and plan for beyond the Samoa Conference to ensure effective progress and implementation of concrete response measures. UNCTAD will continue to support SIDS through its three pillars of work, notably research and analysis, consensus building and technical assistance. It will also continue to promote effective partnerships that enable more sustainable and resilient transport infrastructure and services, including in the maritime transport sector. Relevant action may include compiling SIDS relevant data, monitoring emerging trends, analysing SIDS transport-related issues and providing tailored technical assistance and advisory services.

I. INTRODUCTION

Small Island Developing States[1] (SIDS) are a heterogeneous group of islands that share some common features that make them economically, socially and environmentally vulnerable. Spread over four regions, namely the Caribbean, the Indian Ocean, West Africa and the Pacific, SIDS are particularly small, remote, insular and highly exposed to natural disasters and climate change risks.

"Smallness" in terms of area, population and economies constitutes a key driver of vulnerability as it also implies small domestic markets with limited scope for exploitation of economies of scale; a narrow resource base leading to limited export opportunities; and the production of a narrow range of crops, minerals and manufactures which in turn leads to high dependence on imports (including food, fuel and manufactures). A high level of specialization in exports and dependence on imports increases exposure to global economic and financial shocks, including price volatility. Small economies and populations limit employment opportunities and can lead to high migration rates especially of skilled human resources and to a narrowing of the skill base. High migration rates can also generate a positive feedback through the remittances sent back by migrants. Meanwhile, insularity and remoteness are inherent to SIDS and contribute to heightening their vulnerability as remoteness, distance and isolation drive transport costs.

Together these features underscore the importance of transport and, more specifically, maritime transport for SIDS' access and mobility at the national level as well as for their connectivity and integration into the regional and international transport and trading networks. Seaports and airports, in particular, are the lifelines sustaining the survival of SIDS, given their high dependence on transport-intensive imports for much of their consumption needs. The long and indirect transport routes combined with relatively low and imbalanced import and export volumes can have a significant impact on transport costs. In this context, considerations of ship economics and indivisibilities in associated seaport infrastructure, superstructure and equipment can all drive up transport costs, reduce the competitiveness of exports and increase the costs of imports. Additionally, many SIDS are located unfavourably in relation to global weather systems and on the edges of tectonic plates which increase exposure and vulnerability to disasters of meteorological and tectonic origin, including climate change, tsunamis and earthquakes.

Recognizing the unique challenges associated with being a SIDS, the United Nations system has carried out work over the last two decades to help these island countries address their vulnerabilities. In 1992 the United Nations Conference on Environment and Development (Earth Summit) explicitly recognized SIDS as a distinct group of developing countries presenting special developmental challenges based on their economic, environment and social vulnerabilities. In 1994 the Barbados Programme of Action (BPOA) for the Sustainable Development of SIDS was finalized and adopted. In 2005 the Mauritius Strategy for Implementation of the Programme of Action for the Sustainable Development of SIDS (MSI) reviewed and revamped the Barbados Programme. In 2012, the Rio+20 Conference and its outcome document reiterated the commitment of the international community to enabling effective progress toward sustainable development of SIDS. These landmark events have repeatedly recognized the challenges brought by smallness, remoteness, insularity as well as climate and natural disaster vulnerability. They have emphasized the importance of transport for SIDS and the need to address the related challenges, including their relatively high transport costs. Nevertheless, many of the challenges that were identified decades ago remain ever more present today.

Against this background, the present report was intended as an UNCTAD contribution to the Samoa Conference and its deliberations and aims to inform negotiations of the Post-2015 Development Agenda. Its main objective is to help advance the SIDS transport agenda at all levels and reflect on how best to deliver on the principles laid down in BPOA, MSI and the Rio+20 Conference. The report highlights the importance of the transport sector, in particular maritime transport, for SIDS and underscores the need to address the associated challenges as a pre-condition for achieving their sustainable development objectives. By providing a snapshot of the current situation of the maritime transport in SIDS and presenting original maritime transport-related data that cover all SIDS, the report helps to fill an important information gap resulting from insufficient and fragmented information and data pertaining to the maritime transport of SIDS.

II. PROFILE OF SIDS: FACTORS DRIVING VULNERABILITY

This chapter highlights some of the physical, social and economic features that contribute to the vulnerability of SIDS (see table 2.1). These characteristics, which vary depending on the particular island country, can be summarized as follows: islands countries with small land areas; small populations, with some of the highest and the lowest population densities in the world; large populations in relation to agricultural land; remoteness; small economies when measured in terms of gross domestic product (GDP); with some of the highest and lowest income per capita figures; relatively high ratios of imports of goods and services to GDP (much of which is merchandise imports) and low ratios of merchandise exports to GDP; and high imbalance between merchandise imports and exports.

A. Geography and demography

Table 2.1 features some data on the demographics and physical characteristics of SIDS. The land area of SIDS ranges from 20 square kilometres (km^2) to over 450 000 km^2, the two smallest islands being Nauru (20 km^2) and Tuvalu (30 km^2) and the largest island being Papua New Guinea (452 860 km^2). Seventeen out of the 29 SIDS considered as part of this analysis have land areas less than 1 000 km^2, five have an area between 1 000 and 10 000 km^2 and six have an area between 10 000 and 28 000 km^2. To put these sizes in perspective, the urban area of Paris at 2 845 km^2 is more than the area of 20 of these SIDS.

Many SIDS are not only small but are, themselves made up of numerous small islands. For example, Bahamas, Fiji, Kiribati, Maldives, Marshall Islands, Micronesia (Federated States of), Papua New Guinea, Seychelles, Solomon Islands, Tonga and Vanuatu, all have 30 or more islands. This introduces additional challenges of domestic connectivity for people and goods, including the collection of exports and distribution of imports. Annex I provides further information on the size distribution of islands comprising SIDS.

SIDS may have small land areas, but are also Large Ocean States.[2] The 200-nautical mile exclusive economic zone (EEZ) of many SIDS, mainly located in the Pacific Ocean, Indian Ocean and off the coast of West Africa, is very large. The area of the EEZ of the eight members of the Parties to the Nauru Agreement (PNA), for example, is 14 million square kilometres, which is nearly the area of the Russian Federation and nearly twice the area of Australia. While this vast area presents opportunities in terms of fisheries and extraction of minerals under the seabed, it nevertheless, imposes immense responsibilities on such small nations for the sustainable management of these resources.[3]

Everything else being equal, small land areas are associated with small populations. The country with the smallest population is Tuvalu with 9 860 people, followed by Nauru with 10 032 people and Palau with 20 754 people. A total of 13 SIDS have a population of around 100 000 or less. For the smallest of these, the whole population of the island would fill only 20 per cent of a football stadium. Meanwhile, for the largest, the whole population could fit in two stadiums. Of the remaining SIDS, 11 have a population ranging between 100 000 and one million while five have a population of over one million. Papua New Guinea is the largest with a population of around 7.2 million.

When it comes to population density, the figures are mixed. On the one hand, Maldives, Barbados and Mauritius are in the global top 20 of high population density countries, ranked 10, 13 and 14 respectively. These are followed by Comoros, Tuvalu, Grenada, Saint Lucia, Marshall Islands, Saint Vincent and the Grenadines, Trinidad and Tobago and Jamaica which are ranked in the top 50. On the other hand, Vanuatu, Solomon Islands and Papua New Guinea are ranked 200, 202 and 215 respectively, having amongst the world's lowest densities. A measure of the pressure that population is placing on agricultural land (and also suggesting the necessity to import food) is the population per square kilometre of agricultural land area. Against this measure, Maldives, Seychelles, Nauru, Bahamas, Trinidad and Tobago, Barbados, Saint Lucia and Saint Vincent and the Grenadines have high densities.

Finally, remoteness can be measured by distance weighted by GDP of the partner country. Data from 2003 for this measure are taken from the Pasifika Interactions Project[4] and are only available for Caribbean and Pacific countries. The weighted distance of Caribbean islands was between 7 391 and 8

502 kilometres. Relevant countries were ranked between 70 and 126 out of 219 countries. In the Pacific, the Micronesian countries of Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru and Palau are ranked between 171 and 188 with the remainder being ranked between 195 and 214 including Vanuatu, Fiji and Tonga which are ranked amongst the most remote.

Table 2.1 Physical and demographic profiles

Region/ Country	Land area (km^2)	Agricultural area (km^2)	Islands and atolls	EEZ (km^2)	EEZ: Land area ratio	Population (2012)	Population density (per km2 of land area)	Population density rank (global)	Population density (per km2 of agricultural land area)	Remoteness (distance by GDP of other countries, 2003)	Remoteness rank (out of 219 countries)
Caribbean											
Antigua and Barbuda	440	90	18	107 914	245	89 069	202	55	990	7 991	90
Bahamas	10 010	150	1 897	629 293	45	371 960	37	172	2 480	7 391	70
Barbados	430	150	1	186 107	433	283 221	659	13	1 888	8 291	112
Dominica	750	260	1	28 626	38	71 684	96	103	276	8 121	102
Grenada	340	110	58	26 158	77	105 483	310	35	959	8 371	117
Jamaica	10 830	4 490	47	263 283	24	2 768 941	256	46	617	7 952	88
Saint Kitts and Nevis	260	60	2	10 201	39	53 584	206	52	893	8 003	93
Saint Lucia	610	110	9	15 484	25	180 870	297	39	1 644	8 227	106
Saint Vincent and the Grenadines	390	100	65	36 314	93	109 373	280	42	1 094	8 291	111
Trinidad and Tobago	5 130	540	37	77 502	15	1 337 439	261	45	2 477	8 502	126
Indian Ocean											
Comoros	1 861	1 550	21	164 691	88	717 503	386	24	463		
Maldives	300	70	900	916 189	3 054	338 442	1 128	10	4 835		
Pacific											
Fiji	18 270	4 276	463	1 281 122	70	874 742	48	153	205	12 218	211
Kiribati	810	340	183	3 437 345	4 244	100 786	124	81	296	10 809	185
Marshall Islands	180	130	924	1 992 232	11 068	52 555	292	40	404	10 335	176
Micronesia (Federated States of)	700	220	477	2 992 597	4 275	103 395	148	70	470	10 301	173
Nauru	20	4	1	308 502	15 425	10 032	502		2 508	10 943	188
Palau	460	50	114	604 289	1 314	20 754	45	162	415	10 205	171
Papua New Guinea	452 860	11 900	1 519	2 396 214	5	7 167 010	16	215	602	11 407	195
Samoa	2 830	350	13	131 812	46	188 889	67	138	540	11 874	207
Solomon Islands	27 990	910	1 379	1 597 492	55	549 598	20	202	604	11 574	203
Timor-Leste	14 870	3 600	4	77 256	5	1 114 106	75	116	309		
Tonga	720	310	172	664 853	886	104 941	146	71	339	12 410	214
Tuvalu	30	18	69	751 797	25 060	9 860	329	32	548	11 479	198
Vanuatu	12 190	1 870	156	827 891	68	247 262	20	200	132	12 160	210
West Africa											
Cape Verde	4 030	750	36	796 840	198	494 401	123	83	659		
Sao Tome and Principe	960	487	18	165 364	172	188 098	196	58	386		

Sources:

1. Land areas: FAO land areas, agricultural areas and forest areas.

2. Number of islands and atolls: United Nations Environment Programme /World Conservation Monitoring Centre. Global Distribution of Islands. 2010.

3. EEZ: VLIZ (2014). Maritime Boundaries Geodatabase, version 8. Available online at http://www.marineregions.org/ (accessed 8 August 2014).

4. Population: United Nations Department of Economic and Social Affairs, Population Division (2013). World Population Prospects: The 2012 Revision (medium fertility, 2010–2100).

5. Remoteness (distance): Gibson J (2006) Are Pacific Island Economies Growth Failures? Working Paper #3. Pasifika Interactions Project.

B. Economic growth and trade

1. Economic growth

Table 2.2 features some macroeconomic indicators in SIDS. Trinidad and Tobago recorded the highest GDP in 2012 (with $23 320 million), followed by Papua New Guinea ($15 654 million), Jamaica ($14 755 million) and Mauritius ($10 486 million). These countries were ranked 99th, 113th, 114th and 126th in world GDP ranking (out of 185 countries with data available). The remaining SIDS are very much at the tail end of world rankings.

When considering income per capita, the position for SIDS improves significantly, particularly in the Caribbean region. Bahamas has the highest income per capita ($20 600) and ranked 33rd globally, followed by Barbados (40th), Trinidad and Tobago (41st), Saint Kitts and Nevis (45th) and Antigua and Barbuda (51st). Seychelles ranked 54th ($12 180) while, Comoros as well as the Pacific and West African SIDS ranked much lower. For example, Kiribati ranked 121st, Papua New Guinea ranked 128th and Solomon Islands 144th. Sao Tome and Principe is ranked 138th and Comoros 153rd.

Over the ten-year period 2003 to 2012, a number of SIDS have registered growth rates of more than four per cent. These included Cape Verde, Maldives, Mauritius, Papua New Guinea, Sao Tome and Principe, Solomon Islands, Timor-Leste, Trinidad and Tobago, and Vanuatu. The countries with slow growth rates (less than one per cent) included Bahamas, Jamaica, Micronesia (Federated States of) and Tonga. The 2007–2008 global financial crisis has, substantially impacted the economies of SIDS with many SIDS in 2009 recording negative growth rates. Some of the more seriously hit included Antigua and Barbuda, Bahamas, Barbados, Grenada, Saint Kitts and Nevis, Maldives, Palau and Samoa.

2. Merchandise trade

(a) Trade to GDP ratios

The trade to GDP ratios of SIDS are comparatively high, with the average exceeding 100 per cent.[5] The magnitude of these ratios reflects the fact that SIDS are small open economies that rely heavily on trade but also their vulnerability to external factors including economic shocks and volatility of growth and prices.[6] The extent of trade dependency varies among SIDS with some countries such as Fiji, Maldives, Nauru, Seychelles, Solomon Islands, Tuvalu, and Trinidad and Tobago recording high trade to GDP ratios and others such as Comoros, Jamaica, Palau, St. Kitts and Nevis, St. Lucia, Timor Leste and Tonga having lower ratios.

(b) Composition of trade

There is no general common pattern that distinguishes the structure of SIDS trade. Both exports and imports vary widely from one country to another, although in some cases, SIDS show some commonalities in terms of their trade flows and composition.

For a small number of countries (mainly in the Pacific islands group) export of agricultural raw materials represents between 3 and 6 per cent of merchandise exports (see table 2.3). However, in the case of the Solomon Islands, it is 32.6 per cent (including exports of timber). Food is a significant export for many SIDS representing over 50 per cent of merchandise exports (in most case more than 75 per cent). Examples include Antigua and Barbuda, Cape Verde, Fiji, Kiribati, Maldives, Sao Tome and Principe, Saint Vincent and the Grenadines, Tonga and Vanuatu. Jamaica, Barbados Papua New Guinea and Trinidad and Tobago are exporters of fuel.

Table 2.2 Macroeconomic profiles

Country	GDP ($ million, 2012)	GDP rank (out of 185 countries with data)	Economic growth average (2003–2012)	Economic growth 2009	Income per capita ($, 2012)	Income per capita rank (out of 179 countries) with data)
Caribbean						
Antigua and Barbuda	1 134	167	2.1	-12.0	12 480	51
Bahamas	8 149	136	0.5	-4.2	20 600	33
Barbados	4 225	150	1.2	-4.1	15 080	40
Dominica	480	178	2.8	-1.1	6 440	75
Grenada	767	174	1.8	-6.7	7 220	70
Jamaica	14 755	114	0.5	-3.5	5 130	90
Saint Kitts and Nevis	767	173	2.0	-6.0	13 610	45
Saint Lucia	1 239	166	2.5	0.4	6 890	73
Saint Vincent and the Grenadines	713	175	2.2	-2.3	6 400	76
Trinidad and Tobago	23 320	99	4.5	-4.4	14 710	41
Indian Ocean						
Comoros	596	177	2.0	1.9	840	153
Maldives	2 222	160	5.8	-4.7	5 750	81
Mauritius	10 486	126	4.2	3.0	8 570	65
Seychelles	1 129	168	3.1	-0.2	12 180	54
Pacific						
Fiji	3 908	152	1.2	-1.3	4 110	98
Kiribati	175	184	1.8	-0.6	2 520	121
Marshall Islands	182	183	2.1	-1.3	4 040	99
Micronesia (Federated States of)	326	180	0.2	0.7	3 230	112
Nauru	na	na	-2.0	0.0	na	na
Palau	228	182	1.9	-4.6	9 860	58
Papua New Guinea	15 654	113	5.8	5.5	1 790	128
Samoa	684	176	1.9	-5.4	3 260	111
Solomon Islands	1 008	169	5.5	-1.0	1 130	144
Timor-Leste	1 293	165	8.7	12.8	3 620	103
Tonga	472	179	0.6	-1.0	4 220	96
Tuvalu	40	185	1.6	-1.7	5 650	na
Vanuatu	787	172	4.5	3.5	3 000	115
West Africa						
Cape Verde	1 827	162	4.6	-1.3	3 830	101
Sao Tome and Principe	263	181	5.4	4.0	1 310	138

Source:
1. GDP: World Bank, World Development Indicators, GDP (current, $).
2. Economic growth and inflation: ESCAP, Economic and Social Survey for Asia and the Pacific; ECLAC, Economic Survey of Latin America and the Caribbean; and African Statistical Yearbook, various years.
3. Income per capita: World Bank, World Development Indicators, GNI per capita, Atlas method (current, $).
4. Import and export shares: World Bank, World Development Indicators, imports of goods and services (percentage of GDP) and exports of goods and services (percentage of GDP).

Table 2.3 Commodity groups as a percentage of merchandise exports (2012)

Country	Agricultural raw materials*	Food	Fuel	Manufactures	Ores and metals exports
Antigua and Barbuda	0.0	56.8	0.0	40.4	2.7
Bahamas	0.4	24.4	0.0	68.5	6.7
Barbados	0.4	31.5	10.8	55.4	0.8
Cape Verde	0.0	87.1	0.0	12.9	0.0
Comoros	..	..	..	..	..
Dominica	0.0	13.7	0.0	74.0	12.2
Fiji	4.9	66.0	0.0	25.9	2.3
Grenada	..	..	..	..	..
Jamaica	0.1	22.5	23.9	45.0	8.4
Kiribati	5.2	87.7	0.0	10.6	0.3
Maldives	0.0	96.8	0.0	0.1	1.7
Marshall Islands	..	..	..	..	..
Mauritius	0.4	36.0	0.0	61.7	0.9
Micronesia (Federated States of)	..	..	..	..	..
Palau	..	..	..	..	..
Papua New Guinea	6.3	27.1	1.7	10.0	54.6
Samoa	0.1	30.6	0.0	65.5	0.3
Sao Tome and Principe	0.3	87.2	0.7	11.6	0.1
Seychelles	..	..	..	..	..
Solomon Islands	32.6	16.6	0.0	0.0	0.2
Saint Kitts and Nevis	0.0	11.8	0.0	87.3	0.1
Saint Lucia	..	..	..	..	..
Saint Vincent and the Grenadines	0.0	83.8	0.0	13.7	2.5
Timor-Leste	..	..	..	..	..
Tonga	4.9	76.0	0.0	16.6	2.5
Trinidad and Tobago	..	..	..	..	..
Tuvalu	..	..	..	..	..
Vanuatu	2.8	85.3	0.1	8.2	1.6

Source: World Bank DataBank, World Development Indicators, http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators.

** Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding divisions 22, 27 (crude fertilizers and minerals excluding coal, petroleum and precious stones) and 28 (metalliferous ores and scrap).*

A number of SIDS are endowed with various minerals, with exports of ores and metals being reported for a number of countries; the largest by far being Papua New Guinea with 54.6 per cent of exports. Meanwhile, manufactures are also a relatively significant export for many SIDS. These represent for example over 40 per cent of merchandise exports for Antigua and Barbuda, Bahamas, Barbados, Dominica, Jamaica, Mauritius, Samoa and Saint Kitts and Nevis. As to imports of SIDS, in very broad terms, commodity breakdowns are 25 per cent food, 25 per cent fuel and 50 per cent manufacture (see table 2.4).

Table 2.4 Commodity groups as a percentage of merchandise imports (2012)

Country	Agricultural raw materials	Food	Fuel	Manufactures	Ores and metals exports
Antigua and Barbuda	1.9	37.3	0.9	59.0	0.8
Bahamas	1.3	15.9	24.0	54.3	0.8
Barbados	1.1	19.0	31.0	47.9	0.7
Cape Verde	1.1	27.9	14.6	55.4	0.8
Comoros	..	..	..	..	..
Dominica	2.0	24.9	22.2	50.2	0.6
Fiji	0.3	21.1	30.1	46.5	1.1
Grenada	..	..	..	..	..
Jamaica	0.6	16.6	36.3	44.4	0.3
Kiribati	0.8	33.7	16.5	46.9	0.8
Maldives	2.0	21.2	31.3	43.3	2.1
Marshall Islands	..	..	..	..	..
Mauritius	2.0	21.6	21.0	54.2	1.2
Micronesia (Federated States of)	..	..	..	..	..
Palau	..	..	..	..	..
Papua New Guinea	0.4	11.0	17.1	69.7	0.4
Samoa	2.5	25.7	22.7	45.7	0.7
Sao Tome and Principe	0.8	30.4	25.7	42.2	0.9
Seychelles	..	..	..	..	..
Solomon Islands	0.7	18.3	26.9	18.6	0.1
Saint Kitts and Nevis	1.9	23.7	2.8	70.6	1.0
Saint Lucia	..	..	..	..	..
Saint Vincent and the Grenadines	1.4	24.7	28.5	44.9	0.5
Timor-Leste	..	..	..	..	..
Tonga	1.5	29.0	23.7	45.0	0.5
Trinidad and Tobago	..	..	..	..	..
Tuvalu	..	..	..	..	..
Vanuatu	1.3	25.0	18.2	52.2	0.5

Source: World Bank DataBank, World Development Indicators,
http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators
** Agricultural raw materials comprise SITC section 2 (crude materials except fuels) excluding divisions 22, 27 (crude fertilizers and minerals excluding coal, petroleum and precious stones) and 28 (metalliferous ores and scrap).*

(c) Direction of trade

As shown in table 2.5, SIDS largely trade within their own oceanic basins. Hence, for the Caribbean SIDS, North and South America are important trading partners; for the Pacific SIDS, Australia, New Zealand and East Asia are main partners; and for West Africa SIDS, the main partner is Europe. The range of trade markets for Indian Ocean SIDS is a little wider and extends to Europe and East Asia.

Between 2000 and 2012, the direction of trade of the Pacific SIDS shifted away from Australia and New Zealand towards East Asia. Australia and New Zealand's shares fell from 54 to 40 per cent in the case of Papua New Guinea and 50 to 24 per cent in the case of Other Pacific, while Eastern and South-Eastern Asia's share increased from 38 to 46 per cent in the case of Papua New Guinea and from 26 to 60 per cent in the case of Other Pacific.

Table 2.5 Direction of exports and imports of SIDS regions, 2012 ($ million)

	Exports				Imports			
	Caribbean	Indian Ocean	Pacific	West Africa	Caribbean	Indian Ocean	Pacific	West Africa
01 Pacific SIDS	1	0	299	0	1	0	358	0
02 Oceania	0	0	14	0	0	0	24	0
03 Australia and New Zealand	21	20	4 377	1	141	215	4 259	0
04 South-Eastern Asia	925	91	1 234	2	1 978	1 008	4 128	12
05 Eastern and Central Asia	1 218	126	3 068	0	4 568	1 027	2 304	76
06 Caribbean SIDS	2 818	0	1	0	2 706	4	1	1
07 Other Caribbean	1 484	0	12	4	534	0	0	1
08 Northern America	10 473	318	364	6	10 618	163	649	9
09 Central America and NCSA	1 981	3	4	4	3 467	1	0	1
10 East Coast South America	2 685	3	3	0	2 567	124	13	40
11 West Coast of South America	1 739	1	11	0	83	2	6	0
12 Europe (excluding Mediterranean)	1 668	1 415	1 117	19	2 175	1 171	346	560
13 Mediterranean	1 184	495	309	58	342	472	314	71
14 Western Asia	135	46	17	0	271	802	16	6
15 Southern Asia	17	75	167	3	2 570	1 664	92	2
16 Indian Ocean SIDS	5	55	0	0	0	50	0	0
17 Eastern and Southern Africa	34	530	2	0	33	511	45	1
18 Western Africa	103	7	187	1	669	8	3	16
19 Atlantic Ocean SIDS	1	0	0	0	0	0	0	0
20 Other	69	0	0	0	18	0	9	0
Grand total	26 562	3 184	11 185	100	32 741	7 223	12 568	799

Note: Imports of countries in column headings from regions in row headings and exports from countries in column headings to regions in row headings.

On the import side, the Indian Ocean SIDS have also seen a shift. Between 2000 and 2012, the share of imports from Europe and the Mediterranean fell from 35.7 to 22.7 per cent. This difference was made up by increases in Eastern and Central Asian and Southern Asian imports. Both the Indian Ocean and West African SIDS have limited trade relations with the African continent. (For more details on the direction of trade see Annex II).

(d) Intra-regional trade

As regards intra-regional trade, amongst Pacific SIDS Fiji is by far the largest exporting country, representing 84 per cent (or $320 million) of the total intra-Pacific SIDS' exports (Annex II, table A.8).[7] The next largest country, Papua New Guinea, has only 12 per cent of Fiji's exports at $37 million. Other exporters include Solomon Islands, Samoa, Vanuatu, Tonga, Kiribati and Tuvalu. On the import side, trade values are spread more evenly between countries. The data suggest that countries closer to each other trade with each other. For example, the main trade of Papua New Guinea, Solomon Islands and Vanuatu is with each other while Fiji, Kiribati, Samoa, Tonga and Tuvalu are also trading with each other.

Within the Caribbean, the export trade is dominated by Trinidad and Tobago with $2.3 billion or 77 per cent of the total intra-SIDS trade (presumably a large proportion of which is, oil exports). The second largest exporter is Barbados with $277 million or nine per cent of the total Caribbean SIDS trade (again presumably including a large proportion of oil exports). The remaining countries fall into two groups: those with exports of between $40 and $90 million including Grenada, Saint Vincent and the Grenadines,

Saint Lucia, the Bahamas, Dominica and Jamaica; and Antigua and Barbuda ($13 million) and Saint Kitts and Nevis ($5 million). On the import side, trade values are spread more evenly between countries.

In the Indian Ocean, intra-SIDS trade is dominated by trade between Mauritius and the Seychelles with Mauritius exporting $32 million to Seychelles and Seychelles exporting $16 million to Mauritius.

(e) Trade and transport facilitation

Trade facilitation is an important area for SIDS, especially as inefficient logistics can have a significant impact on export earnings and import costs. Many SIDS are performing well in terms of number of documents required for a container import and export transaction (excluding customs tariffs and duties or costs related to sea transport). According to the World Bank/International Finance Corporation ranking in "Trading across borders" (*Doing Business 2013*), best SIDS performers in 2012, included Mauritius which ranked 12th, Seychelles (29th), Barbados (30th) as well as Saint Vincent and the Grenadines (38th).

The Caribbean SIDS perform reasonably well on the export side when compared with Latin America and the Caribbean region in general. Many of the Pacific SIDS are doing reasonably well on all counts when compared with the East Asia and Pacific region. However, a number of countries including the Federated States of Micronesia, Fiji, Vanuatu and Papua New Guinea are ranked well down on the global scale. In the Indian Ocean, while Mauritius and Seychelles performed well, Maldives and Comoros were ranked 138th and 146th respectively. They did, however, perform better on most counts than the sub-Saharan comparator. Finally, Cape Verde and Sao Tome and Principe were ranked 95th and 102nd respectively, equalling or bettering all indicators of the sub-Saharan comparator.[8]

Given the importance of maritime transport for SIDS, facilitation of maritime traffic in particular is a key consideration for their trade. In this respect, the 1965 International Maritime Organization (IMO) Convention on Facilitation of International Maritime Traffic, the so-called FAL Convention is an important instrument, which many SIDS have adopted and implemented. In force since 5 March 1967 (and amended in 2002, 2005 and 2009), the convention is binding in 15 SIDS. The aim of the FAL Convention is to facilitate maritime transport by simplifying and minimizing the formalities, data requirements and procedures associated with arrival, stay and departure of ships engaged in international voyages. To this end the convention contains standards and recommended practices. Its main contribution lies with the acceptance of a set of models for standardized facilitation forms for ships to fulfil certain reporting formalities when they arrive in, or depart from a port.

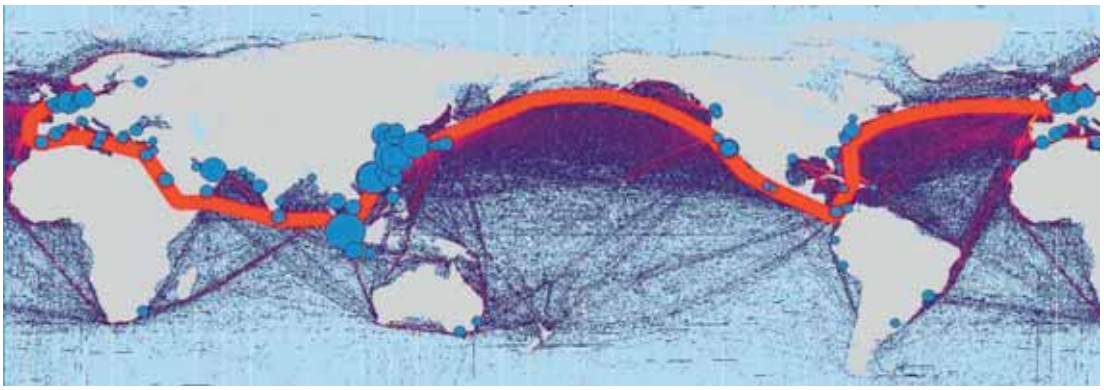
III. MARITIME TRANSPORT IN SIDS: AN OVERVIEW

A. The position of SIDS in the global shipping network

Together, Asia, including Western Asia and the Indian subcontinent, North America and Europe (Northern Europe and the Mediterranean) dominate the flow of maritime containers and account for around 85 per cent of global container trade flows. Given the geographical location of these main economic centres, large volumes of containerized trade are carried on the belt or corridor which circumnavigates the northern hemisphere. At no time does the belt enter the southern hemisphere and when it crosses the Pacific and Atlantic oceans it reaches relatively high northerly latitudes. It is the east-west belt of shipping services, which circumnavigates the northern hemisphere as well as the intersecting north-south services that determine the maritime transport connectivity of SIDS to global markets and the associated transport costs.

SIDS' trade has benefited from container trade services as operators tend to adopt strategies that serve the trades in which they are engaged while at the same time optimizing vessel productivity and utilization. Relevant strategies include hub-and-spoke[9] feedering, interlining[10] and relay services,[11] with hub-and-spoke being the most prevalent. The hub-and-spoke strategy has led to the emergence of a number of regions where feeder ships carry containers to larger hub ports. The geographical regions that have emerged include North Europe, the Mediterranean, the Middle East, the Indian subcontinent, South East Asia, Central East Asia, North East Asia and the Caribbean (figure 3.1).

Figure 3.1 Principal global container flows



Source: UNCTAD secretariat based on port traffic data from UNCTAD Review of Maritime Transport, various issues. Base map soured from the European Commission Joint Research Centre (http://bioval.jrc.ec.europa.eu/products/gam/images/large/shipping_laness.png). Sizes of the circles are based on data sourced from various issues of Containerisation International Yearbook. Routes identified on the basis of various shipping line and port sources.
Note: Red line represents the main east-west container trade belt.

The relay strategy is most often used to connect east-west services on the belt to north-south services to Africa, Australia and South America. The principal ports acting as relay ports are Algeciras, Tanger Med and Las Palmas at the eastern end of the Mediterranean (for South America and West and South Africa); Gioia Tauro (for the Indian Ocean SIDS and Australia); Salalah (for East and South Africa as well as the Indian Ocean SIDS); Singapore and Tanjung Pelepas (for Africa – including Indian Ocean SIDS, South America, Australia and Pacific Islands); Hong Kong and Kaohsiung (for the Philippines and Northern Pacific Islands); Busan (for the Pacific Islands); and Manzanillo and Lazaro Cardenas (Mexico), Panama (east and west coast), Kingston (Jamaica) and Freeport (Bahamas) (for South America).

Thus, apart from some islands in the Caribbean, SIDS are located outside the global belt or corridor where large volumes of containers circumnavigate the northern hemisphere. Indeed, while the belt passes through the Caribbean, the remaining SIDS regions are located in the southern hemisphere and removed from the belt. One of the Indian Ocean SIDS (Mauritius) is on the Asia-Africa/South America route and the Europe-Australia route. The Pacific islands are remote from the east-west belt, which veers further north as it crosses the Pacific. While the West African island of Cape Verde is relative close to Las Palmas; which is one of the global transhipment ports; Sao Tome and Principe are, however, off the beaten track. Consequently, most SIDS rely on north-south shipping routes to connect to the rest of the world and do not benefit from the more competitive freight rates applied on trades carried along the belt.

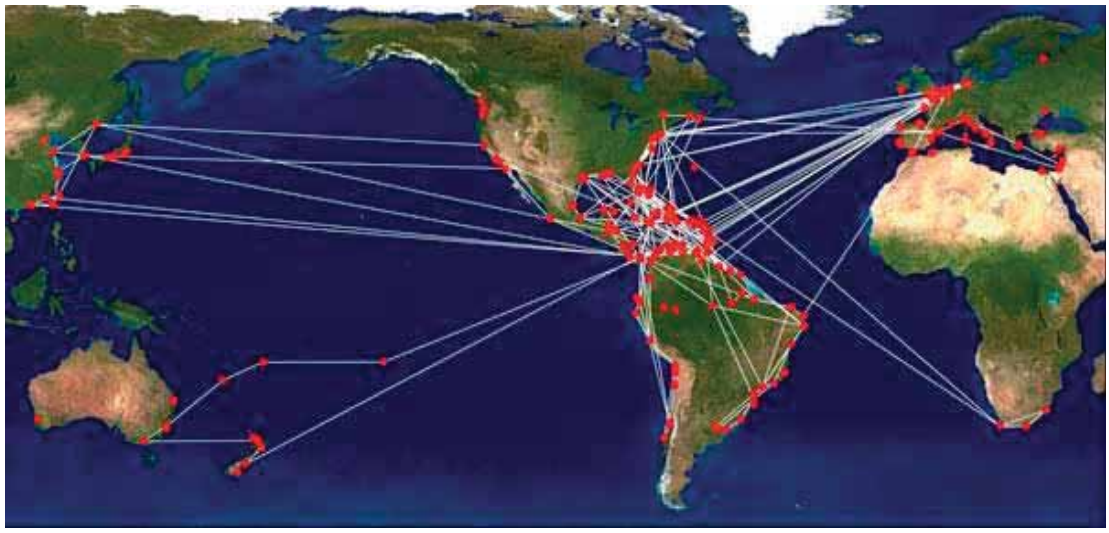
B. Shipping services in SIDS

Most shipping services are provided by non-SIDS operators, although many of the vessels serving the trade fly the flag of a SIDS. Consequently, decision-making concerning vessels deployed and route structures adopted lies largely outside SIDS.

1. Caribbean

The global east-west belt passes through the middle of the Caribbean SIDS. This geographical advantage and proximity to the United States of America provide additional benefits to the Caribbean SIDS. Services to or through the Caribbean are provided by the global operators (CMA-CGM, Maersk and MSC) or their brand names[12] as well as the G6 (Hapag-Lloyd, NYK Line, OOCL, Hyundai Merchant Marine, APL and Mitsui O.S.K. Lines) or their members individually and Geest. There are also a number of services that are operated out of Florida ports. Figure 3.2 shows the services that pass through ports in the Caribbean SIDS. The discussion on connectivity below highlights some features of the network. See Annex II for additional information about these services.

Figure 3.2 Shipping services calling at ports in the Caribbean SIDS

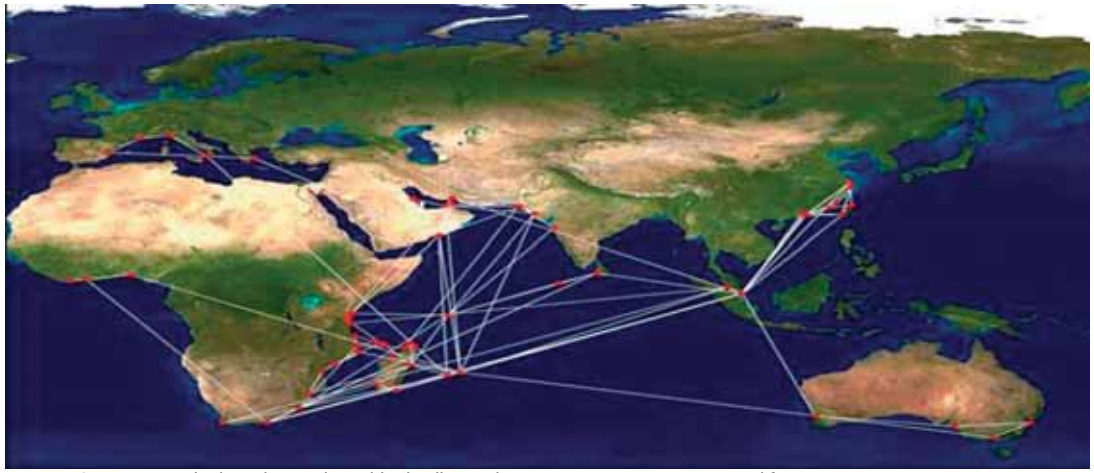


Source: UNCTAD secretariat based on various shipping line and port sources. Base map sourced from http://visibleearth.nasa.gov/view.php?id=5775.2 For the Caribbean, routes are derived from information available at http://www.acs-aec.org/index.php?q=transport/projects/maps-of-maritime-routes-of-the-greater-caribbean.

2. Indian Ocean

Apart from the Maldives, the Indian Ocean SIDS[13] are not located on the global East-West belt but are instead located on or close to a number of north-south routes including: Europe to Australia; East Asia to East Africa; East Asia to South Africa; East Asia to West Africa and potentially, East Asia to the East Coast of South America (ECSA). In addition, they lie at the intersection of the north-south route linking South and East Africa to the Middle East and Indian subcontinent. Services to or through Indian Ocean SIDS are provided by global operators including CMA-CGM, Maersk, MSC and UAFL (Deutsche Afrika-Linien) also provide regional services. Figure 3.3 shows the services that pass through the ports of Indian Ocean SIDS. The discussion on connectivity in Section C below highlights a number of features of the network while Annex II provides additional information about these services.

Figure 3.3 Shipping services calling at ports in the Indian Ocean SIDS

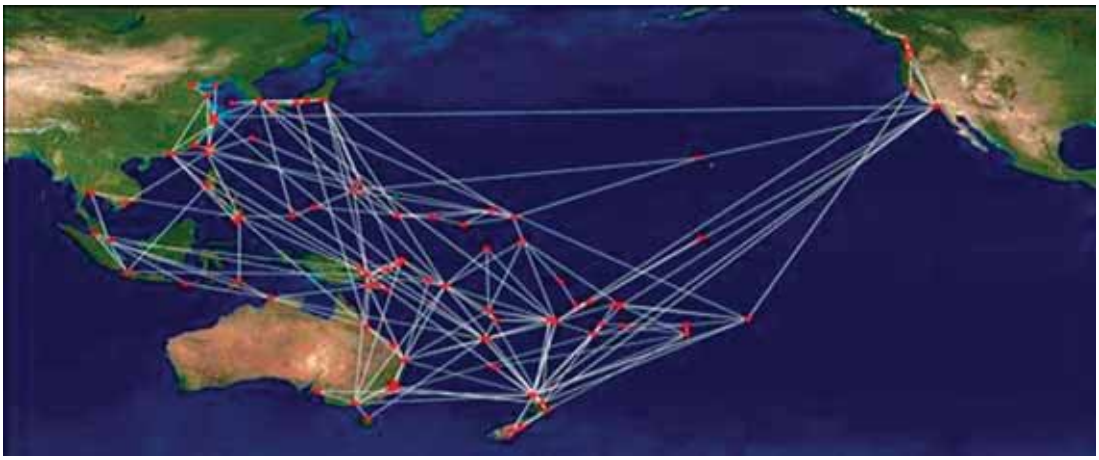


Source: UNCTAD secretariat based on various shipping line and port sources. Base map sourced from http://visibleearth.nasa.gov/view.php?id=57752.

3. Pacific

The Pacific SIDS are not located on the global East-West belt and are served both directly and indirectly by/through the global feeder/relay ports of Singapore, Hong Kong/Kaohsiung and Busan as well as Australia and New Zealand. In addition there are services from the West Coast of North America (WCNA) to the islands in the North Pacific. No direct services exist between the Pacific SIDS and Europe. The global ship operators are largely absent in the Pacific SIDS trade. Figure 3.4 shows the services that pass through the ports of Pacific SIDS. The discussion on connectivity in Section C below highlights a number of features of the network while Annex II provides additional information about these services.

Figure 3.4 Shipping services calling at ports in the Pacific SIDS

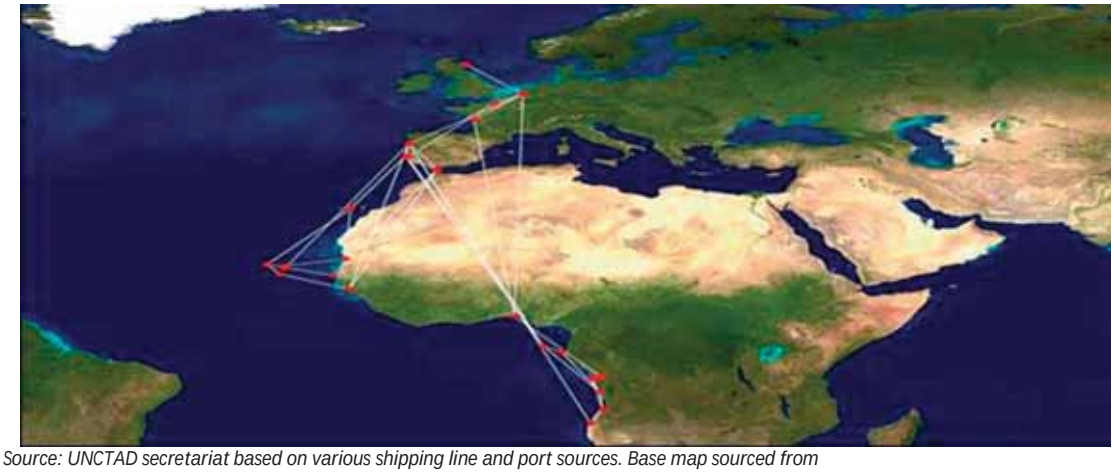


Source: UNCTAD secretariat based on various shipping line and port sources. Base map sourced from http://visibleearth.nasa.gov/view.php?id=57752.

4. West Africa

West African SIDS, namely Cape Verde and Sao Tome and Principe are located on the global east-west belt. Cape Verde, however, is better positioned in relation to a number of global hubs including Las Palmas, Algeciras and Tanger Med. Sao Tome and Principe is mainly serviced out of Portugal. Both countries rely on transhipment services for their connections to the rest of the world. Figure 3.5 shows the services that pass through the ports of West African SIDS. The discussion on connectivity in Section C below highlights a number of features of the network.

Figure 3.5 Shipping services calling at ports in Western African SIDS



Source: UNCTAD secretariat based on various shipping line and port sources. Base map sourced from http://visibleearth.nasa.gov/view.php?id=57752.

C. Liner shipping connectivity of SIDS

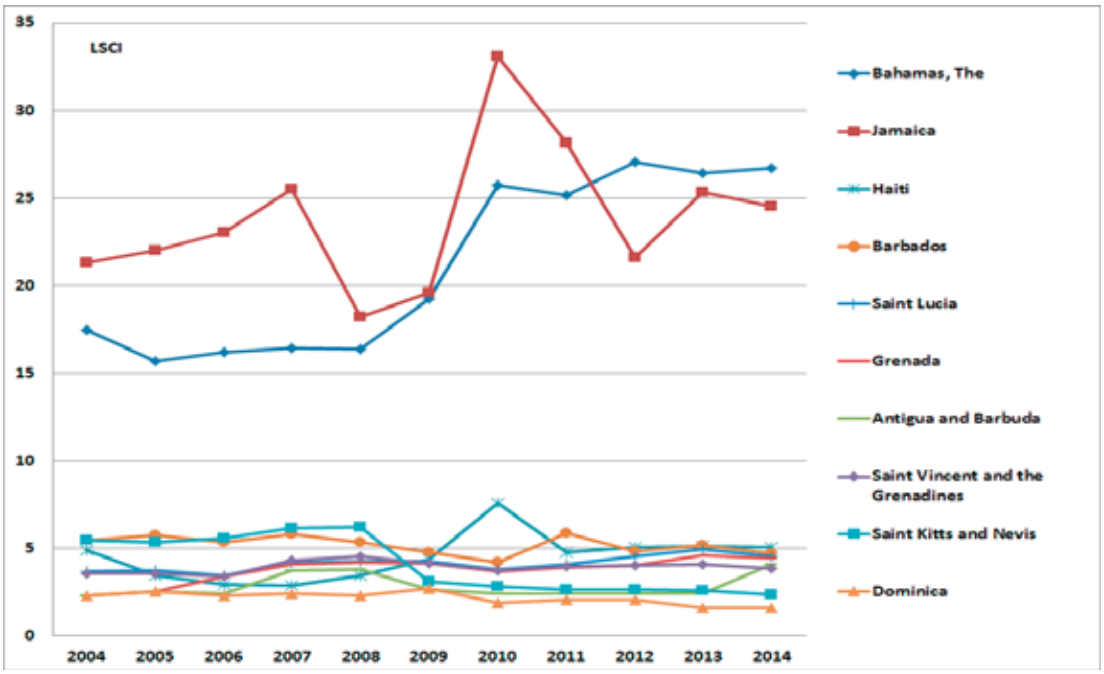
1. Determinants of connectivity

Participation in global trade and the ability of a country to use reliable transport services can be measured by its level of liner shipping connectivity. The position of a country within the global liner shipping network depends largely on factors that also determine transport cost levels. These include in particular, the geographical position, the hinterland and the captive cargo base, as well as the port characteristics and overall non-physical aspects, including efficiency, processes and the underlying regulatory framework. UNCTAD's Liner Shipping Connectivity Index (LSCI),[14] computed for the first time in 2004, illustrates the difficulties facing SIDS in accessing regional and global markets.

As shown in figures 3.6, 3.7 and 3.8, SIDS across all regions are among the least connected economies. Between 2004 and 2014, the LSCI values for selected SIDS in the Caribbean, the Indian Ocean and the Pacific increased by 50 per cent from 16.8 to 25 index points. With few exceptions, the liner shipping connectivity of SIDS has largely remained low. The exceptions were the same countries whose ports have been able to position themselves as global or regional transhipment centres, such as the Bahamas, Jamaica and Mauritius. These three countries have a higher LSCI than their neighbours and report a higher positive growth that is roughly in line with the global trend. The main parameters underpinning SIDS' LSCI values for 2014 are set out in table 3.1.

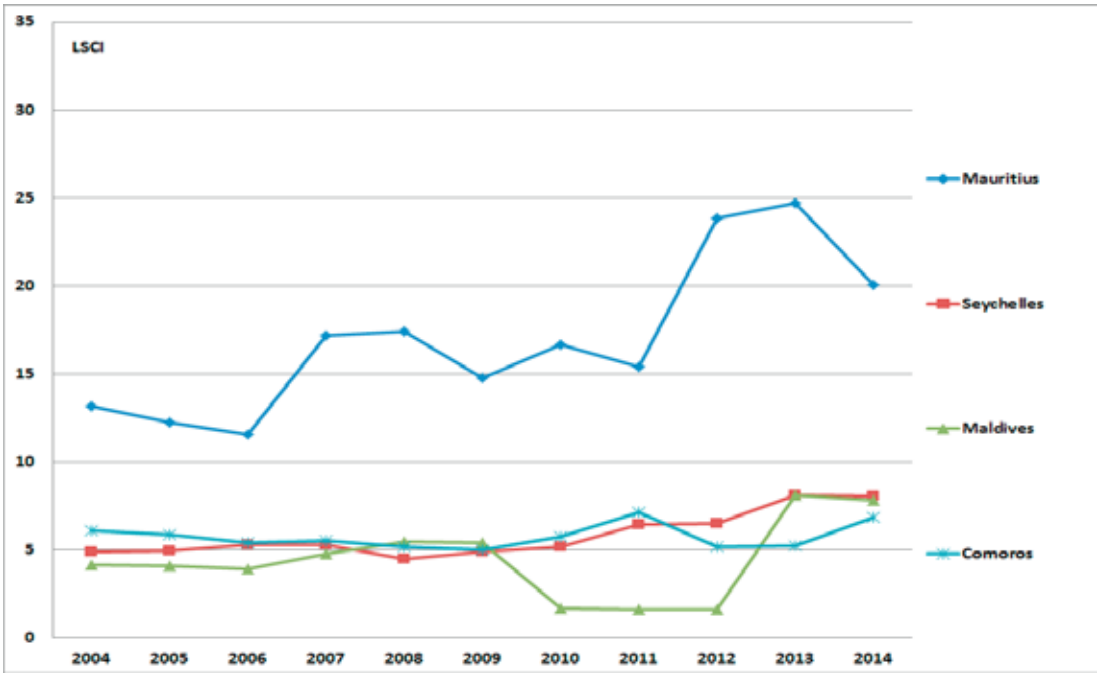
Practically all SIDS are served by fewer container shipping companies, providing fewer services, with fewer and smaller ships than the world average. Several SIDS accommodate ships below 1 000 twenty-foot equivalent unit (TEU) container carrying capacity. This is far below the 7 076 TEU global average or the 18 270 TEU vessels deployed on the main east-west services. Over half of the SIDS covered in table 3.1 lack necessary infrastructures while another majority is served by fewer than five companies. The small number of service providers suggests a potential risk for oligopolistic markets.

Figure 3.6 Liner Shipping Connectivity Index for selected Caribbean SIDS (2004–2014)



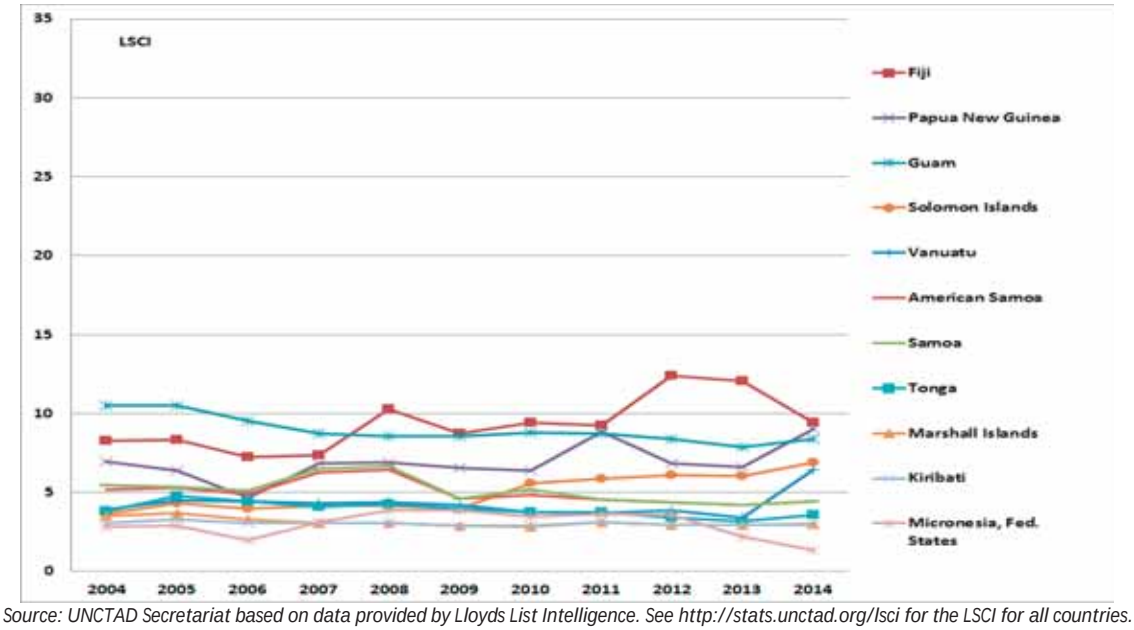
Source: UNCTAD Secretariat based on data provided by Lloyds List Intelligence. See http://stats.unctad.org/lsci for the LSCI for all countries.

Figure 3.7 Liner Shipping Connectivity Index for selected Indian Ocean SIDS (2004–2014)



Source: UNCTAD Secretariat based on data provided by Lloyds List Intelligence. See http://stats.unctad.org/lsci for the LSCI for all countries.

Figure 3.8 Liner Shipping Connectivity Index for selected Pacific Ocean SIDS (2004–2014)



Source: UNCTAD Secretariat based on data provided by Lloyds List Intelligence. See http://stats.unctad.org/lsci for the LSCI for all countries.

Lying close to the main shipping routes or next to a large trading nation makes it easier for a port to attract liner companies and become a port of call. The Caribbean islands, for example, are located closer to the main east-west and north-south routes as compared with most SIDS in the Indian Ocean or the Pacific. Meanwhile, shipping lines provide their services if the market is deemed of interest commercially. Some island economies have sufficient cargo volumes to become attractive ports of call. In other SIDS, notably those linked to France or the US, a subsidy could shift the balance and encourage more liner companies to provide services to and from the islands.

Shipping lines will be inclined to connect their global liner network to ports if they can rely on modern infrastructure and efficient operations. Cargo reservation regimes, either for international or for cabotage cargo, prevent non authorized shipping lines from providing services in a given market that they would otherwise consider viable. This is of acute relevance for SIDS that have several islands and ports or neighbouring SIDS where different islands may be close to seaports in a neighbouring territory.

Table 3.1 Container ship fleet deployments per country, selected island economies (May 2014)

Country	Number of Ships	TEU carrying capacity	Largest ship (TEU)	Number of companies	Number of services
American Samoa	7	7 229	1 304	4	11
Antigua and Barbuda	11	6 880	1 250	3	6
Aruba	7	8 676	2 008	4	7
Bahamas, The	44	271 936	9 178	4	10
Barbados	15	10 504	1 250	6	9
Bermuda	3	1 002	3 62	3	2
Cape Verde	4	4 027	1 325	3	5
Cayman Islands	3	798	340	1	1
Comoros	11	16 219	2 210	3	16
Dominica	5	1 494	430	2	3
Dominican Republic	122	397 375	6 750	21	55
Faeroe Islands	3	3 425	1 457	2	2
Fiji	23	42 993	2 758	8	18
French Polynesia	19	45 779	3 820	8	17
Grenada	10	6 182	1 284	5	6
Guam	15	24 804	2 781	4	8
Haiti	16	13 582	1 296	7	11
Iceland	9	8 099	1 457	2	6
Jamaica	109	355 837	6 750	15	41
Kiribati	4	3 760	970	1	7
Maldives	5	12 871	2 764	3	2
Marshall Islands	7	4 997	970	1	9
Mauritius	40	124 005	6 712	7	12
Micronesia, Fed. Sts.	3	1 237	418	1	1
Netherlands Antilles (From 2011, Curaçao)	9	13 229	2 546	6	11
New Caledonia	26	48 917	2 758	7	24
Palau	3	1 237	418	1	1
Papua New Guinea	29	34 646	2 546	8	21
Saint Kitts and Nevis	5	2 864	660	3	3
Saint Lucia	14	10 188	1 284	5	7
Saint Vincent and the Grenadines	9	4 988	1 122	4	6
Samoa	7	7 229	1 304	4	11
Sao Tome and Principe	5	6 757	2 169	2	2
Seychelles	10	21 723	2 764	3	8
Solomon Islands	22	25 165	2 082	6	3
Tonga	6	5 049	1 043	3	12
Trinidad and Tobago	52	110 424	5 089	13	25
Vanuatu	11	12 143	2 082	4	8
Average Rest of the World	166	749 001	7 076	20	90

Source: UNCTAD Secretariat based on data supplied by Lloyds List Intelligence.

Table 3.2 Liner shipping connectivity of SIDS in the Caribbean

Region	Country	Antigua and Barbuda	Bahamas	Barbados	Dominica	Grenada	Jamaica	Saint Kitts and Nevis	Saint Lucia	Saint Vincent and the Grenadines	Trinidad and Tobago	Grand total
Europe and Mediterranean	Belgium		1				1				1	3
	France	1	1	1	1	1	1		1	1	1	9
	Germany		1				1					2
	Greece						1					1
	Israel		1				1					2
	Italy		1				1					2
	Netherlands		1				1				1	3
	Portugal		1									1
	Russia						1					1
	Spain		1				1				1	3
	United Kingdom	1	1	1	1	1	1		1	1	1	9
North America	Canada						1					1
	United States of America	1	1	1		1	1	1	1	1	1	9
Caribbean	Anguilla			1				1	1	1		4
	Antigua and Barbuda			1	1	1	1	1	1	1	1	8
	Aruba						1					1
	Bahamas						1					1
	Barbados	1			1	1	1	1	1	1	1	8
	Bonaire											
	Cayman Islands											
	Cuba						1					1
	Curacao						1					1
	Dominica	1		1		1			1	1	1	6
	Dominican Republic	1	1	1		1	1		1		1	7
	Grenada	1		1	1		1		1	1	1	7
	Guadeloupe			1				1	1	1	1	5
	Haiti	1		1			1	1			1	5
	Jamaica	1	1	1		1		1	1		1	7
	Martinique	1		1	1	1	1		1	1	1	8
	Montserrat			1				1	1	1		4
	Puerto Rico	1		1			1	1	1		1	6
	Saint Kitts and Nevis	1		1			1		1	1	1	6
	Saint Lucia	1		1	1	1	1	1		1	1	8
	Saint Vincent and the Grenadines	1		1	1	1		1	1		1	7
	Saint Martin	1		1			1	1	1	1	1	7
	Trinidad and Tobago	1		1	1	1	1	1	1	1		8
	Virgin Islands, American			1				1		1	1	4
	Virgin Islands, British							1				1

Region	Country	Antigua and Barbuda	Bahamas	Barbados	Dominica	Grenada	Jamaica	Saint Kitts and Nevis	Saint Lucia	Saint Vincent and the Grenadines	Trinidad and Tobago	Grand total
Central America	Belize						1					1
	Costa Rica						1					1
	Guatemala		1				1					2
	Honduras		1				1					2
	Mexico		1				1				1	3
	Panama						1				1	2
North Coast South America	Colombia						1				1	2
	Venezuela (Bolivarian Republic of)						1				1	2
	Guyana	1		1		1	1	1	1	1	1	8
	Suriname	1		1		1	1	1	1	1	1	8
	French Guiana										1	1
East Coast of South America	Argentina		1				1				1	3
	Brazil		1				1				1	3
	Uruguay		1				1				1	3
	Chile						1					1
	Ecuador						1					1
	Peru						1					1
Oceania	Australia						1					1
	Fiji											
	French Polynesia						1					1
	New Caledonia						1					1
	New Zealand						1					1
East Asia	China		1				1				1	3
	Hong Kong, China		1				1				1	3
	Malaysia						1				1	2
	Singapore		1									1
	Republic of Korea						1				1	2
	Sri Lanka		1									1
	Taiwan Province of China						1				1	2
Africa	South Africa		1									1
	Grand total	18	23	22	9	14	52	17	20	18	36	229
	Total inside Caribbean	13	2	17	7	9	15	14	15	13	15	120
	Total outside Caribbean	5	21	5	2	5	37	3	5	5	21	109

Source: UNCTAD secretariat based on data derived from Lloyds List Intelligence. A "1" in a cell of the matrix indicates that there is at least one shipping service that makes a direct call in the row and column countries of that cell (that is, the two ports are potentially connected).

2. Direct shipping services

(a) Caribbean

Table 3.2 shows the direct liner shipping connection to/from the Caribbean SIDS. Apart from the Bahamas, the 10 Caribbean SIDS featured in the table are relatively well connected to each other, as each country is connected to six or more of the other countries.[15] Caribbean SIDS are also relatively well connected with other economies in the Caribbean.

Outside the Caribbean, SIDS are well connected to France, the United Kingdom and the United States of America to the north and Guyana and Suriname to the south. The row "Grand total" shows the total number of countries or territories to which SIDS have direct shipping connections. Jamaica has the largest number of connections at 52, followed by Trinidad and Tobago at 36 and Bahamas at 23. The other islands have between 17 and 22 connections.

Overall, however, these figures mask the low connectivity of SIDS with countries outside the Caribbean. Indeed, while only three countries – Jamaica, Bahamas and Trinidad and Tobago – are connected to some 21 to 37 countries outside the Caribbean, the remaining SIDS are connected to only two to five countries (France, the United Kingdom, the United States of America, Guyana and Suriname). The totals also mask the low connectivity of the Bahamas inside the Caribbean – this country only has connections with the Dominican Republic and Jamaica. The two least well-connected countries are Dominica and Grenada.

(b) Indian Ocean

Table 3.3 shows the direct liner shipping links to/from the Indian Ocean SIDS are direct connections to Australia as well as East Asia, the Middle East, the Indian subcontinent, the Mediterranean as well as East and South Africa. Mauritius is the most connected of the Indian Ocean SIDS (21 countries), followed by Seychelles (15 countries), Comoros (12 countries) and Maldives (6 countries).

The structure of liner shipping routes is relatively dynamic. For instance, the MSC "Asia-Africa Express" extends the connectivity of Port Louis to Nigeria and Ivory Coast, while the Maersk Far East – WCSA – South Africa service extends the connectivity of Port Louis to Mexico, Panama, Colombia, Peru and Chile. Within the Indian Ocean, the Seychelles is connected to the other three SIDS; Comoros and Mauritius are connected to two other countries; and Maldives is only connected to the Seychelles.

(c) West Africa

As shown in table 3.4, Cape Verde and Sao Tome and Principe are only connected to some countries in Europe and West Africa. In both cases, African connections tend to be with neighbouring countries on the African mainland.

(d) Pacific

Pacific SIDS only have direct liner shipping connections to countries in East Asia, Australia, New Zealand, United States of America and Canada (table 3.5). Such connections are, however, mostly with East Asia, Australia and New Zealand. There are only one and two direct connections to the United States of America and Canada respectively. It is worth noting that Pacific SIDS have no direct connections to countries outside of the Pacific Basin.

Table 3.3 Liner shipping connectivity of SIDS in the Indian Ocean

	Mauritius	Seychelles	Comoros	Maldives	Grand total
Australia	1				1
China	1				1
Hong Kong, China	1				1
Taiwan Province of China					
Singapore	1	1		1	3
Malaysia	1	1		1	3
France	1				1
Greece	1				1
Italy	1				1
Spain	1				1
India	1	1	1		3
Pakistan			1		1
Sri Lanka		1		1	2
Maldives		1			1
United Arab Emirates	1	1	1		3
Oman	1	1	1		3
Saudi Arabia	1				1
Kenya	1	1		1	3
United Republic of Tanzania		1	1	1	3
Madagascar	1	1	1		3
Mozambique	1	1	1		3
Mayotte	1	1	1		3
Réunion	1	1	1		3
Seychelles	1		1	1	3
Comoros	1	1			2
Mauritius		1	1		2
South Africa	1		1		2
Grand total	21	15	12	6	54

Source: UNCTAD secretariat based on data derived from Lloyds List Intelligence. A "1" in a cell of the matrix indicates that there is a shipping service that calls in the row and column countries of that cell (that is, the two ports are potentially connected).

Table 3.4 Liner shipping connectivity of West African SIDS

	Cape Verde	Sao Tome and Principe	Grand total
Netherlands	1		1
France	1		1
Spain	1		1
Gambia	1		1
Guinea	1		1
Guinea-Bissau	1		1
Mauritania	1		1
Morocco	1		1
Canary Islands	1	1	2
Portugal	1	1	2
Belgium		1	1
United Kingdom		1	1
Cameroon		1	1
Nigeria		1	1
Equatorial Guinea		1	1
Gabon		1	1
Angola		1	1
Grand total	10	9	19

Source: UNCTAD secretariat based on data derived from Lloyds List Intelligence. A "1" in a cell of the matrix indicates that there is a shipping service that calls in the row and column countries of that cell (that is, the two ports are potentially connected).

Table 3.5 Liner shipping connectivity of SIDS in the Pacific

Country	Fiji	Solomon Islands	Vanuatu	Papua New	Marshall Islands	Tonga	Samoa	Kiribati	Micronesia	Palau	Nauru	Timor-Leste	Grand total
Japan	1	1	1	1	1	1	1	1	1	1			10
Republic of Korea	1	1	1	1	1	1	1	1	1	1			10
Australia	1	1	1	1		1	1				1	1	8
Hong Kong, China	1	1	1	1	1	1	1	1					8
Marshall Islands	1	1	1			1	1	1	1	1			8
New Caledonia	1	1	1	1	1	1	1	1					8
Solomon Islands	1		1	1	1	1	1	1			1		8
Taiwan Province of China	1	1	1	1	1	1	1	1					8
Vanuatu	1	1		1	1	1	1	1			1		8
Fiji		1	1	1	1	1	1	1					7
French Polynesia	1	1	1		1	1	1	1					7
Samoa, American	1	1	1		1	1	1	1					7
Guam		1	1	1	1				1	1			6
Kiribati	1	1	1		1	1	1						6
Samoa	1	1	1		1	1		1					6
Tonga	1	1	1		1		1	1					6
New Zealand	1	1	1	1		1							5
China	1	1	1	1									4
Indonesia	1	1		1								1	4
Singapore	1	1		1								1	4
Northern Marianas					1				1	1			3
Papua New Guinea	1	1	1										3
Thailand	1	1		1									3
Malaysia		1		1									2
Micronesia (Federated States of)					1					1			2
Nauru		1	1										2
Palau					1				1				2
Philippines	1			1									2
United States of America	1						1						2
Canada	1												1
Cook Islands						1							1
Grand total	23	23	19	17	17	16	15	13	6	6	3	3	161

Source: UNCTAD secretariat based on data derived from Lloyds List Intelligence. A "1" in a cell of the matrix indicates that there is a shipping service that calls in the row and column countries of that cell (that is, the two ports are potentially connected).
Note: Excluding Tuvalu as no data were available.

3. Indirect shipping services – transhipments in SIDS

Container transhipment services are important to SIDS. At the global level, SIDS are sometimes served through transhipment services (hub-and-spoke or relay ports) involving major east-west and north-south routes. At the SIDS' regional level, transhipment and regional hubs are seen as means of improving shipping services to SIDS. Intra-regional and international liner shipping connectivity of SIDS and the required number of transhipment moves to reach the main markets are presented below as well as in Annex III.[16]

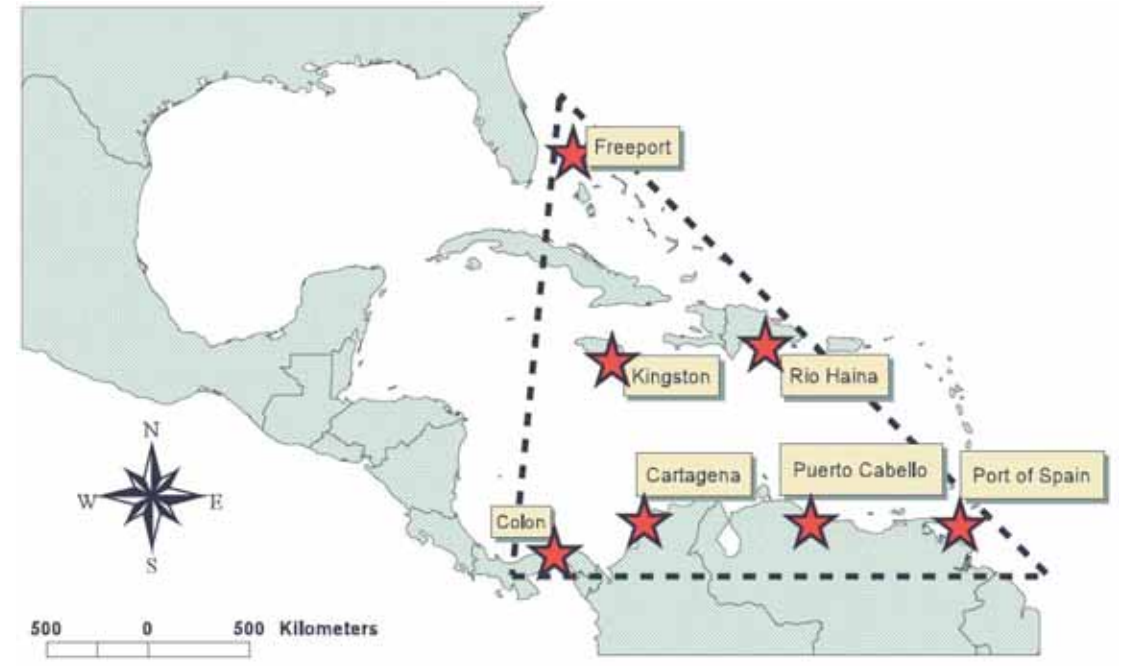
(a) Caribbean

Wilmsmeier *et al*.[17] classify ports in the Caribbean as being of four types: pure transhipment hubs (minimum of 70 per cent transhipment cargo), hybrid ports (between 30 and 70 per cent transhipment cargo), gateway ports (less than 30 per cent transhipment cargo) and local and inter-islands transhipment ports.

Using this classification, Kingston (Jamaica) and Freeport (Bahamas) are considered transhipment ports; Port Lisas and Port of Spain (both Trinidad and Tobago) are considered hybrid ports; there are no gateway ports; and Bridgetown (Barbados), Vieux Fort (Saint Lucia), Castries (Saint Lucia), Campden Park Container Port (Saint Vincent and the Grenadines), Kingstown (Saint Vincent and the Grenadines) and Long Point Port (Saint Kitts and Nevis) are considered local and inter-islands transhipment ports.

The transhipment/relay status of ports in the Freeport, Kingston and Port of Spain section of the Caribbean triangle was also reflected in the previous section where it was observed that Bahamas, Jamaica and Trinidad and Tobago had the largest number of direct connections with countries outside of the Caribbean. In general then, unless containers are coming from or going to France, United Kingdom, United States of America, Guyana, Suriname, Jamaica or Trinidad and Tobago they will need to be transhipped at one of those ports (figure 3.9).

Figure 3.9 Caribbean transhipment triangle



Source: McCalla R, Slack, B and Comtois C (2005). The Caribbean basin: Adjusting to global trends in containerization. Maritime Policy and Management. 32(3):245–261.

UNCTAD estimated the minimum theoretical number of transhipment moves necessary to ship a container between country pairs where no direct connections exist. It found that for the Caribbean SIDS the average minimum number of transhipment moves required to ship a container from the Caribbean to Europe is 0.8; to the Americas 0.9; to Asia 1.3; to Africa 1.9; and to the Pacific region 2.3. The estimated average minimum number of transhipment moves required to ship a container within the Caribbean SIDS is presented in table 3.6.

Overall, most SIDS in the Caribbean region are directly connected to each other. The least connected country from an intra-regional perspective is Bahamas with a direct connection only to Trinidad and Tobago. As shown in Annex III, Jamaica and Trinidad and Tobago are the most connected both to other SIDS and to external regions. The United States of America, the Dominican Republic, France and the United Kingdom are the only countries outside the Caribbean SIDS that have direct liner shipping connections to all Caribbean SIDS.

Table 3.6 Intra-Caribbean SIDS: Minimum number of required transhipment moves

Required Transhipment moves	From									
To	Antigua and Barbuda	Bahamas	Barbados	Dominica	Grenada	Jamaica	Saint Kitts and Nevis	Saint Lucia	Saint Vincent and the Grenadines	Trinidad and Tobago
Antigua and Barbuda	2	2	0	0	0	0	0	0	0	0
Bahamas	0		1	2	1	1	1	1	1	1
Barbados	0	1		0	0	0	0	0	0	0
Dominica	0	2	0		0	1	0	0	0	0
Grenada	0	1	0	0		0	0	0	0	0
Jamaica	0	1	0	1	0		0	0	0	0
Saint Kitts and Nevis	0	1	0	0	0	0		0	0	0
Saint Lucia	0	2	0	0	0	0	0		0	0
Saint Vincent and the Grenadines	0	1	0	0	0	0	0	0		0
Trinidad and Tobago	0	0	0	0	0		0	0	0	

Source: UNCTAD secretariat based on data sourced from Lloyds List Intelligence.

(b) Indian Ocean/Africa

Apart from the Maldives, the Indian Ocean SIDS are not located on the global container belt. Consequently, their containers are transhipped at global hubs including Gioia Tauro, Salalah, Jebel Ali, Colombo and Singapore. Even the Maldives utilizes Colombo, as the port facilities at Male are inadequate for the vessels employed on the global belt. Regionally, the second level hubs are Durban and to a certain extent Port Louis. The third level hubs ("local" hubs which transhipment/relay to surrounding ports) include Port Louis, Mauritius; Mutsamudu, Comoros; and Pointe des Galets, Reunion. Table 3.7 illustrates the dominant role of Durban and Port Louis among the Indian Ocean SIDS as well as the not insignificant volumes passing through Réunion. UNCTAD estimates the average number of required transhipment moves to ship containers from Africa/Indian Ocean SIDS to Africa, Asia, Europe, the Americas and the Pacific region at 1.1, 1.1, 1.5, 1.9 and 2.4, respectively. Table 3.8 illustrates the minimum number of required transhipment moves involving the trade between African and Indian Ocean SIDS (see also Annex III, tables A.14-A.18).

Table 3.7 Transhipment volumes at East African and Indian Ocean SIDS (metric tons)

Port	Country	Year	National	Transhipment	Total
Longoni	Mayotte	2008	34 441	1 920	36 361
Moroni	Comoros	2008	10 031	0	10 031
Pointe des Galets	Réunion	2008	234 866	41 010	275 876
Tamatave	Madagascar	2008	141 857	2 900	144 757
Port Victoria	Seychelles	2008	12 216	1 234	13 450
Port Louis	Mauritius	2011	235 040	231 168	466 208
Durban	South Africa	2012	2 201 371	497 285	2 698 656
Mombasa	Kenya	2013	894 000	negligible (1)	894 000
Dar es Salaam	United Republic of Tanzania	2009	353 700	negligible (2)	353 700
Beira	Mozambique	2008	na	na	85 716
Beira	Mozambique	2012	na	na	160 000
Maputo	Mozambique	2008	na	na	92 284
Nacala	Mozambique	2008	na	na	49 770

Source: UNCTAD based on available data from ports and shipping lines
Notes: (1) Total transhipment moves, all commodities 0.8 per cent. (2) Total transhipment moves, all commodities 2.6 per cent.

Table 3.8 Africa/Indian Ocean SIDS: Minimum number of required transhipment moves

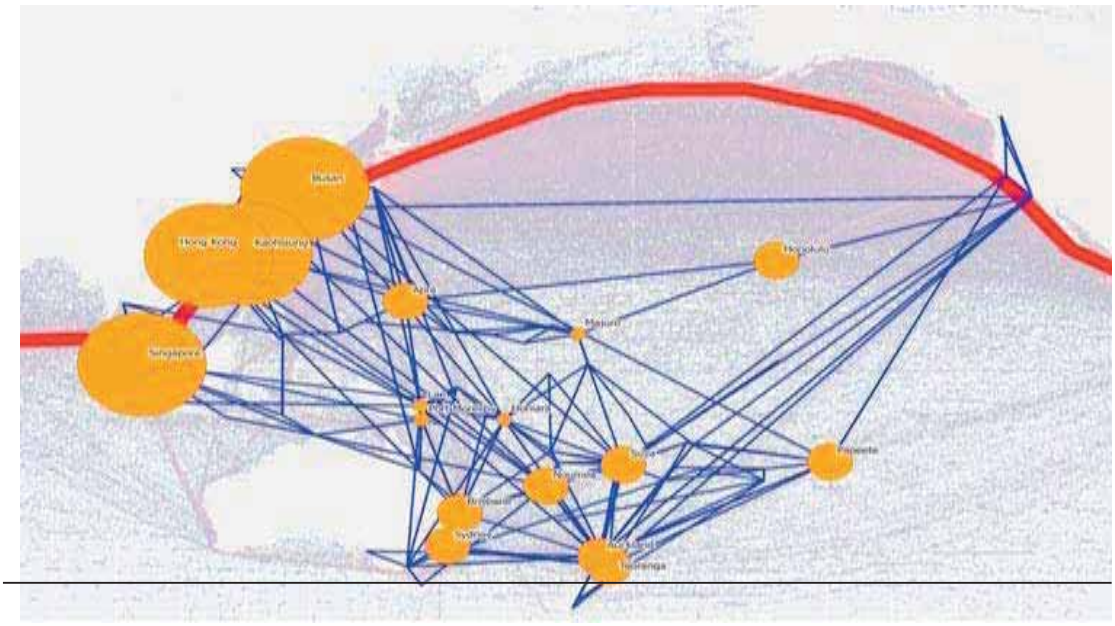
Required Transhipment moves	From					
To	Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
Cape Verde		3	2	2	2	2
Comoros	3		2	0	2	0
Maldives	2	2		2	3	2
Mauritius	2	0	2		2	0
Sao Tome and Principe	2	2	3	2		2
Seychelles	2	0	2	0	0	

Source: UNCTAD secretariat based on data sourced from Lloyds List Intelligence.

(c) Pacific Ocean

The SIDS in the Pacific Ocean trade with countries in East Asia, Australia and New Zealand and their trade is served by both direct and indirect services. With the exception of limited services from North America, trade with the rest of the world is served by indirect services. Within this service system, four levels of transhipment/relay hubs emerge. At the highest level, there are the global hubs including Singapore, Hong Kong, China, Kaohsiung and Busan, which are located on the global shipping belt (Figure 3.10). These are the ports where containers to or from the Pacific SIDS are transhipped to or from the rest of the world. In some cases, they also act as hubs for trade within the East Asia-Pacific region. For some destinations (Pago Pago, Apia and Port Vila) containers can be transhipped via either Singapore or Busan. Singapore, Hong Kong, China, Kaohsiung and Busan also perform a second level regional hub function for trade within the East Asia and Pacific region. Other ports in this category include Sydney, Brisbane, Auckland and Tauranga. Guam and to a small extent Majuro; Suva; Noumea; and Honiara are examples of third level hubs ("local hubs") which transhipment/relay to surrounding islands. In countries with more than one port, there may be fourth level national hubs for the distribution of containers domestically, Papua New Guinea being an example. UNCTAD estimates the average number of required transhipments moves to ship containers within the Pacific as well as from the Pacific SIDS to Asia, the Americas, Europe and Africa at 0.5, 1.0, 1.8, 2.2 and 2.3, respectively. Table 3.9 illustrates the minimum number of transhipment moves required among the SIDS in the Pacific Ocean region (see also Annex III, tables A.19-A.22).

Figure 3.10 Pacific hub ports



Source: UNCTAD secretariat with the base map sourced from the European Commission Joint Research Centre (http://bioval.jrc.ec.europa.eu/products/gam/images/large/shipping_laness.png). Sizes of circles are based on data contained in various issues of Containerisation International Yearbook. Routes identified on the basis of various shipping line and port sources.

Table 3.9 Intra-Pacific SIDS: Minimum number of required transhipment moves

Required Transhipment moves	From									
To	Fiji	Kiribati	Marshall Islands	Nauru	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Australia	0	1	1	0	1	0	0	0	0	0
Fiji		0	0	1	1	0	0	0	0	0
French Polynesia	0	0	0	1	1	1	0	0	0	0
Guam	1	1	1	2	0	1	1	1	1	1
Kiribati	0		0	1	1	1	0	0	0	0
Marshall Island	0	0		1	1	1	0	0	0	0
New Caledonia	0	0	0	1	1	0	0	0	0	0
New Zealand	0	1	1	1	1	0	0	0	0	0
Palau	1	1	1	2		1	2	1	2	2
Papua New Guinea	0	1	1	1	1		1	0	1	0
Samoa	0	0	0	1	1	1		0	0	0
Solomon Islands	0	0	0	0	1	0	0		0	0
Tonga	0	0	0	1	2	1	0	0		0
Vanuatu	0	0	0	0	2	0	0	0	0	
Pacific Average	**0.2**	**0.4**	**0.4**	**0.9**	**1.1**	**0.5**	**0.3**	**0.2**	**0.3**	**0.2**

Source: UNCTAD secretariat based data sourced from Lloyds List Intelligence.

D. Summary of key issues facing shipping in SIDS

1. Cargo volumes and imbalances

Cargo volumes of SIDS are small. As shown in table 3.10 the ports with the highest throughputs are the transhipment ports of Kingston, Freeport, Port Louis, Port of Spain and Pointe Lisas. However, even the port of Kingston only handles about 6.5 per cent of the throughput of Singapore. In addition, apart from Trinidad and Tobago, Seychelles, Papua New Guinea and Solomon Islands, import values are many times the export values (table 3.11).[18]

Table 3.10 Container throughputs of selected ports in SIDS, 2009

Rank	Port	TEU
1	Singapore	25 866 400
62	Kingston	1 689 670
76	Freeport	1 297 000
161	Port Louis	406 862
162	Port of Spain	403 000
255	Point Lisas	164 183
276	Lae	134 603
331	Port Moresby	70 726
na	Suva*	87 000

Source: Containerisation International Yearbook, 2010. Data for Suva sourced from the Annual Report of the Fiji Ports Corporation Limited. http://www.fijiports.com.fj/annual-reports.
Note: Suva Data for 2010.

Table 3.11 Merchandise imports and exports (percentage of GDP)

Region/country	Imports	Exports	Region/country	Imports	Exports
Caribbean			**Pacific**		
Antigua and Barbuda	45.8	5.7	Fiji	62.7	24.1
Bahamas	42.3	12.3	Kiribati	57.1	5.7
Barbados	41.9	13.5	Marshall Islands	76.8	19.2
Dominica	41.7	7.3	Micronesia (Federated States of)	64.4	10.7
Grenada	43.7	4.6	Nauru	na	na
Jamaica	45.4	10.8	Palau	61.3	3.1
Saint Kitts and Nevis	30	5.9	Papua New Guinea	35.1	41.5
Saint Lucia	56.5	15.3	Samoa	50.5	11.1
Saint Vincent and the Grenadines	49.1	6.2	Solomon Islands	49.6	46.6
Trinidad and Tobago	40.3	56.2	Timor-Leste	28.6	0.9
			Tonga	44.5	3.4
Indian Ocean			Tuvalu	62.7	0.8
Comoros	50.3	4.2	Vanuatu	37.5	7
Maldives	69.9	14.1			
Mauritius	49.6	25.3	**West Africa**		
Seychelles	70.9	44	Cape Verde	41.9	2.9
			Sao Tome and Principe	53.2	4.2

Source: World Bank, World Development Indicators, 2012.

Low volumes are often an important driver of transport costs as they prevent economies of scale. Smaller vessels are less fuel efficient; smaller ports have higher operating costs per ton of cargo and investments in infrastructure take longer to pay off for smaller volumes of business. This is a challenge for SIDS not only because of their own limited cargo volumes, but also because they have limited possibility to expand the hinterland and cargo base by serving the trade of neighbouring countries. That being said, there are some exceptions, such as the Bahamas, Jamaica and Mauritius, which managed to become host to attractive transhipment centres. Concentrating cargo in their country has made it economically viable for larger container ships to call at ports in these countries, while the ports have invested in necessary dredging and container handling equipment.

2. Remoteness and connectivity

As previously noted, SIDS are very remote from major global markets located in Asia, North America, North Europe, the Mediterranean, Western Asia and the Indian subcontinent. Their geographical location is a major challenge in particular for SIDS in the Indian Ocean and the Pacific. For the Caribbean SIDS, however, being close to North America as well as to the main east-west and north-south shipping routes that pass through the Panama Canal provides some advantages. The widening of the Panama Canal in particular could offer additional opportunities for some Caribbean SIDS to participate in the transhipment port services market.

As SIDS are mainly served by north-south shipping routes based in major relay or transhipment hubs located on the east-west container belt, the smaller container volumes on the north-south routes entail the use of smaller vessels with the concomitant higher costs per unit of cargo. Rising fuel costs combined with these various factors exacerbate the problem given their heavy reliance on transport-intensive imports.

3. Competition and shipping market structures

As many SIDS have not been able to expand their cargo base, this trend has led to a declining number of companies providing services to/from many SIDS, leading in turn to a risk of oligopolistic markets. This drives up their transport costs. SIDS are not usually importing large volumes of raw materials, with their trade focusing more on the carriage of finished manufactured goods, where the incidence of transport costs as a percentage of the goods' value is lower. This incidence remains high, however, compared with other regions.

Since at least the middle of the 19th century, liner shipping markets have been known for their anti-competitive practices including collusion in setting freight rates. The United Nations Economic Commissions for Latin America and the Caribbean (ECLAC, 2009), for example, in its report "Maritime sector and ports in the Caribbean: the case of CARICOM countries" noted that "Price arrangements of the oligopolistic quasi monopolistic structure of maritime service providers lead to an overpricing of services, which impedes competitiveness of export products".

In the Pacific, the governments of the Marshall Islands, the Federated States of Micronesia and Palau,[19] have formed the Micronesian Shipping Commission (MSC), which restricts entry to their shipping markets. The objective of the MSC is to encourage and promote an economical, reliable, safe and coordinated system that meets the demand of international commercial shipping throughout the three Micronesian island nations. Policy is implemented through an entry assurance system whereby an entry assurance certificate (EAC) is required for all commercial carriers servicing the sub-region. The scheme is largely financed through an annual fee for each EAC issued. The criteria for granting EACs include that: (a) routes satisfy basic trade requirements; (b) tariffs charged should be reasonable for the service proposed; (c) the carrier must demonstrate capability to provide a reliable and stable service in terms of frequency, regularity and on transit time performance; (d) the service must be flexible to accommodate both specialized and conventional cargo; (e) the capitalisation or investment of the operator must be sufficient to adequately sustain the proposed service; and (f) employment is provided to citizens of the three countries (including internships with the operators).

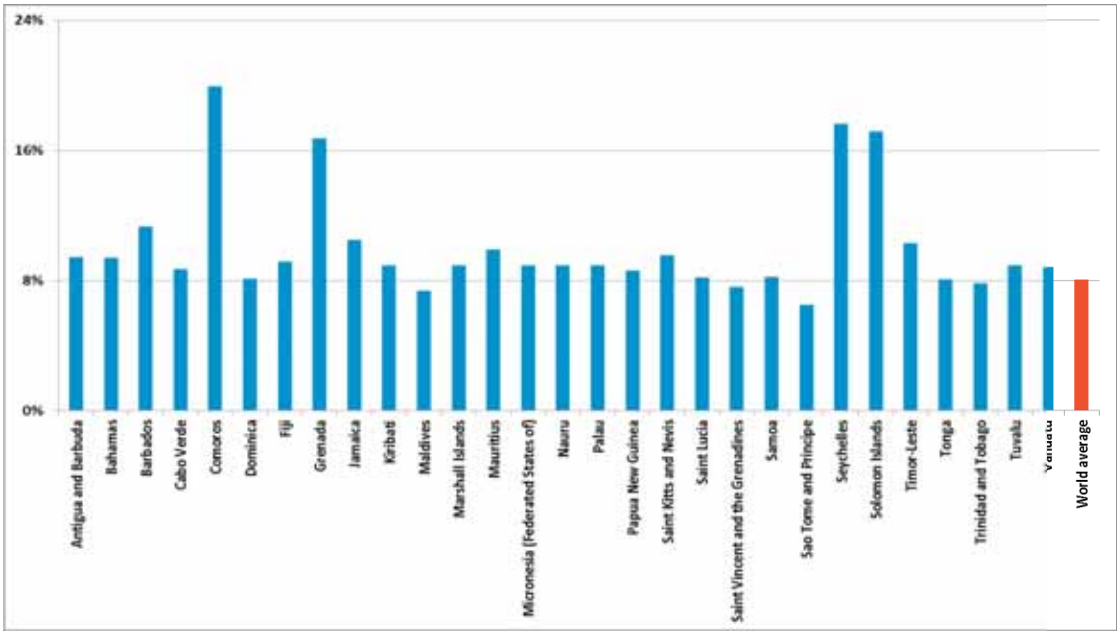
Reaction to the MSC has been mixed. The Secretariat of the Pacific Community (SPC), when it considered the establishment of a similar commission in the Central Pacific, noted that: "In carefully studying shipping patterns in the region, RMP realizes the very close collaboration amongst shipping companies render little or no competition to the PICTs resulting in a near cartel environment. Their services are selective being regular to profitable ports and erratic to others. To address this arrangement, a shipping commission along the lines of the Micronesian Shipping Commission model is planned for the central and eastern Pacific region. An important feature of these shipping commissions is the promotion of sufficient or controlled competition so that monopoly is removed but the restricted number of carriers for operations to remain commercially viable maintained."[20] Two Pacific island studies have, however, questioned the need for such arrangements.[21]

4. Transport costs in SIDS

Shipping costs are an important consideration for traders, transport operators as well as policymakers and regulators, especially in developing countries, where international transport costs can often exceed customs duties as a barrier to international trade.[22] While data on freight rates are scarce, available information indicates that transport costs for SIDS are relatively high, including when compared with developing countries. UNCTAD estimates that in 2013, the average freight cost as a share of imports value was close to 7 per cent for developed economies, 10 per cent for developing economies and 13 per cent for SIDS.

Figure 3.11 provides UNCTAD estimates for the ten-year average of selected SIDS' expenditures on international transport costs as a share of the value of their imports (2004–2013 average). The average SIDS has paid two percentage points more than the world average of 8.1 per cent during the period. The highest values are estimated for Comoros (20.2 per cent), followed by Seychelles (17.9), Solomon Islands (17.4) and Grenada (17.0). The freight costs paid by SIDS totalled $4.1 billion in 2013, over 60 per cent increase since 2005. The challenge for SIDS is to avoid a vicious circle where high transport costs create a negative feedback loop which lowers service levels, compresses trade flows, eliminates economies of scale and reduces the overall transport connectivity. Figure 3.12 illustrates these trends.

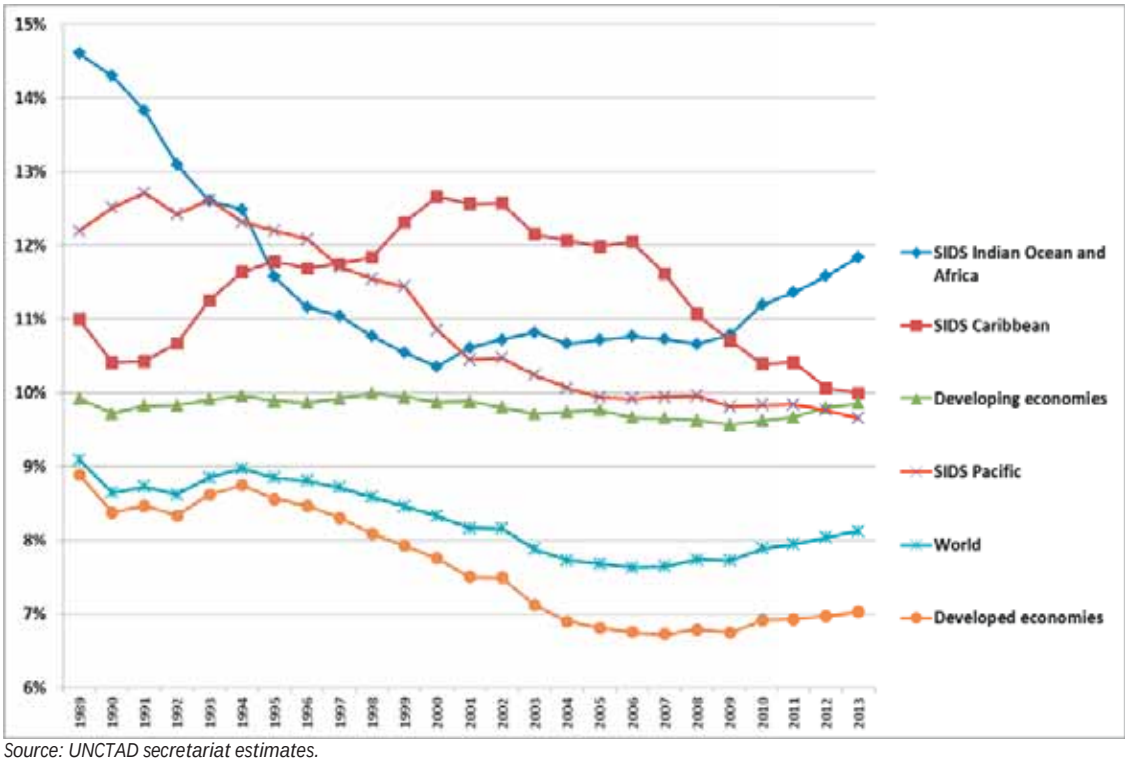
Figure 3.11 Expenditures on international transport as a percentage of the value of imports (average 2004–2013)



Source: UNCTAD secretariat estimates.

Determinants of international transport costs can be grouped into six main categories: economies of scale; trade imbalances; type and value of the traded goods; geographical distance; level of competition among transport service providers; and characteristics of the sea- and airports – infrastructure, operation and management.[23] These factors examined in the following section, are interlinked; low trade volumes, for example, may lead to diseconomies of scale and at the same time also reduce the level of competition.

Figure 3.12 Comparing SIDS' freight costs as per cent of the value of imports (1989–2013)



Source: UNCTAD secretariat estimates.

E. Ports

Some features of port and services infrastructure in SIDS are also raising transport costs and highlight the need for SIDS to improve port efficiency, ensure the right depth to accommodate larger ships and increase the number of ship-to-shore container cranes.

The coverage, comparability and currency of sources of information on ports,[24] especially for small, remote ports are not always consistent. Keeping these limitations in mind, some analysis of port facilities in SIDS is, however, possible. Of the 51 main SIDS international ports, four are classified as being medium sized, 16 small and 31 very small (see Annex IV).[25] The four medium-sized ports were St John's (Antigua and Barbuda); Nassau (Bahamas); Kingston (Jamaica); and Port of Spain (Trinidad and Tobago). Table 3.12 shows the frequency distribution of cargo pier depths in SIDS.

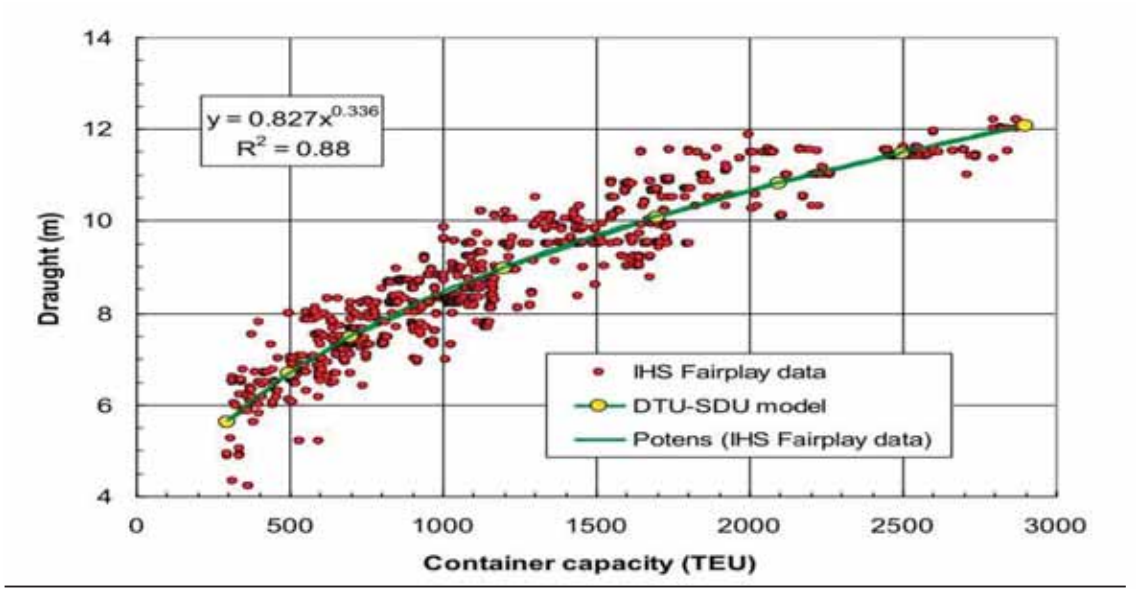
Table 3.12 Frequency distribution of depths alongside berths in SIDS

Depth alongside (ft)	Depth alongside (m)	Frequency
>+76	>23.2	2
61–65	18.6–19.8	1
51–55	15.5–16.8	1
46–51	14.0–15.2	4
36–40	11.0–12.2	9
31–35	9.4–10.7	12
26–30	7.9–9.1	14
21–25	6.4–7.6	4
16–20	4.9–6.1	1
11–15	3.4–4.6	1
6–10	1.8–3.0	1
..	..	1
Total		51

Source: World Port Index 2014, National Geospatial-Intelligence Agency, United States of America.

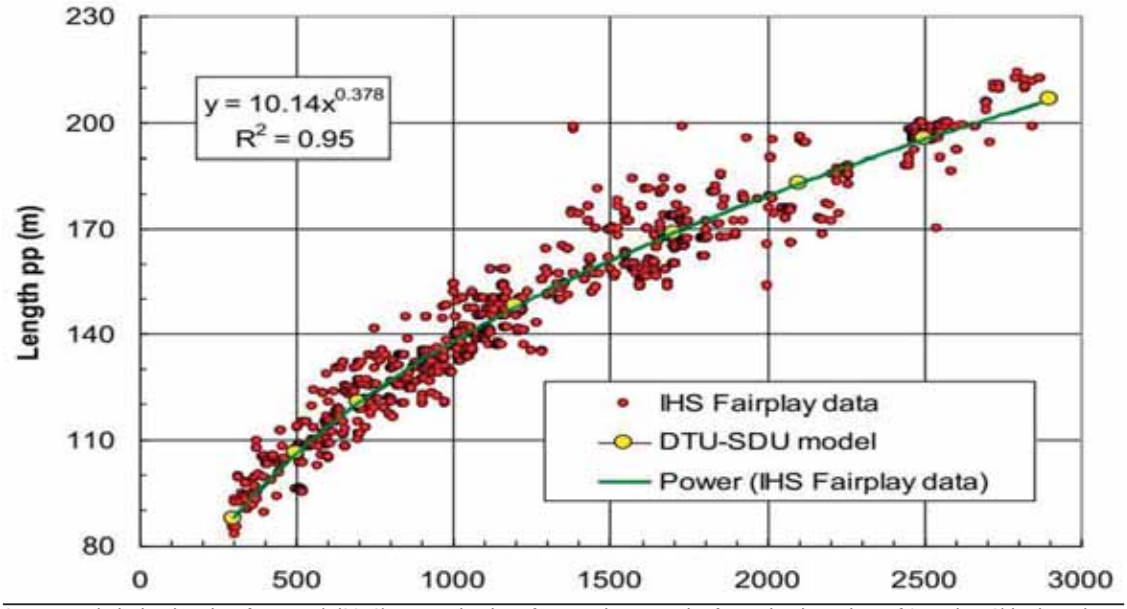
Out of the 50 SIDS ports for which relevant data are available, 42 had cargo pier depths of less than 12.2 metres. From figure 3.13, the corresponding largest container ship that could call at these 42 ports at maximum draft would be 3 000 TEU. For many ports in SIDS the maximum size of container ships that can call is much smaller. The World Port Index data which indicate the maximum vessel length allowed at ports, shows that 19 ports could accept vessels greater than 152 metres (500 feet), 26 vessels less than 152 metres (500 feet) and 6 had no data. Figure 3.14 shows that this placed further restrictions on vessel sizes as container ships with a length of 150 metres have an average capacity of around 1 200 TEUs.

Figure 3.13 Relationship between draft and TEU capacity



Source: Technical University of Denmark (2013). Determination of Regression Formulas for Main Dimensions of Container Ships based on IHS Fairplay Data. Project no. 2010-56, Emissionsbeslutningsstøttesystem, Work Package 2, Report no. 03 February 2013.

Figure 3.14 Relationship between length and TEU capacity



Source: Technical University of Denmark (2013). Determination of Regression Formulas for Main Dimensions of Container Ships based on IHS Fairplay Data. Project no. 2010-56, Emissionsbeslutningsstøttesystem, Work Package 2, Report no. 03 February 2013.

1. Vessel calls at SIDS ports[26]

Except for Port Louis (Mauritius), which registers the second largest number of calls per year (620), the Caribbean region ports register the highest number of calls (Kingston, 1 227; Freeport, Bahamas, 574; and Point Lisas, Trinidad and Tobago, 484 calls). All of these ports transhipment ports (tables 3.13 and 3.14). Generally, ports in the other two regions, West Africa and the Pacific, receive a much smaller number of calls, mostly below 150 (tables 3.15 and 3.16).

2. Cargo handling productivity

The speed with which containers area loaded and unloaded at ports helps determine the time a ship spends in port and consequently the freight rates charged by shipowners. Although data on berth productivity are relatively scarce, existing Caribbean container berth productivity data published by the Florida Ship Owners' Group in 2008 (see table 3.17) show that although relatively low, Kingston Container Terminal had the highest number of container berth moves per hour with 19.8 moves per hour.[27] The second highest level (17.72 moves per hour) was recorded by Kingston Wharves Limited. The remaining ports had very low productivities of around 11 or fewer berth moves per hour.

Berth productivity in the top 20 ports in the Americas are presented in table 3.18. In these ports, productivity ranges from a low of 42 container moves per hour to 74 container moves. The only Caribbean island included in the top 20 is Caucedo, Dominican Republic. This indicates that global transhipment ports in the Bahamas and Jamaica have much lower berth productivities of less than 42 container moves per hour. Equally, Port Louis in Mauritius does not appear in the top ports of West Africa/Indian Ocean SIDS.

Table 3.13 Vessel calls at ports in the Caribbean SIDS

Port	Country	Number of vessels	Total TEU capacity	TEU capacity of largest vessel*	Calls per year
St John's	Antigua and Barbuda	13	9 146	1 213	205
Freeport	Bahamas	56	285 220	8 416	574
Marsh Harbour	Bahamas	1	157	157	52
Nassau	Bahamas	4	1 532	392	156
Bridgetown	Barbados	17	13 424	1 213	309
Roseau	Dominica	8	3 442	559	153
St George's	Grenada	7	7 277	1 232	104
Kingston	Jamaica	128	417 992	6 583	1,227
Montego Bay	Jamaica	7	8 395	1 232	104
Basseterre	Saint Kitts and Nevis	5	2 287	559	116
Charlestown	Saint Kitts and Nevis	4	1 902	559	104
Castries	Saint Lucia	16	12 048	1 232	257
Vieux Fort	Saint Lucia	8	6 391	1 213	101
Kingstown	Saint Vincent and the Grenadines	15	12 761	1 232	257
Point Lisas	Trinidad and Tobago	27	23 864	1 232	484
Port of Spain	Trinidad and Tobago	45	106 255	4 726	352

Source: Source: UNCTAD secretariat based on available data from ports, shipping agents and shipping lines, First quarter 2014.
**For the Caribbean only, the "TEU capacity of the largest vessel" is based on the average TEU capacity provided by each shipping company as data for individual ships were not available.*

Table 3.14 Vessel calls at ports in the Indian Ocean SIDS

Port	Country	Number of vessels	Total TEU capacity	TEU capacity of largest vessel	Calls per year
Moroni	Comoros	4	5 774	1 742	52
Mutsamuda	Comoros	8	8 528	1 742	132
Male	Maldives	5	9 258	2 770	130
Port Louis	Mauritius	105	532 111	9 400	620
Port Victoria	Seychelles	15	37 435	3 646	163
Grand total		133	586 523	9 400	976

Source: Source: UNCTAD secretariat based on available data from ports, shipping agents and shipping lines, First quarter 2014.

Table 3.15 Vessel calls at ports in West African SIDS

Port	Country	Number of vessels	Total TEU capacity	TEU capacity of largest vessel	Calls per year
Mindelo	Cape Verde	6	7 889	1 606	63
Praia	Cape Verde	6	7 889	1 606	63
Sal Rei (Boa Vista)	Cape Verde	1	375	375	19
Santa Maria (Sal)	Cape Verde	1	375	375	19
Sao Tome	Sao Tome and Principe	7	7 198	2 169	64
Grand total		21	23 726	2 169	228

Source: UNCTAD secretariat based on available data from ports, shipping agents and shipping lines, First quarter 2014.

Table 3.16 Vessel calls at ports in the Pacific SIDS

Port	Country	Number of vessels	Total TEU capacity	TEU capacity of largest vessel	Calls per year
Suva	Fiji	35	50 354	2 758	319
Port Moresby	Papua New Guinea	19	27 062	2 546	158
Lae	Papua New Guinea	20	28 840	2 082	152
Lautoka	Fiji	16	15 942	1 730	151
Honiara	Solomon Islands	20	23 993	2 082	146
Apia	Samoa	13	11 731	1 368	132
Majuro	Marshall islands	19	20 187	1 347	113
Port Vila	Vanuatu	12	14 652	2 082	96
Nuku'alofa	Tonga	7	5 506	1 037	85
Santo	Vanuatu	9	6 987	981	80
Yap	Federated States of Micronesia	13	14 593	1 347	78
Koror	Palau	13	14 593	1 347	78
Tarawa	Kiribati	7	6 113	981	58
Chuuk	Federated States of Micronesia	8	7 914	1 347	52
Kosrae	Federated States of Micronesia	8	7 914	1 347	52
Pohnpei	Federated States of Micronesia	8	7 914	1 347	52
Ebeye	Marshall Islands	8	7 914	1 347	52
Dili	Timor-Leste	5	9 996	2 546	43
Vavau	Tonga	2	740	516	30
Rabaul	Papua New Guinea	3	3 974	1 740	26
Kwajalien	Marshall Islands	3	1 235	416	26
Noro	Solomon Islands	2	1 341	981	25
Nauru	Nauru	2	906	546	24
Funafuti	Tuvalu	1	519	519	23
Kimbe	Papua New Guinea	3	4 394	2 078	17
Madang	Papua New Guinea	2	3 468	1 740	16
Alotau	Papua New Guinea	1	1 728	1 728	8
Oro Bay	Papua New Guinea	1	1 728	1 728	8
Grand Total		261	302 238		2 107

Source: UNCTAD secretariat based on available data from ports, shipping agents and shipping lines, First quarter 2014.

Table 3.17 Berth productivity by equipment type in the Caribbean SIDS

(Berth moves per hour, January to December 2008)			
Country	**Ports**	**Crane type**	**Berth moves per hour**
Antigua and Barbuda	St John's	Mobile cranes	9.13
Bahamas	Freeport	Ship's crane/ro-ro	7.42
Bahamas	Marsh Harbour		
Bahamas	Nassau	Mobile cranes	10.93
Barbados	Bridgetown	Gantry	7.72
Dominica	Roseau	Ship's crane/ro-ro	8.93
Grenada	St George's	Ship's crane/ro-ro	7.13
Jamaica	Kingston Container Terminal	Gantry	19.80
Jamaica	Kingston Wharves Limited	Mobile cranes	17.73
Jamaica	Montego Bay	Mobile cranes	8.67
Saint Kitts and Nevis	Basseterre	Ship's crane/ro-ro	6.26
Saint Kitts and Nevis	Charlestown		
Saint Lucia	Castries	Mobile cranes	11.08
Saint Lucia	Vieux Fort	Mobile cranes	9.84
Saint Vincent and the Grenadines	Kingstown	Ship's crane/ro-ro	6.53
Trinidad and Tobago	Point Lisas	Gantry	11.86
Trinidad and Tobago	Port of Spain	Gantry	10.98

Source: Pinnock F and Ajagunna I (2012). The Caribbean maritime transportation sector: Achieving sustainability through efficiency. The Caribbean Papers No. 13. Centre for International Governance Innovation. Ontario, Canada.

Data on cargo handling productivities for Pacific SIDS are even more difficult to obtain. However, estimates in table 3.19 below highlight the low port productivity levels in the region. Overall, SIDS need to further develop relevant information on cargo handling productivity and review the whole container handling process to reduce ships' time in port.

Ports in four SIDS have lighterage facilities only: Moroni (Comoros); Tarawa, (Kiribati, an alongside berth is expected to be completed in the second half of 2014); Nauru; and Sao Tome (Sao Tome and Principe). In addition, Male (Maldives) handles larger self-geared container vessels with lighters. A total of 21 out of the 51 main international ports in SIDS have cranes with a capacity of 25 tons or more. The remainder either had no cranes or no relevant information was available. Only six ports in SIDS have container gantry cranes[28] and include Freeport (Bahamas), Bridgetown (Barbados), Kingston (Jamaica), Port Louis (Mauritius), Port of Spain (Trinidad and Tobago), and Point Lisas (Trinidad and Tobago). None of the Pacific or West African SIDS have container gantry cranes. Lighterage ports and non-universal availability of shore cranes mean that vessels serving the SIDS trades are generally self-geared.

Table 3.18 Berth productivity: top ports in the Americas

Port	Country	Berth productivity
Long Beach	United States of America	74
Elizabeth	United States of America	74
Prince Rupert	Canada	68
Lázaro Cárdenas	Mexico	65
Vancouver	Canada	63
Savannah	United States of America	60
Tacoma	United States of America	58
Bayonne	United States of America	58
Charleston	United States of America	56
Norfolk	United States of America	54
New York	United States of America	52
Los Angeles	United States of America	52
Balboa	Panama	51
Houston	United States of America	50
Halifax	Canada	50
Seattle	United States of America.	48
Veracruz	Mexico	48
Caucedo	Dominican Republic	43
San Antonio	Chile	43
Manzanillo	Mexico	42

Source: Based on data from Journal of Commerce (2013). Key Findings on Terminal Productivity Performance Across Ports, Countries and Regions.

Note: Berth productivity is defined as the number of total container moves (on-load, off-load and re-positioning) divided by the number of hours during which the vessel is at berth (time between berth arrival, or "lines down" and berth departure, or "lines up"), without adjustments for equipment and labour down time. The productivity metrics contained in these rankings are the average berth productivity for all validated and standardized vessel calls in the database for each port or terminal during calendar year 2012.

Table 3.19 Port productivity: ports in the Pacific SIDS

Country	Port	Port productivity
Fiji	Suva	15 TEU per hour
Fiji	Lautoka	
Kiribati	Betio	12 TEU per hour
Marshall Islands	Majuro	20 TEU per hour
Micronesia (Federated States of)	Yap Colonia International Port	12.5 TEU per hour
Micronesia (Federated States of)	Weno Harbour, Chuuk	
Micronesia (Federated States of)	Pohnpei	
Micronesia (Federated States of)	Okat Port, Kosrae	20 TEU per hour
Nauru	Nauru	8 TEU per hour
Palau	Koror	
Papua New Guinea	Port Moresby	18 TEU per hour
Papua New Guinea	Lae	18 TEU per hour
Samoa	Apia	
Solomon Islands	Honiara	20 TEU per hour
Solomon Islands	Noro	
Timor-Leste	Dili	
Tonga	Nuku'alofa	14 TEU per hour
Tuvalu	Funafuti	4 TEU per hour
Vanuatu	Port Vila	
Vanuatu	Santo	

Source: UNCTAD secretariat based on available data from ports and port directories.

Note: Data on cargo handling productivities for Pacific SIDS are difficult to obtain. Consequently, various sources were used for the data In many cases methods used to calculate the productivities were not clear (for example, whether they were berth or crane rates, or whether they were crane design rates). Consequently figures above should be considered as indicative only.

3. Private sector participation

Private sector participation in the development and operation of ports is an integral part of the strategic plans of international financial institutions and agencies and a key policy objective for many governments. For example, the operational and institutional goals set out in the Asian Development Bank's Strategy 2020, include: scaling up private sector development and private sector operations in all operational areas, reaching 50 per cent of annual operations by 2020; and increasing its public and private sector operations progressively at the regional and subregional levels to at least 30 per cent of total activities by 2020. In support of such policies, the Asian Development Bank (ADB) has published its "Developing Best Practices for Promoting Private Sector Investment in Infrastructure – Ports"[29], while other organizations such as the World Bank have also published the second edition of their "Framework for Port Reform" toolkit[30] while The main arguments to support private sector participation include easing the constraints on trade resulting from expensive and inefficient ports; introducing efficiency benefiting from the know-how of the private sector, and reducing the pressure on governmental budgets.

In the ports sector, privatization has often followed a commercialization, corporatization privatization path. In the first step, namely commercialization, the government enables the operations of the port to run, as far as possible, on a commercial basis while the port remains as a statutory body. In the second step, corporatization, a limited liability company is created and the port business is transferred to the company. Finally, in the third step, privatization, shares are sold to the private sector. Significant progress has been made by SIDS in moving towards more commercially oriented ports. Privatization (or corporatization) carries with it the responsibility of ensuring an efficient physical performance as well as a sound financial performance. In this respect, the ADB has been assisting state owned enterprises (SOE) in general and ports in particular to benchmark their performance.[31] The ADB, in considering the benchmarking of performance of SOEs in Papua New Guinea noted that, "The key to successful SOE reform is therefore to infuse SOEs with private sector discipline, competitive market pressures, and clear consequences for non-performance. This forces SOEs to meet their costs of capital and divest any activities that are not commercially viable. When SOEs remain under public ownership, the process of 'commercialization' is incremental and, where political commitment to ongoing reform is weak, can be reversed. Privatization, in contrast, is immediate; it relies on a transfer of ownership to accelerate, intensify, and lock in the benefits of commercialization. Full privatization, however, is not always politically feasible nor the most suitable reform mechanism. In these cases, partial privatization (such as joint ventures and public-private partnerships) can help improve SOE performance."[32] Whilst considerable progress has been made by SIDS in moving towards more commercially oriented ports there appears to be scope for further improvements.

Table 3.20 shows selected ports going through this process. In Samoa, Solomon Islands and Tonga, for instance, various administrative arrangements have been made which focus upon ports providing efficient services. In Fiji and Papua New Guinea, the Fiji Ports Corporation Limited (FPCL) and the Papua New Guinea Ports Corporation (PNGPCL) have been formed. In Port of Spain, Trinidad and Tobago, a number of strategic units have been established which separate infrastructure development and management from stevedoring.

Various port administration models differentiated by the way in which responsibilities are shared between the public and private sectors can be adopted by ports. Relevant models include public service ports, tool ports, landlord ports and private service ports.[33] Public-private partnerships, including terminal management concessions, are being used at some SIDS ports. Examples of management concessions include: Hutchison Port Holdings at Freeport, Bahamas; Aitken Spence PLC at Suva and Lautoka, Fiji; as well as the recent concession agreement between Jamaica Government and CMA CGM consortium under which the French company will invest $509 million to upgrade and expand Kingston Container Terminal (KCT) and operate it for 30 years. Hutchison's operation at Freeport also represents a joint venture between HPH and Grand Bahama Development Company, of which HPH owns 50 per cent.

Table 3.20 Current status of private sector participation at selected ports

Port	Current privatization status
Fiji	Ports Terminal Limited (PTL) was created as a subsidiary of Fiji Ports Corporation Limited (FPCL) in 2005 to handle the provision of marine services at the ports such as stevedoring and cargo handling. FPCL is the commercial port management company wholly owned by the Government of Fiji that manages the two major ports of Suva and Lautoka and the secondary ports of Levuka, Vuda, Malau, Rotuma and Wairiki. In August 2013, FPCL sold 51 per cent of its shares in PTL to Aitken Spence PLC and entered into a PPP concession agreement with Aitken Spence to manage the container ports of Suva and Lautoka. http://www.fijiports.com.fj/ports-terminal-limited
Papua New Guinea	Papua New Guinea Ports Corporation Limited (PNGPCL) is a State Owned Entity (SOE) whose ownership is vested in trust with the Independent Public Business Corporation ("IPBC") on behalf of the Government of PNG. It was launched on the 13 November 2006 as a fully corporatized entity owned by the State. IPBC holds shares of the company in trust for the State. The overall management and operations of PNGPCL are determined by the Papua New Guinea Harbours Act, as well as by policy directives of the National Executive Council (NEC); through the Ministry of Information and State Enterprises. The Independent Public Business Corporation of Papua New Guinea (IPBC) was established in 2002, as an Independent Entity under its own Act to hold the majority of state-owned commercial assets in trust and to manage those assets prudently to improve commercial performance and underpin economic development. http://www.pngports.com.pg/, http://www.ipbc.com.pg ,
Samoa	Samoa Ports Authority was established to operate as a self-financed, commercially viable organization, required to ensure that the ports and maritime needs of Samoa are met in an effective, efficient and timely manner. http://www.samoaportsauthority.ws
Solomon Islands	The Solomon Islands Ports Authority (SIPA) was established on 4 June 1956 as a statutory corporation by an Act of Parliament. It is a state owned enterprise (SOE) and is wholly owned by the Government of Solomon Islands. SIPA directly operates the declared Port of Honiara and Noro. Its mandate and operation is subjected to the State Owned Enterprise Act of 2007. Financially, SIPA has to be self-sufficient and operate as a commercial entity. It is required to operate as a successful business, be profitable and efficient as compared with businesses that are not owned by the crown or established as statutory bodies by an Act of Parliament. This means that SIPA has to meet all commercial operating costs and generate a net operating surplus and achieve an annual rate of return on fixed assets. http://www.sipa.com.sb/aboutcompany.html
Tonga	Port Authority Tonga (PAT) was established under the Ports Authority Act 1998 as a corporate body to promote, encourage and assist in the development of commercially viable and efficient ports in Tonga. http://www.portsauthoritytonga.com/index.php/corporate-centre/background-history
Mauritius (Port Louis)	The Cargo Handling Corporation Ltd (CHCL) is a state owned private company incorporated in October 1983 to take over the activities of four private stevedoring companies. The CHCL is the sole operator for container handling activities at Port Louis. It also handles general and bulk cargoes excluding products through pipelines. http://www.chcl.mu/info/?id=10
Comoros, Anjouan Island (Mutsamudu Port)	Mutsamudu Port was built in 1982 with African Development Bank (AfDB) financing. In 2005 an agreement was signed between Maersk and United Africa Feeder Lines (UAFL) to make Mutsamudu a regional hub port. Spanfreight, a subsidiary of UAFL, was awarded a ten-year concession.
Trinidad and Tobago (Port of Spain)	The services of the Port Authority of Trinidad and Tobago are carried out by four of separate strategic units that are accountable to the authority and, by extension, to the Government of Trinidad and Tobago. • The Port Authority of Trinidad and Tobago Governing Unit (PATTGU) is a statutory authority, which was established by the Port Authority Act. The Act provides for a

Table 3.20 Current status of private sector participation at selected ports

Port	Current privatization status
	coordinated and integrated system of harbour facilities and port services. • The Port of Spain Infrastructure Company (POSINCO) plays the strategic role of port landlord, managing the Port Authority's 151.48 hectares of real estate. Additionally, POSINCO provides the ancillary services of towage, harbour management and cruise shipping terminal operations. • The Port of Port of Spain (PPOS) is the cargo handling business unit of the Port Authority of Trinidad and Tobago. http://www.patnt.com/index.php
Trinidad and Tobago (Port Lisas)	Point Lisas Industrial Port Development Corporation Limited (PLIPDECO) was incorporated in 1966. It is a public company owned, 51 per cent by the Government of Trinidad and Tobago and 49 per cent by private shareholders including banks, insurance companies, financial institutions, company employees and the general public. PLIPDECO's two core activities are: • Industrial real estate management; and • Port management and operations, including cargo handling services. Port Point Lisas, the second major port in Trinidad and Tobago, consists of six general cargo and container berths. http://www.plipdeco.com/main/index.php?page=corporate-overview
Jamaica (Kingston Container Terminal)	The Port Authority of Jamaica is a statutory corporation established by the Port Authority Act of 1972. It is the principal maritime agency responsible for the regulation and development of Jamaica's port and shipping industry. Kingston Container Terminal (KCT), which began operations at Port Bustamante in 1975, is owned by the Port Authority of Jamaica and managed by KCT Services Limited. Vessel operations are carried out from three berths located on the north, south and west sides of the terminal and are referred to as the North (including berths 10 and 11), South and West terminals. After several years of negotiations a CMA CGM-controlled consortium has won a bid to operate Kingston Container Terminal after Singapore's PSA and DP World pulled out of the bidding process. Ownership of one of the Caribbean's most important transhipment ports is to be handed over to the CMA CGM-controlled consortium on a 30-year build-operate-transfer (BOT) model, which will invest $509 million and see the port expanded in two phases, with capacity taken successively up to 3.2-million teu and then 3.6-million teu. Kingston Container Terminal (KCT) will operate under the banner of a newly formed company — Kingston Freeport Terminal Ltd (KFTL). http://www.portjam.com/nmCMS.php?p=aboutus; http://www.arabiansupplychain.com/article-11141-cma-cgm-wins-kingston-terminal-after-dp-world-pull-out/
Jamaica (Kingston Wharves Ltd)	Kingston Wharves Limited (KWL), multipurpose terminal operators, was founded in 1945 and listed on the Jamaica Stock Exchange in 1995. Kingston Wharves Limited operates a terminal in Port Bustamante, just east and adjoining Kingston Container Terminal. It consists of a continuous quay nearly 1 600 metres long providing nine deepwater berths for ro-ro, lo-lo, container, general break bulk and bulk shipping services. From 1972 until 2001 KWL managed the transhipment facility of KCT at berths 10 and 11 when it was taken over by APM Terminals for the period 2002 until 2009. http://kingstonwharves.com.jm
Bahamas (Freeport Container Port)	In 1995, Hutchison Whampoa Ltd (an independent port investor, developer and operator) bought a 50 per cent share in Freeport harbour. The global terminal operator has been managing the port since 1997. Serving as a major hub for transhipment of containerised cargo, Freeport Container Port has 16 metres of depth alongside, 750 reefer points, and 3 berths. It contains 57 hectares of stacking area and capacity to handle 1.5 million TEUs per year. http://freeportcontainerport.com/freeport-container-port

Sources: UNCTAD secretariat based on information contained on the above port websites.

Table 3.21 Stevedoring services in ports of selected Pacific SIDS

Port/state/country	Stevedoring services	Comments/source
Koror, Palau	Belau Transfer and Terminal Company (B.T.& T.Co.)	Administrator of port facilities at the commercial seaport of Palau, stevedoring services, shipping agent. http://www.belautransfer.com
Yap Colonia International Port, Yap, Federated States of Micronesia	Waab Stevedoring Company leases the old section of the quay and performs most cargo handling services.	Waab Transportation Co. Inc. PO Box 177, Yap, FM 96943 grtceo@yahoo.com George R Torwan Federated States of Micronesia Infrastructure Development Plan (IDP) 2004–2023
Weno Harbour, Chuuk, Federated States of Micronesia	Transco Co. Ltd is in charge of cargo handling operations.	Truk Transportation Company, Inc. PO Box 99, Weno Chuuk FM 96942 Tel: (691) 330-2147; Fax: 330-2726; e-mail: transco@mail.fm
Okat Port, Kosrae, Federated States of Micronesia	Kusaie Terminal & Stevedoring Company (KT&SC) has operated the port since it was built in 1984.	Federated States of Micronesia Infrastructure Development Plan (IDP) 2004–2023 (see Yap)
Delap Dock, Majuro, Marshall Islands	Majuro Stevedore and Terminal Company (MSTCO) provide all stevedoring services at Delap Dock for the Republic of the Marshall Islands Ports Authority.	Port of Majuro Pre-Final Master Plan, February 2014
Tuvalu	Government controls stevedoring.	Tuvalu Diagnostic Trade Integration Study 2010 Report https://www.enhancedif.org
Papua New Guinea	Stevedoring organizations are licensed by the Papua New Guinea Ports Corporation Ltd and may stevedore within the Papua New Guinea Ports Corporation Ltd operating areas with the exceptions of certain smaller ports, some classes of vessels working at the coastal wharves and ships at private wharves. The Independent Consumer and Competition Commission may restrict the licensing of the stevedores at each port to the number which it considers reasonable in the interests of efficiency.	http://www.pngports.com.pg
Apia, Samoa	In Apia private companies provide stevedoring. Four stevedoring companies compete for the right to handle container and break bulk cargoes.	http://dlca.logcluster.org/
Solomon Islands	The Solomon Islands Port Authority arranges stevedore services at the port with two shifts per day. There are no other stevedore services offered.	http://dlca.logcluster.org

Source: UNCTAD secretariat based on information available from respective port authorities, stevedores and the Logistics Capacity Assessment (LCA) of the World Food Programme (WFP) Logistics.

Except in the case of the traditional public service port, cargo handling is a key activity entrusted to the private sector. Table 3.21 provides some examples in selected Pacific SIDS of public and private sector engagement in stevedoring Except for Solomon Islands and Tuvalu, these are all in the private sector domain.

4. Financing

SIDS have used a full range of financing mechanisms for the development of their seaports, including grants, loans and direct investment from the private sector.

(a) Grant aid

For smaller ports in the Pacific, grant aid has been a major source of financing. The Japan International Cooperation Agency (JICA), for example, has been active in supporting projects that improved the connectivity of Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Samoa, Solomon Islands, Tuvalu and Vanuatu.

(b) Concessional bilateral loans

In some other cases concessional bilateral loans have been made available, as has been the case for example, for the Port Vila Lapetasi International Multi-Purpose Wharf Development Project in Vanuatu which benefited from a loan from JICA.[34]

(c) Loans and grants from development agencies

International lending agencies and developments banks such as the Caribbean Development Bank (CDB), African Development Bank (AfDB) and ADB have participated in the financing of ports, such as the Papua New Guinea Lae Port Development Project. In this $154-million project, loans and grants were obtained through the ADB, the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development, the Japan Fund for Poverty Reduction and the Cooperation Fund for Fighting HIV/AIDS in Asia and the Pacific, with the Papua New Guinea Government contributing nearly 30 per cent (see table 3.22).

(d) Self-financing

The National Infrastructure Investment Plan 2010 of Tonga, which includes some capital expenditure ($ 6 millions) for the Queen Salote Wharf (Nuku'alofa) is a recent example of self-financing. The source of funds is the Ports Authority Tonga (PAT).

(e) Public-private partnership (PPPs)

As previously mentioned, PPPs are not new for SIDS – in the Caribbean they have been used in various infrastructure projects including roads, ports and airports, though not always successfully. However, recent years have witnessed a new surge of PPPs to provide for more infrastructure project development including in maritime transport. Many governments have increasingly been turning to PPPs to meet their infrastructure needs, driven by a combination of tight fiscal constraints, the need for innovative sources of finance and the growing appreciation of the role and expertise of the private sector in delivering public services. A case in point is the Jamaica PPP model for the operation of the Kingston Container Terminal. PPPs have also been a modality for managing and developing ports in other regions, for example, Mutsamudu, Comoros; Suva and Lautoka, Fiji; Port Louis, Mauritius; and Tibar Bay Port, Timor-Leste.

The expertise of private partners for building, operating and maintaining transport infrastructure and services is significant and constitutes an important resource to draw from in addition to finance. However, experience has shown that for PPPs to be successful they require well prepared, structured and managed projects, supported by clear PPP policy and legislation framework and institutions. To this end, for instance the CDB is establishing a PPP unit to enable coordination of donor support and ensure sustained capacity building at the country level and improvements in the regulatory environment. CDB intends to assist countries by providing upstream capacity building through the provision of technical assistance and downstream support through the financing of private sector investment in PPPs.

Table 3.22 Financing the Lae Port development project, Papua New Guinea ($ million)

Source	Total	Per cent	
Asian Development Bank	100.00	64.9	
- Ordinary capital resources (OCR)	60.00	39.0	24 years with a grace period of 4 years, an interest rate determine in accordance with ADB's London interbank offered rate (LIBOR) based lending facility, a commitment charge of 0.35 per cent pe annum, and such other terms and conditions set forth in the draf OCR loan agreement.
- Asian Development Fund (ADF)	40.00	26.0	32 years including a grace period of 8 years, an interest charge of per cent per annum during the grace period and 1.5 per cent pe annum thereafter, equal amortization, and such other terms an conditions set forth in the draft ADF loan agreement.
Japan Fund for Poverty Reduction	1.50	1.0	Grant
Cooperation Fund for Fighting HIV/AIDS in Asia and the Pacific	0.75	0.5	Grant
OPEC Fund for International Development	6.00	3.9	20 years, including a grace period of 5 years, and an interest charg of 1.5 per cent, plus a 1 per cent service charge to be fixed for th term of the loan.
Government	45.75	29.7	
Total	154.00	100.0	

Source: Asian Development Bank, Papua New Guinea: Lae Port Development Project (Additional Financing, Project Administration Manual, Project Number: 40037 October 2011. http://www.adb.org/sites/default/files/project-document/75365/40037-043-png-pam.pdf.

(f) Full private sector financing

An example of full private sector financing is Kingston Wharves Limited, which was listed on the Jamaica Stock Exchange in 1995. As previously mentioned, Hutchison's operation at Freeport also represents full private sector participation as they have a 50 percent holding in the port. Other fully private operations include Port Lisas, Trinidad and Tobago. Private sector financing of port development is also undertaken by minerals companies, for example, the Prony Bay Port, New Caledonia (Goro Nickel Project of Vale Nouvelle-Calédonie) and the Lihir port facilities on Niolam Island, New Ireland Province, Papua New Guinea (goldmine, Newcrest Mining Limited).

F. Summary of key issues facing ports in SIDS

The above analysis highlights a number of port issues that require special attention and include in particular concerns relating to infrastructure (age, containerization-related requirements, berthing priorities, maintenance and vulnerability); and equipment (adequacy and maintenance). These are summarized below.

(a) Infrastructure

Age: The age of some port infrastructure and superstructure, often combined with poor maintenance, means that their structural integrity is compromised. At the very least this means that restrictions on vessel sizes berthing alongside the infrastructure need to be imposed and/or weight restrictions on cargo and vehicles enacted. Moreover, the state of the infrastructure may require rehabilitation, reconstruction or relocation of the facility.

Containerization: Port infrastructure facilities in many SIDS were constructed before the advent of the container. Consequently, the deck loadings, terminal design and layout (including space allocated to warehousing and storage spaces) do not meet the requirements for the rapid handling of containers. While a number of ports are taking action to remedy these shortcomings, further improvements can be made. In this respect, ports need to ensure that they have adequate berth lengths, quay apron areas, internal road access, and container storage areas.

Maintenance: Adequate maintenance of port infrastructure is essential to ensure that the assets continue to provide the services for which they were designed and so that they do not deteriorate more rapidly because of the postponement of maintenance. In most grant-aided or loan projects, the responsibility for repairs and periodic maintenance lies with the recipient port or country. However, in many cases such maintenance is not undertaken. In the CARICOM region, for instance, ECLAC noted that, "While the coverage of infrastructure in CARICOM can be considered as acceptable, a major problem has been its maintenance."[35] A continuing challenge for CARICOM ports (especially smaller island ports) is the acquisition of financing for capital and maintenance projects. In the Pacific, the ADB's regional technical assistance project on "Improving the Delivery of Infrastructure Services in the Pacific" assessed the maintenance issues in the ports of eight countries. For Papua New Guinea, Tonga and Vanuatu it noted a number of significant maintenance issues (see table 3.23).

Berthing priorities: Tourism has become an increasingly important contributor to the economies of SIDS. Amongst other changes, this has led to increased calls of cruise ships. In SIDS without dedicated cruise ship berthing facilities, cruise ships are generally given priority berthing at cargo handling facilities. As a result, the cargo handling process is delayed which increases the costs of imports and reduces export competitiveness.

Separation of cargo and passenger services is desirable for safety and amenity. In some cases countries have found locations for passenger terminals that have more central locations. A case in point is Barbados which has been facing a significant challenge as cargo ships are forced to wait until after cruise vessels sail in the afternoon to commence their load and discharge operations. Work has begun on a new state-of-the-art cruise terminal, expected to cost over $300 million, being built in Barbados with the capacity to berth some of the world's largest cruise ships. The proposed facility will separate cruise and cargo activities, thereby addressing concerns about the two competing for limited space within the port.

Vulnerability: The approach channels, anchorages and port areas of many SIDS are particularly vulnerable to maritime accidents arising from grounding and/or sinking of vessels as well as collisions of vessels with each other or with port infrastructure. This arises because of narrow approach channels which can become obstructed in the case of grounding or sinking. It also arises because ports often only have one berth for cargo handling which, if damaged, becomes unusable thereby severing the country's lifeline. Associated with such accidents are the risk of oil spills and the limited technical and financial resources of SIDS to remove sunken or damaged vessels. Whilst these risks cannot be eliminated the probability of their occurrence can be reduced through the installation of appropriate navigational aids and regulations that, for example, require vessels to proceed to sea in the event of cyclonic weather.

(b) Equipment

Adequacy: The efficient handling of containers requires a minimum of equipment to move containers from the ship's side to the stacking area as well as moving containers in the stacking area or out of the port area. There are a number of different subsystems in the movement of containers, the capacities of which need to be matched. For example, if a ship's crane has a cycle time of say four minutes (it takes four minutes to hook on the container, lift it to the quay, unhook the container and return to lift off the next container) 15 containers per hour can be handled. However, if there is a tractor trailer system with a cycle time of say 12 minutes (to take the container from the ship's side to the stacking area and return to the ship's side) then it can only handle five containers per hour. The overall productivity of the system is, in such a situation, only five containers per hour. One solution to this problem would be to increase the number of tractor trailer units. However, in many cases financing is an issue. A cost-benefit analysis may conclude that with low traffic volumes the additional investment is not warranted.

Maintenance: In addition to adequacy of equipment, there is also an issue of maintenance. Lack of funds, spare parts and maintenance plans as well as insufficient skills are often an obstacle to adequate maintenance. Clearly, there is a need to develop appropriate maintenance schedules, keep an adequate stock of spare parts, set aside sufficient funds and ensure that maintenance staff receives the right

training. An associated issue is when different donors give different brands of equipment requiring in principle separate sets of spare parts and reducing the ability to interchange (cannibalize) parts between different pieces of equipment.

Table 3.23 Maintenance issues in selected Pacific SIDS

	Cook Islands	Federated States of Micronesia	Fiji	Palau	Papua New Guinea	Samoa	Tonga	Vanuatu
Ports	Maintenance issues are not evident in urban ports (Rarotonga and Aitutake), which are under the corporatized CIPA. Stevedoring services are outsourced in Rarotonga only. Outer Island ports under the OMIA are dilapidated due to lack of resources, trained staff/skills and capacity for maintenance.	Significant maintenance issues are not evident, except in Kosrae where considerable political influence over operations and expenditures is evident. All commercial ports in the FSM are under State corporatized entities. Stevedoring services are outsourced in all States but are not competitive or well regulated.	Significant maintenance issues are not evident in the six commercial ports under the corporatized and well-managed Fiji Ports Corporation Ltd (FPCL). Stevedoring services provided by a wholly-owned subsidiary of FPCL, not outsourced. Ports are regulated by the Commerce Commission.	Significant maintenance issues are not evident, but the commercial port is under the total effective control of a private stevedoring company operating without competition or regulation. The private company maintains the port out of commercial interest, but the facility itself is owned by Koror State. There is no Ports Authority. The port dates from WWII and will need overhaul soon.	Serious maintenance issues are evident in the major ports of Lae and POM; many small Provincial ports are dilapidated. The PNG Ports Corporation is the corporatized entity responsible for all ports, taking over from the previous Harbours Board. The Ports Corporation , remains under-funded and not yet functioning effectively. Stevedoring services are not outsourced.	Significant maintenance issues are not evident. The sector is under the corporatized Samoa Ports Authority.	Though the sector is under the corporatized Ports Authority of Tonga (there is only one commercial port, in Nuku'alofa), the PAT lacks commercial orientation, trained staff/skills or capacity for maintenance. The PAT is subject to poor assessment of maintenance and upgrading needs. The port is in poor repair and needs urgent upgrading (including safety systems).	Two commercial ports under the corporatized Ports Authority; O&M outsourced in both. Poor maintenance in the Santo port due to poor supervision of private sector contract. In Port Vila, ports O&M carried out under a well-executed contract by a private company that owns and operates the domestic port outright. Maintenance issues are not evident in outsourced port operations in Port Vila.

Source: Asian Development Bank, REG: Improving the Delivery of Infrastructure Services in the Pacific, Technical Assistance Consultant's Report, Project Number: 38633, December 2007, http://www.adb.org/sites/default/files/project-document/65495/38633-reg-tacr.pdf.

IV. CLIMATE CHANGE IMPACTS, DISASTER RISKS AND ADAPTATION ACTION

The geographical location and topological features of SIDS makes them extremely vulnerable to the impacts of climate change and natural hazards.[36] Many SIDS face the impacts of strong winds, heavy rainfall, storm surges and wave action from hurricanes, cyclones or typhoons; while from geologically related natural hazards they suffer the impacts of rupturing of the earth's surface, ground failure and induced damage from earthquakes, volcanic eruptions and tsunamis. They are also vulnerable to man-made hazards such as maritime oil spills.

A. Climate change[37]

Extensive scientific modelling and research has been undertaken on climate change and its impact in SIDS including in particular assessments by the International Panel on Climate Change (IPCC), governments and scientific research organizations. The IPCC Fifth Assessment Report, Chapter 29 on "Small Islands"[38] concludes that:

"Current and future climate-related drivers of risk for small islands during the 21st century include sea-level rise, tropical and extra-tropical cyclones, increasing air and sea surface temperatures, and changing rainfall patterns (high confidence, robust evidence, high agreement). Sea-level rise poses one of the most widely recognized climate change threats to low-lying coastal areas on islands and atolls (high confidence, robust evidence and high agreement)."

The previous IPCC Fourth Assessment Report, Chapter 11[39] summarized the findings of the projected regional change for "Small Islands" over the 21st century as follows:

"Sea levels are likely to rise on average during the century around the small islands of the Caribbean Sea, Indian Ocean and northern and southern Pacific Oceans. The rise will likely not be geographically uniform but large deviations among models make regional estimates across the Caribbean, Indian and Pacific Oceans uncertain. All Caribbean, Indian Ocean and North and South Pacific islands are very likely to warm during this century. The warming is likely to be somewhat smaller than the global annual mean. Summer rainfall in the Caribbean is likely to decrease in the vicinity of the Greater Antilles but changes elsewhere and in winter are uncertain. Annual rainfall is likely to increase in the northern Indian Ocean with increases likely in the vicinity of the Seychelles in December, January and February, and in the vicinity of the Maldives in June, July and August, while decreases are likely in the vicinity of Mauritius in June, July and August. Annual rainfall is likely to increase in the equatorial Pacific, while decreases are projected by most models for just east of French Polynesia in December, January and February."

According to available evidence there is a long-term increasing trend in the mean air temperature.[40] Projections for the end of the twenty-first century suggest that the atmospheric temperature will increase between 1° Celsius (C) and 3.7°C (mean estimates, see table 4.1), depending on the scenario.[41]

Table 4.1 Forecasts of global mean surface temperature and global mean sea-level changes for the period 2081–2100

Scenario	*Temperature*		*Sea-level rise*	
	Mean (°C)	Likely range (°C)	Mean (m)	Likely range (m)
RCP 2.6	1.0	0.3–1.7	0.40	0.26–0.55
RCP 4.5	1.8	1.1–2.6	0.47	0.32–0.63
RCP 6.0	2.2	1.4–3.1	0.48	0.33–0.63
RCP 8.5	3.7	2.6–4.8	0.63	0.45–0.82

Source: IPCC, 2013.

Note: Forecasted means and likely ranges calculated with a baseline on data available for the period 1986–2005, according to different scenarios. Predictions are made according to four radiative forcing scenarios (representative concentration pathways).[42]

Precipitation has also been found to be changing. For example, rainfall records for the Caribbean region for the period (1900–2000) show a consistent reduction in rainfall; in comparison, rainfall on Seychelles in the same period has shown substantial variability that can be associated with the El Niño–Southern Oscillation. Nevertheless, average rainfall on Seychelles increased during the latter part of the twentieth century, 1959 to 1997.[43]

Many SIDS lie in the hurricane zone of the Atlantic, Pacific or Indian Ocean basins. In the Atlantic basin, many of the storms recorded over the past century had their origin in the vicinity of Cape Verde and moved across the Atlantic passing over the SIDS of the Lesser Antilles, then continuing on to Jamaica and the Bahamas. In the Pacific basin, SIDS lying in the hurricane track zone include Fiji, Samoa, Tonga and Vanuatu (southern Pacific Basin) and Marshall Islands, Federated States of Micronesia and Palau (northern Pacific Basin). Tuvalu and Solomon Islands are inside the northern edge of the zone, while Kiribati, Nauru and Papua New Guinea are largely outside of the zone. In the Indian Ocean basin, Mauritius is in the middle of the hurricane zone, Comoros and Seychelles are largely outside the zone and the Maldives is outside the zone. Over the period 1990 to 2012, the estimated total damage caused by storms to SIDS was around $7.5 billion. Of this total 85 per cent was accounted for by the Caribbean, where the worst year was 2004 with damages concentrating in particular on the Bahamas, Grenada and Jamaica. Damage in the Pacific for the same period totalled $914 million, and was particularly severe in Samoa and Fiji. And, in the Indian Ocean damage was estimated at $225 million, with more than 80 per cent in Mauritius.

Temperature increases are also associated with a substantial rise of the mean sea level.[44] Since 1860, sea levels have increased by about 0.20 m, with the rate of increase becoming progressively greater, particularly since the 1990s; satellite information[45] shows that sea levels rise at a rate close to the upper range of previous IPCC projections (about 3.1 millimetres per year). Due to the large spatial variability observed in **the sea-level rise,** regional trends in sea level should be considered when assessing potential impacts over any particular SIDS. Combinations of global and regional factors can cause relatively rapid rates of sea-level change along particular island coasts that can be different from the current global rate (3 millimetres per year).[46] Some models are predicting a sea-level rise of between 1 and 2 m by the end of this century. Such rises will be catastrophic for a number of low-lying SIDS, especially if combined with storm surges. For example, most of the land of Maldives, Kiribati, the Marshall Islands and Tuvalu has an elevation of less than 5 m, whereas 72 per cent of Bahama's land is below 5 m in elevation. Between 30 per cent and 50 per cent of the land in Antigua and Barbuda, Seychelles, Micronesia, Nauru and Tonga is less than 5 m in elevation.

Table 4.2 Percentage land area where the elevation is less than five metres

Country	Percentage land area where the elevation is less than 5 metres
Caribbean	
Antigua and Barbuda	32.4
Bahamas	72.0
Barbados	15.7
Grenada	21.7
Jamaica	7.1
Saint Kitts and Nevis	19.0
Saint Lucia	8.0
Saint Vincent	22.0
Trinidad and Tobago	8.0
Indian Ocean	
Comoros	13.5
Maldives	100.0
Mauritius	7.1
Seychelles	43.9
Pacific	
Fiji	11.4
Kiribati	96.7
Marshall Islands	99.0
Micronesia (Federated States of)	33.4
Nauru	40.4
Palau	21.4
Papua New Guinea	1.8
Samoa	7.3
Solomon Islands	11.5
Timor-Leste	2.9
Tonga	40.5
Tuvalu	100.0
Vanuatu	11.7
West Africa	
Cape Verde	14.5
Sao Tome and Principe	14.7

Source: National Aggregates of Geospatial Data: Population, Landscape and Climate Estimates, v.2 (PLACE II) (2007). Center for International Earth Science Information Network (CIESIN). Columbia University. New York. Available at: http://sedac.ciesin.columbia.edu/place.

B. Geological hazards

Many SIDS lie along the edges of the earth's tectonic plates. This means that they are susceptible to volcanic eruptions and earthquakes as well as being the source regions of tsunamis. All of the Caribbean SIDS except the Bahamas lie on the edge of the Caribbean plate; a number of Pacific island SIDS including Fiji, Vanuatu, Samoa, Solomon Islands, Tonga and Papua New Guinea lie on the edge of the Pacific plate; and Timor-Leste lies on the edge of the Australian plate. These regions are extremely prone to earthquakes, volcano eruptions and tsunamis.[47]

Over the period 1990 to 2012, the estimated total damage caused by earthquakes, tsunamis and volcanoes to SIDS was around $800 million. The impact of tsunamis was the largest, accounting for more than 80 per cent of the total amount of damage ($660 million). Tsunamis also have the greatest impact on human lives, with more than 2 500 deaths being recorded on SIDS during the period. Geographically, earthquake damage was greatest in Trinidad and Tobago ($25 million) and Papua New Guinea ($5 million); tsunami damage was greatest in Maldives ($470 million from the 2004 Indian Ocean Tsunami) and Samoa ($150 million); and volcano damage was mainly in Papua New Guinea ($110 million).

C. Potential impacts of climate change and other hazards on transport infrastructure

Water events (resulting from increased rainfall or the action of the sea, storms and tropical cyclones, and sea level rise) compromise the integrity of roads, bridges and airport runways; lead to scouring under bridges and erosion of road bases; cause inundation of roads, ports and airports; seriously damage port and airport equipment and disrupt traffic and cut off access. The exposure to seawater also has a corrosive effect on infrastructure. Equipment and facilities including bridges, terminal cranes and

navigation aids can also be seriously affected by strong winds. Tsunamis and earthquakes can inflict major damage on transport infrastructure including: cracked road, seaport and airport pavements; damage to suspended infrastructure (including bridges, overpasses, quay decking and their supports) and to buildings, communications, traffic management systems and power and liquid fuel storage facilities; and the submerging of infrastructure and scouring of foundations. For example, the UNDP has estimated the exposure of port infrastructure to sea level rise in the Caribbean and concludes that most ports would be inundated with a one-metre sea level rise (see table 4.3). However, information on exposure of port infrastructure to sea level rise outside of the Caribbean tends to be limited; given the location of seaports it is likely that many would be inundated.

Table 4.3 Impacts of a one meter sea lever rise in CARICOM nations

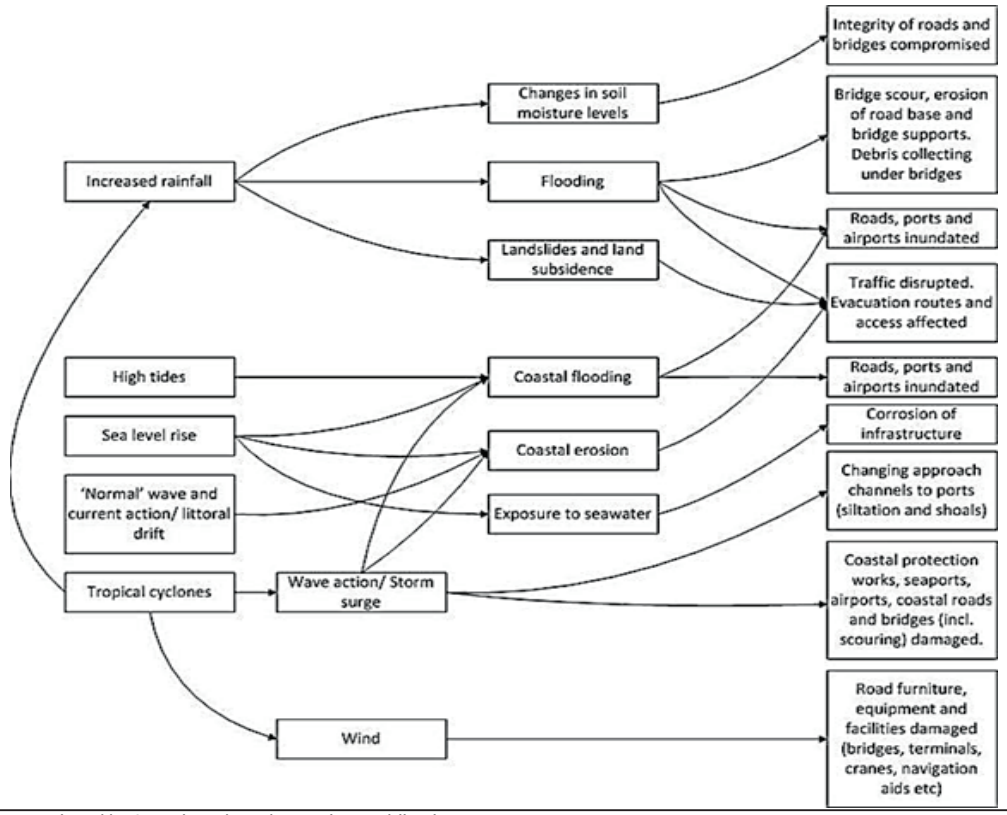
	Land Area	Population	Urban Area	Wetland Area	Agricultural Land	Crop and Plantation	Major Tourism Resorts	Airports	Road Network	Protected Areas	Sea Turtle Nests	Power Plants	Ports
Antigua & Barbuda	2%	3%	2%	*	2%	1%	10%	0%	2%	5%	12%	0%	100%
Barbados	1%	1%	<1%	*	<1%	<1%	8%	0%	0%	*	3%	0%	100%
Belize	1%	1%	1%	2%	1%	1%	73%	50%	4%	0%	44%	33%	40%
Dominica	<1%	1%	<1%	*	5%	<1%	0%	0%	14%	0%	7%	0%	67%
Grenada	1%	1%	<1%	*	3%	1%	11%	100%	1%	*	8%	0%	100%
Guyana	<1%	1%	<1%	1%	<1%	*	0%	0%	12%	*	50%	100%	0%
Haiti	<1%	1%	1%	2%	3%	1%	46%	50%	1%	*	44%	0%	100%
Jamaica	<1%	0%	<1%	<1%	1%	<1%	8%	20%	2%	1%	25%	0%	100%
Montserrat	1%	1%	*	*	2%	1%	0%	0%	4%	*	4%	0%	100%
St. Kitts & Nevis	1%	2%	1%	*	5%	1%	64%	50%	0%	*	35%	0%	50%
St. Lucia	1%	1%	<1%	*	1%	1%	7%	50%	0%	0%	6%	0%	100%
St. Vincent & the Grenadines	1%	1%	1%	*	2%	1%	10%	50%	1%	*	11%	0%	67%
Suriname	<1%	1%	1%	<1%	<1%	<1%	5%	0%	7%	0%	0%	0%	100%
The Bahamas	5%	5%	3%	5%	6%	3%	36%	38%	14%	1%	35%	38%	90%
Trinidad & Tobago	1%	1%	1%	<1%	3%	*	33%	50%	1%	0.%	15%	0%	100%

* Unable to calculate due to various data restrictions

Source: UNDP (2010). Quantification and magnitude of losses and damages resulting from the impacts of climate change: Modelling the transformational impacts and costs of sea level rise in the Caribbean.

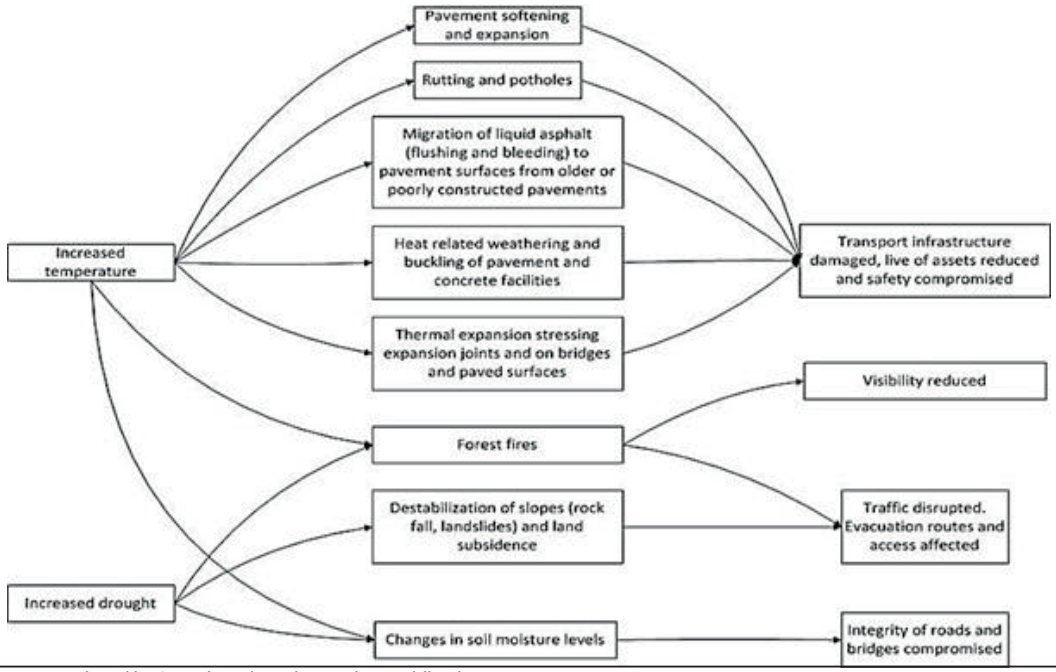
Figures 4.1, 4.2 and 4.3 further illustrate the linkages between various wind and water events; earthquakes and tsunamis; and temperature increases; and their potential impact on transport infrastructure.

Figure 4.1 Potential impacts of wind and water on transport infrastructure



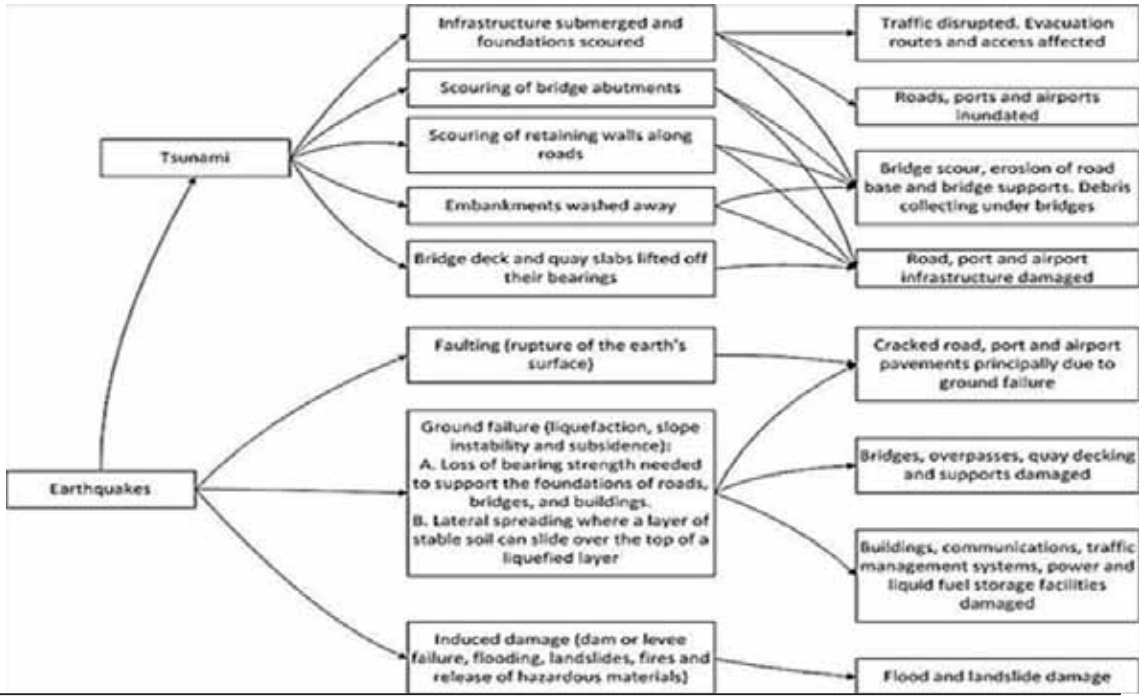
Source: Developed by Consultant based on various publications.

Figure 4.2 Potential impacts of temperature and drought on transport infrastructure



Source: Developed by Consultant based on various publications.

Figure 4.3 Potential impacts of tectonic movements on transport infrastructure



Source: Developed by Consultant based on various publications.

D. Response measures and adaption action

1. The need for adaptation action in coastal transport infrastructure

In a survey of 98 international ports,[48] it was found that about half of the respondents believed that climate change would negatively impact their port operations in the coming decades but about two thirds did not feel well informed about how climate change might directly impact their own port. Most, however, had no policies in place that specifically address climate change adaptation.

Table 4.4 Selected potential adaptation and disaster mitigation measures in ports

Climate change/natural disaster factor	Adaptation measures
Rising sea levels Flooding and inundation Erosion of coastal areas	Relocation, redesign and construction of coastal protection schemes (e.g. levees, seawalls, dikes, infrastructure elevation) Insurance Strengthening and elevation of infrastructure e.g. ports and 62arbor facilities Reduction or avoidance of development/settlement in coastal flood prone areas though economic incentives and regulation Provision for evacuation routes and operational plans Preparation for service delays or cancellations Adjustments to speed and frequency of service
Extreme weather conditions Hurricanes Storms Floods Increased precipitation Wind	Integration of emergency evacuation procedures into operations Setting up of barriers and protection structures Relocation of infrastructure Ensuring functioning of alternatives routes Greater monitoring of infrastructure conditions Restriction of development and settlement in low lying areas Construction of slope retention structures Preparation for service delays or cancellations Adjustments to speed and frequency of services Strengthening of foundations, raising dock and wharf levels Smart technologies for abnormal events detection New design for sturdier ships Development of new design standards for hydraulic structures such as drainage channels Better land use planning in flood prone areas Construction of storm retention basins for flush flooding
Rising temperatures Increases in very hot days and heat waves Large variations in temperature	Greater use of heat-resistant construction and materials Continuous inspection, repair and maintenance Monitoring of infrastructure temperatures Adjustments to cargo loads Adjustments to speed and frequency of service Preparation for service delays or cancellations Refrigeration, cooling and ventilation systems Insulation and refrigeration Modal shift Transit management scheme and regulation of navigation in northern regions Ship design, skilled labour and training requirements Development of new designs for building transportation systems on less stable soils
Tectonic movement Earthquakes Tsunamis	Adopt engineering standards appropriate to the earthquake risk in the area[49]

Source: UNCTAD secretariat based on literature review.

Partly to address some of the knowledge gaps and policy implications identified in the survey, a number of policy papers and meetings convened by UNCTAD, the Economic Commission for Europe (ECE) and the European Commission[50] in the last five years have highlighted the importance of climate change impacts and adaptation for the transport sector in general and seaports in particular. Experts participating in these meetings underscored the importance of ports for global connectedness and the crucial need to embark on adaptation action and plan for known impacts. Table 4.4 shows selected potential adaptation measures identified for ports.

Most ports, including in developing countries and SIDS, have "no policies in place that specifically address climate change adaptation".[51] Barriers to adaptation in SIDS[52] include a lack of financial resources; inadequate institutional systems and individual capacity in issues related to climate change; inadequate public awareness on climate change and its impact on ecosystems and the economy; and limited training and technology transfer on adaptation and mitigation technologies.

2. Relevant national and regional response measures: Adaptation and disaster risk reduction

Until recently, countries have been operating under two different United Nations mandates and two different United Nations bodies when dealing with disaster risk reduction and climate change adaptation. The implications of this situation were, in the Pacific for example, that under disaster risk reduction there was a Pacific Disaster Risk Reduction and Disaster Management Framework for Action (2005–2015) and National Adaption Plans while under climate change adaptation a Pacific Regional Framework on Climate Change, National Communications and National Adaptation Plans of Action (NAPAs) existed. In a review undertaken by UNISDR and UNDP[53] the need to integrate DRR and CCA was recognized, based on the need to ease the burden of programming development assistance; minimizing the risk of duplicating efforts; reducing potential conflicts in policy development; and making efficient use of scarce resources.

Some activities have been undertaken including, for instance, the development of a Joint National Action Plan (JNAP) for CCA and DRM 2010–2015 by Tonga in 2010. Similar plans have been developed by Cook Islands, Marshall Islands and Tuvalu. SIDS in other regions have also been working towards joint plans. In the Indian Ocean, for example, the Maldives has drafted a Strategic National Action Plan for Disaster Risk Reduction and Climate Change Adaptation 2010–2020. Most recently, the Fifth Assessment Report of the IPCC stated that:

"Adaptation to climate change generates larger benefit to small islands when delivered in conjunction with other development activities, such as disaster risk reduction and community based approaches to development (medium confidence) [29.6.4]. Addressing the critical social, economic and environmental issues of the day, raising awareness and communicating future risks to local communities [29.6.3] will likely increase human and environmental resilience to the longer-term impacts of climate change [29.6.1, 29.6.2.3, figure 29-5]."[54]

Whilst the need to integrate CCA and DRR has been recognized it should be noted that these two issues sit within National Sustainable Development Plans. Within the framework of compliance with the UNISDR and UNFCCC mandates there have been broad policy statements and a limited number of specific projects and project proposals in the physical infrastructure sectors. Table 4.5 shows extracts from the Cook Islands JNAP for Disaster Risk Management Climate Change Adaptation (2011–2015). These extracts highlight the importance of: mainstreaming CCA and DRR into national development plans, sector plans, policies, legislation and budgeting; monitoring and assessing geophysical and climate change risks and incorporating them into development planning; and strengthening and climate-proofing infrastructure in coastal zones.

The 7th Conference of the Parties (COP) of the UNFCCC held in 2001, further, decided that the Global Environment Facility (GEF) should provide financial resources to developing country parties, in particular the least developed, and the SIDS among them, to establish pilot or demonstration projects to show how adaptation planning and assessment can be practically translated into projects that will provide real benefits, and may be integrated into national policy and sustainable development planning. However, only 10 SIDS submitted NAPAs. While most of the proposed projects dealt with issues such as water resources, fisheries, agriculture, health, coral reef restoration and early warning systems, only a limited number dealt with protection of transport infrastructure systems. Table 4.6 summarizes the projects that had a transport component. A number of initiatives exist at the regional level, which also include or recognize the importance of CCA and DRR in the transport sector as illustrated below:

Table 4.5 Cook Islands Joint National Action Plan for Disaster Risk Management and Climate Change Adaptation (JNAP) 2011-2015

ACTIONS	INDICATIVE SUB-ACTIONS	KEY PERFORMANCE INDICATORS
STRATEGY: MAINSTREAM NATURAL HAZARD AND CLIMATE CHANGE-RELATED RISK CONSIDERATIONS IN PLANNING AND BUDGETARY SYSTEMS		
Mainstream DRM and CCA into national development plans, sector plans, policies, legislation and budgeting	1. Incorporate DRM and CCA in national development plans 2. Integrate natural hazard and climate change-related risk considerations into sector policies, plans and legislation 3. Incorporate NAPA in ministry and agency work plans and annual budget submissions	1. DRM and CCA integrated in the National Sustainable Development Plan 2. Relevant policies, plans and legislation have sections on DRM 3. NAPA is reflected in relevant agencies work plans
STRATEGY: MONITOR AND ASSESS RISKS AND VULNERABILITIES, INCLUDING VULNERABILITIES TO CLIMATE CHANGE		
Monitor and assess geophysical and climate change risks and incorporate into development planning	1. Strengthen use of spatial mapping technologies and extend the development of risk exposure databases, taking into account the risks related to climate change 2. Conduct climate and sea surge modelling for areas at risk and to inform new coastal developments 3. Strengthen system of weather data collection and monitoring on all islands	1. Spatial location of risk is mapped 2. Risk modelling and projections used in project planning 3. Monitoring systems in place
STRATEGY: STRENGTHEN INFRASTRUCTURE AND SAFEGUARD ESSENTIAL SERVICES		
Strengthen and climate proof infrastructure in coastal zone	1. Identify coastal infrastructure in need of strengthening to the impacts of climate change (e.g. reticulation systems, airports, coastal roads, etc.) 2. Construct appropriate coastal protection structures to prevent flooding and damage from storm sea surge (e.g. Avatiu and Avarua townships) 3. Upgrade coastal protection structures and harbours to higher cyclone and storm standards, and to any additional impacts of climate change and sea level rise	1. Studies on climate change vulnerability of coastal infrastructure and services completed 2. All vulnerable coastal infrastructures are identified and climate proofed 3. Coastal protection structures and harbours are strengthened and climate proofed

(a) Pacific

The Pacific Adaptation to Climate Change (PACC) programme, for example, has projects aimed at climate proofing and protecting coastlines in 14 countries including in the Cook Islands, the Federated States of Micronesia, Samoa and Vanuatu. The pilot project in the Federated States of Micronesia, for example, focused on improving a 7-km section of Kosrae's coastal road, which is the main transport route on the island. The section of road was being progressively damaged by flooding from heavy rains and high tides. Interventions included redesigning and raising the level of the road and building larger culverts to withstand the heavier rainfall and higher sea levels that were anticipated in the coming decades. The ADB has set up an adaptation programme which includes water supply and sanitation, water resources, health, urban development and road transport sectors. It has also recently published *Guidelines for Climate Proofing Investment in the Transport Sector: Road Infrastructure Projects* (2011). Climate proofing is also part of some port improvement projects.[55] An example is the ADB's project for the upgrading of Avatiu port in the Cook Islands. The project is expected to replace the existing structure that is extremely vulnerable to wave action and forces with a new structure that is fully resistant to such forces. The project will also enable the wharf to be raised along with the container yard-deck, should a rising sea level require it."[56]

Table 4.6 NAPAs with transport components

Country	Project	Description
Cape Verde	Integrated protection and management of coastal zones	The project noted that 80 per cent of the population was located in the coastal zone and that "flat islands" such as Sal, Boavista and Maio were the most vulnerable. Amongst the benefits of the project, protection of tourist infrastructure (including airports) was noted.
Kiribati	Upgrading of coastal defences and causeway	The project, included as an objective "to prevent encroaching coastal erosion from affecting public infrastructure such as roads, airfields and community public assets by upgrading existing seawalls".
Maldives	Coastal protection of Male International Airport (MIA) to reduce the risk from sea induced flooding and predicted sea level rise	The project noted, "due to their low elevation and proximity to coastline, the infrastructure of the five main airports is highly vulnerable to damage from severe weather-related flooding and future climatic change". The activities proposed within the project were: (1) Undertake detailed technical and engineering studies for the coastal protection of MIA, including cost effectiveness of the proposed solutions; (2) Develop detailed engineering and design of coastal protection measures for MIA; and (3) Construction of demonstration coastal protection measures on part of the coastline of MIA.
Samoa	Implement coastal infrastructure management plans for highly vulnerable districts	The project included upgrading of roads, culverts and drains as part of its activities.
Solomon Islands	Coastal protection	One of the outcomes of the project was "construction and climate proofing of engineered coastal roads, bridges and other key infrastructure".
Solomon Islands	Infrastructure development	Outcomes for the project were: (1) Improved operational safety and efficiency of airport and airport facilities; (2) Constructing of engineered protective structures in the harbour and coastal areas: and (3) Climate proof key infrastructure. Some of the activities to be included were: climate-proof design criteria for airport development with a 60-year recurrence; construction of protective seawalls, revetments, culverts, bulkheads, jetties and floodgates; building of drainage system for the protection of airports; and replanting of foreshore vegetation.

Source: UNCTAD secretariat based on information available at http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4583.php.

(b) Caribbean

The Caribbean Community Climate Change Centre (CCCCC) had a series of adaptation projects including: the Caribbean Planning for Adaptation to Climate Change Project (CPACC): 1997–2001; the Adaptation to Climate Change in the Caribbean Project (ACCC): 2001–2004; Mainstreaming and Adaptation to Climate Change (MACC): 2004–2007; and, the Special Program on Adaptation to Climate Change (SPACC): 1February 2007–31 January 2011. The CPACC, for example, included the formulation of national climate change adaptation policies and implementation plans for the 12 participating countries.[57]

Overall and while there are adaptation projects in the Caribbean concerning flood management, coastal zone management and water resources management, there appears to be few projects focusing specifically on transport infrastructure.

(c) Indian Ocean

The Indian Ocean Commission (IOC) implemented a project entitled "Acclimate" (Adaptation au changement climatique) between 2008 and 2012. The principal aims of the project were to: (1) Understand climate changes across the IOC; (2) Identify vulnerabilities to climate change; and (3) Develop a regional adaptation strategy that reduced the vulnerabilities. The project conducted a number of studies to enhance understanding, raise awareness and developed a "Framework document for regional adaptation strategy to climate change in member countries of the Indian Ocean Commission, 2012–2020".[58]

(d) Africa

Two SIDS are participating in the Africa Adaptation Programme namely Mauritius and Sao Tome and Principe. The nature of support has been largely capacity building with the provision of hardware in the case of Mauritius. At the national level, Mauritius has a relatively large ($8.4 million) UNDP executed

project “Climate Change Adaptation Programme in the coastal zone of Mauritius”. However, there is no direct transport component in the project.

In conclusion, while disaster risk reduction and adaptation in transport are sometimes mentioned in policy documents and integrated to justify coastal protection projects, (except probably for the projects in the (PACC) programme), transport projects appear to be the most under-represented. UNCTAD has over recent years dedicated greater attention to the issues at the interface of climate change adaptation and maritime transport and worked, including in cooperation of other international and regional organizations such as the ECE and the European Commission to raise awareness about the need to address the climate change challenge in maritime transport and to build capacity with a view to enhancing the climate resilience of the transport sector in general and seaports in particular.[59]

V. ENERGY EFFICIENCY AND SUSTAINABILITY

A. International context

Transport is a major consumer of carbon intensive and finite fossil fuels, notably oil, and constitutes an important contributor of global greenhouse gas (GHG) emissions and air pollution. Globally, the transport sector, including freight and passenger, already consumes over 50 per cent of global liquid fossil fuels[60] and emits around 13 per cent of global GHG emissions (2004 figure).[61] Logistics, including freight transport and logistics buildings account for 5.5 per cent of global GHG emissions.[62] Fossil fuel combustion for transportation has substantial negative effects on limited fossil fuel resources, carbon emissions, local pollution as well noise, congestion, health and safety. Estimates have revealed that worldwide air pollution from transport is responsible for about 1.1 per cent of all deaths annually.[63] These concerns are heightened by the expected growth in the transport sector and international energy demand for commercial transportation purposes driven in particular by growing demands of an expanding world economy and population. Greater pressure on global natural resources, environment and climate are therefore raising the profile of environmental sustainability as a key component to mainstream when planning, designing, investing in, operating, managing and maintaining transport infrastructure and services.

International transport energy requirements are set to increase by over 70 per cent between 2010 and 2040[64] while global transport-related carbon dioxide (CO_2) emissions are expected to rise by 57 per cent over the period 2005–2030. Over 80 per cent of the predicted growth in transport emissions will be from developing countries. While maritime transport is a relatively green mode of transport when considering the carbon emissions per ton carried and distance travelled, GHG emissions from international shipping were nevertheless responsible for nearly 3 per cent of the global CO_2 emissions in 2007. If left unchecked and driven by trade expansion, these levels are projected to increase by 200–300 per cent by the year 2050.[65]

Recognizing the energy and climate change nexus and the implications for sustainable development the international community through the UNFCCC and the International Maritime Organization (IMO) is currently negotiating instruments to help curb emissions from international shipping. A set of technical and operational measures have been adopted under the auspices of the IMO in July 2011 in the form of technical measures for new ships and operational reduction measures for all ships. These are the first mandatory global GHG emissions reduction regimes for an entire industry sector. The adopted measures add to Section VI of the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL). A new Chapter 4 in MARPOL VI entitled “Regulations on energy efficiency for ships” makes mandatory the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships. The regulations apply to all ships over 400 gross tonnage and entered into force through the tacit acceptance procedure on 1 January 2013.
Meanwhile, work at the IMO continues with a view to adopting market based instruments such as levies on bunker fuel and carbon trading mechanisms. The shipping industry, for example, through the Case for Action paper (which looks up to 2040) recognizes this trend and is considering ways in which it can best

respond to the shifting demands.[66] The Case for Action paper was released in 2011 under the Sustainable Shipping Initiative (SSI) which brings together leading companies from across the industry and around the world.[67] The goal of the SSI is to transform the global shipping industry and the wider maritime sector by establishing a new, sustainable approach as the norm.

Initiatives at government level are also emerging and often entail incorporating sustainability criteria into planning processes, policies and investment strategies. Key measures generally involve a three-pronged approach: avoid-shift-improve. More specifically, this requires avoiding inefficient freight transport and operations such as empty trips; shifting to greener modes of transport, cleaner fuel sources and technologies, as well as more energy efficient vessels and vehicles; and improving infrastructure, logistics and operations to improve the sector's energy efficiency, reduce fuel consumption and emissions.

B. SIDS context

In this context, the perspective of SIDS is extremely challenging given the serious structural vulnerabilities and constraints that are inherent to these islands. High energy cost associated with transportation in SIDS result from their heavy reliance of imported fossil fuels for transport, lack of proper and efficient transport infrastructure and services, low shipping connectivity as well as their inability to benefit from economies of scales trough lower unit costs (small land areas, populations and markets, low trade volumes, trade imbalances).

High energy costs can be a drain on the economies and the transport sector of SIDS as which in many cases accounts for a significant share of total energy consumption. Countries in the Pacific region are the most dependent on imported fossil fuels globally with 95 per cent of their energy needs being met with imports. Transport consumes around 70 per cent of the total fuel imported in the region and sea transport is the majority fuel user for some Pacific island countries.[68] In Tuvalu, for example 38 per cent of total fuel imports or 64 per cent of all transport fuel in 2012 was for maritime use.[69] This heavy reliance on fuel imports constrains SIDS foreign exchange earnings and public finances and exposes them to rising and volatile energy prices which in turn increase transport and logistics costs and undermine growth and development. Many maritime transport services, in this respect, become commercially unaffordable and unsustainable, and governments are often required to subsidize or service certain coastal shipping routes to maintain domestic and inter-island transport connectivity. Fiji is a case in point as a shipping franchise scheme has been established by the government since 1996 to enable the provision of a minimum of one monthly service by private sector vessels to remote maritime islands which would otherwise not be serviced. In 2014, $950 000 was allocated by the Fiji Government Shipping Franchise scheme to subsidize the provision of maritime transport services to 10 identified uneconomically viable sea routes.[70]

Investment in renewable energy, including wind, sun, wave and bio fuels and the deployment of more energy efficient vessels are increasingly used to promote sustainable transport and shipping. Applications include primary hybrid and auxiliary propulsion and on-board and shore-side ancillary power. Several renewable energy and energy efficiency programmes have recently been developed in SIDS at the national and regional level. This includes for instance the SIDS DOCK initiative,[71] the Caribbean Renewable Energy Development Programme, the Caribbean Sustainable Energy Roadmap and the Framework for Action on Energy Security in the Pacific. Nevertheless, little attention has been devoted to improving energy efficiency and promoting renewable energy applications in any of the modes of transport used in SIDS. This is mainly due to lack of data, research work, policies, incentive schemes and financial resources. There is, however, some interest in promoting energy efficiency and sustainable shipping via various research and pilot projects. One example is the University of the South Pacific initiative, which has been collaborating with a network of stakeholders and knowledge partners since 2012 to advance this agenda through a vast research and technical assistance programmes.[72] Another initiative relates to the feasibility study “Small Island States (SIS) Bulk Procurement of Petroleum Products” conducted by the Pacific Islands Forum Secretariat (PFIS) under a technical assistance project of the ADB. This study reviews petroleum supply chains, operating models and performance in the SIS and identifies immediate opportunities for them to obtain cost effective access to petroleum fuels

through, inter alia, improved procurement and supply chain management, reduction in duplication and redundancy, opportunities for shared infrastructure development and dedicated terminals, and changes in the institutional and legal framework to facilitate collective negotiation, and supplier and contract management for regional bulk purchases.[73]

Although SIDS contribution to carbon emissions is marginal (estimated at less than 0.05 per cent of global emissions),[74] climatic factors are very significantly impacting livelihoods and transport infrastructure in SIDS. This could be aggravated if no action is taken to control GHG concentration in the atmosphere. Moreover, the strong interdependence between key economic sectors (such as fisheries and tourism) and transport magnifies the challenge, as negative impacts of energy climate change factors on any one of these sectors would have repercussions on the other. Bearing in mind the discussion in the previous section on climate change impacts and associated adaptation needs, reducing the fossil fuel energy dependence of SIDS, including in their transport systems and promoting the use of less carbon intensive alternatives is crucial not only for energy sustainability but also for climate change mitigation. Thus addressing the energy and the climate change nexus though climate resilience building in transport and low-carbon transport systems are two sides of the same coin. This will not only improve transport sector energy efficiency and adaptive capacities but will also create positive spillovers for other sustainable policy goals, such as reducing fossil fuel dependency, energy costs and vulnerability to climate change for SIDS. With dependence on fossil fuel imports being a major source of SIDS' vulnerabilities, efforts should aim to promote the development and uptake of sustainable energy through a robust action plan spanning various areas, including policy, technology, capacity building and finance.

C. Financing

Enabling a paradigm shift towards sustainable transport systems requires more resources and capacities in SIDS. Domestic public finance (using both domestic and international flows, such as ODA and multilateral finance) is an essential source of financing for the transport sector, namely for infrastructure construction and maintenance. Countries typically spend 2–13 per cent of their public budgets on transport.[75] For many SIDS, public financing of transport infrastructure is constrained by among others competition from other high priority areas such as health, education and debt servicing. Nevertheless, the public sector remains a key player with the role of government varying from that of policymaker and investment provider to that of a co-sharer of risks and developer of transport infrastructure and services through, for example, the provision of guarantees.

New sources of finance such as remittances, capital markets and climate finance as well as new financing tools and mechanisms such as infrastructure and diaspora bonds, green bonds and blended finance can be used to complement or leverage investment in the field of sustainable transport.

A fundamental element in meeting the investment requirements for more sustainable transport patterns will be the promotion of a collaborative approach between public and private investment partners. Governments may therefore explore alternative collaboration models of sustainable PPPs with appropriate risk-sharing frameworks and administrative and institutional arrangements supported by the necessary legal, regulatory and policy provisions.

National, regional and subregional development banks can play an important complementary role in assisting governments in this respect. Recognizing this situation the world's biggest multilateral development banks pledged in 2012 to provide $175 billion over 10 years to help fund sustainable transportation systems that are accessible, affordable, efficient, financially sustainable, environment friendly and safe.[76] Development banks are better positioned to respond to national and regional needs and demands and can play an effective role in providing financing or risk mitigation mechanisms adapted to the requirements of the different regions and countries. This is the case for instance of the CDB, AfDB and ADB which are looking into PPP mechanisms and technical assistance programmes to deliver public goods and services including in transport.

VI. INTERSECTORAL LINKAGES

An overriding feature distinguishing SIDS is the strong interlinkages between their transportation sector including maritime and air and other productive sectors of strategic importance such as tourism, fisheries and agriculture. For many SIDS, these activities are the main drivers of economic growth, employment, income and revenue. An example illustrating the intersection between transport and other sectors and exemplifying the associated need for integrated inter-sectoral policy approaches is the proposed regional maritime strategy of the IOC's.[77] The objective of the strategy is to boost regional trade and production, in particular agricultural trade and fish products through a regional maritime policy that establishes a regional transhipment hub complemented by a regional feeder ship system and a regional shipping company.[78] A similar example is the concept of the "Vanilla Islands" in the Indian Ocean SIDS which integrates air transport with tourism mobility.[79] The following section provides some examples illustrating the underlying linkages between transport and other productive sectors in SIDS and underscoring the critical importance of transport as an economic sector in its own right but also as a key input into other productive sectors. The linkages highlight the need for more integrated, inter-sectoral and cross-cutting policies that build on co-benefits and synergies and minimize duplication and potential inconsistencies.

A. Linkages to trade

The linkages between maritime transport and merchandise trade are widely recognized since demand for shipping and port services derives from the need to carry merchandise trade. Trade flows, patterns and direction determine the type, range and extent of transportation systems used as well as the trade routes which they serve. At the same time, transportation systems and networks (e.g. greater use of the container, the deployment of increasingly larger container ships and the development of container terminals and platforms) also shape trade patterns and structure and can enable existing and new trade relations and partnerships to grow and flourish (e.g. intra-SIDS trade through feeder services and south-south trade).

Other linkages bringing together transport and trade relate to the services sector. Transport services, in particular air and maritime account for an important share of SIDS services trade. Generally, imports of transport services outweigh exports substantially.
Some SIDS, mostly in the Caribbean, have established competence in shipping services such as open fleet registries, yachting and increasingly transhipment services (e.g. Mauritius, Jamaica and the Bahamas). Services trade and maritime transport also intersect through remittances, which play an important. According to the World Bank, several SIDS are amongst the top remittances receiving countries. These include Tonga (28 per cent of GDP), Samoa (22 per cent), Jamaica (14 per cent), Cape Verde (9 per cent) and Grenada (9 per cent).[80] Interestingly, a substantial percentage of these remittances are linked to temporary movement of persons[81] in the maritime transport sector. Overseas maritime sector employment such as seafarers from Tuvalu and Kiribati and Vanuatu is an important source of remittances. For the some Pacific SIDS, remittances from workers employed on internationally trading vessels account for 25 per cent of gross national income.[82]

International trade agreements, at the multilateral (WTO), regional (among regional SIDS and SIDS as part of other regions) as well as bilateral levels is one area where the transport and trade sectors are collectively addressed. Eighteen SIDS are WTO members, while several others are in the process of acceding to the WTO. Under the WTO's GATS, members undertake commitments to liberalize trade in a range of service sectors including air transport, maritime transport and tourism. Several SIDS have made commitments on maritime transport services under the WTO General Agreement on Trade in Services (GATS) and in bilateral and regional trade agreements (see table 6.1).

Different approaches have been adopted at the regional level. CARICOM for example, has a stand-alone Transport Protocol (Revised Treat of Chaguaramas) while the Pacific Islands Forum has negotiated transport liberalization commitments (both air and maritime) under the Pacific Island Countries Trade Agreement (PICTA). The IOC has operated largely through decisions and cooperative arrangements in the

area of transport. However, a key shortcoming of the regional agreements is the lack of effective on the ground implementation. Besides trade agreements a second area where SIDS transport and trade interdependencies occur is through regional cooperation initiatives. These can take the form of regional decisions, projects or policies and include elements of external finance or expertise, including from regional development banks or international donors.

Table 6.1 Selected SIDS' regional trade agreements, institutions and coverage of transport

Trade agreement and institution	Coverage of transport	Regional institutions for transport tourism, fisheries and agriculture
CARICOM CARICOM Secretariat	Protocol of Transport[83] of Revised Treaty of Chaguaramas covers expansion of shipping and air transport and includes road and river transport CARICOM Multilateral Air Services	Caribbean Tourism Organization Caribbean Food Corporation Caribbean Regional Fisheries Mechanism Caribbean Aviation Safety and Securing Oversight System
PICTA Pacific Islands Forum Secretariat	Pacific Island Countries Trade Agreement Trade in Services: Transport provisions being negotiated under the services agreement. Exact coverage depends on commitments made by participating Parties. Parties have made commitments in maritime services (13 Parties) and air transport services (12 Parties).[84]	Central Pacific Shipping Commission Pacific Islands Forum Fisheries Agency Pacific Aviation Safety Office
IOC IOC Secretariat	Mostly through non-binding regional decisions and cooperative arrangements	Large portfolio of projects relating to: tourism, development of trade, fishing and, most recently (2013), a regional maritime project encompassing key economic sectors

Source: Compiled by the UNCTAD secretariat on the basis of the relevant trade agreements.
Note: This table is only illustrative and not exhaustive of all SIDS' regional trade agreements and institutions.

B. Linkages to tourism

Tourism is a key source of export earnings for all SIDS that on average, accounts for around 30 per cent of total employment and up to 50 per cent of GDP.[85] Export of travel services[86] by SIDS reached $24 billion in 2012, representing more than 50 per cent of their total services. Tourism arrivals by air, are particularly high for the Caribbean SIDS where they have been estimated at about 5.7 million passengers in 2011.Toursim arrivals by air are also important in Mauritius, Seychelles and Cape Verde. This high passenger carriage is due to the direct flight connectivity that the Caribbean SIDS, Mauritius, Seychelles and Cape Verde maintain with former colonial powers and trading partners.

High air transport prices can reduce tourist flows and compress revenue. One study, which assessed the competitiveness of islands as tourist destinations, found that the cost of a holiday (price of flights and three- or four-star hotel accommodation) crucially contribute to determining demand for tourism in SIDS.[87] In terms of domestic demand for air transport and tourism services, high fares coupled with high poverty levels (e.g. in the Pacific and some Indian Ocean/West Africa SIDS) make it difficult to stimulate domestic demand for the tourism sector. Reduced traffic impedes the financial viability of highly capital intensive airport infrastructure, equipment and vehicles. Insufficient upgrading and maintenance of air transport infrastructure in turn leads to higher airfares and acts as an obstacle for most SIDS in terms of market route development.

Several SIDS (e.g. Seychelles, Mauritius and Jamaica) have sought to overcome transport connectivity and cost issues of long-haul, multi-leg and expensive flights by setting up direct flight connectivity with cities of tourist origin and effectively utilizing cheap chartered flights which consume less fuel per passenger.[88] Regional air connectivity has also been effectively leveraged by some SIDS. In the Caribbean, regional air carriers such as the Leewards Island Air Transport (LIAT) have been crucial to intra-Caribbean tourism by servicing all of the Caribbean as well as outbound and inbound travel. Indian Ocean SIDS[89] and West African SIDS have also expressed concern that the fragmentation of the air transport sector and tourism markets affect regional competitiveness. To counter this, the IOC has suggested the concept of the "Vanilla Islands" which aims to seamlessly integrate air transport with tourism mobility, amongst Indian Ocean SIDS and with the rest of the world.[90]

While tourist arrivals are primarily by air transport, there are other arrivals by cruise ships. The Caribbean is a major maritime destination for cruise ships, with up to 18.2 million arrivals in 2008.[91] Other SIDS such as Cape Verde, Fiji and the Seychelles also receive visits on round-the-world itineraries. This segment of the tourism sector is highly dependent on marine transport as cruise ships require investment in port infrastructure to accommodate the increased size and number of vessels. Since berthing space is limited, cruise ships often compete with cargo vessels to berth. More often than not, cargo vessels have to wait until cruise ships leave. Consequently, higher maritime transport costs are paid out in terms of delays and overtime costs.[92]

C. Linkages to the fishing sector

Fish is traded live, fresh, frozen, cured or canned and is distributed though wholesale or local markets, supermarket chains or auctions. The entire process, from the point of fish harvest to the point of consumption involves a complex set of logistics and fisheries equipment. Maritime transport in the fisheries sector depends on fishing vessels which operate as transport vessels, fish harvest points, storage vessels and also on-board processing and sorting centres. Fishing vessels require ports, wharves/docks for anchorage and fish landing. The absence of well-equipped fish ports in SIDS results in commercial fishing vessels moving to mainland fishery processing centres.

SIDS' fishing vessels are often inadequate or ill equipped in terms of appropriate craft and gear and SIDS' national fishing industries are underdeveloped. This has a negative effect on the ability of SIDS to maximize fish catches and the safety of their fishing fleets. As a result, many SIDS enter into auctioning of fishing licences and fishing agreements with third party countries such as the European Union, Japan, the United States of America, China and the Republic of Korea. Access fees collected form these distant water fleets (DWFs) form a significant proportion of the national income of several SIDS: in the case of some Pacific SIDS they can account for up to 40 per cent of government revenue.[93] Fisheries management tools comprise several maritime transport components including vessel monitoring systems, maritime patrols, fishing limits (quotas/licences for fishing), geographical limits for fishing, closure of high seas areas in cases of falling fish stocks and limits on fishing methods used by fishing vessels.

D. Linkages to agriculture

Transport enables agricultural production in SIDS and facilitates access to inputs (pesticides, seeds, irrigation) and export of outputs. SIDS' agricultural trade (mostly imports) is carried by sea. A frequent and reliable intra-regional shipping or even air transport service, to which the island community can link its harvesting schedule, is crucial. For instance in the Caribbean, it is expected that if dependable, regular transport is maintained agriculture-related trade will increase and thus reduce the region's food import bill, which was $3 billion in 2006.[94]

However, currently for most SIDS, shipping arrangements are focused on external trade, rather than intra-regional shipping. Several SIDS notably in the Pacific have tried to overcome this as in Fiji and the Solomon Islands, by franchising shipping services to private operators to enhance access to remote rural communities.[95]

VII. ADDRESSING THE CHALLENGES AND HARNESSING THE OPPORTUNITIES

This report provides an overview of the maritime transport situation in SIDS. It covers sector specific issues such as shipping services, ports, transport costs and liner shipping connectivity as well as cross-cutting themes that permeate all aspects of the maritime transport such as energy efficiency and sustainability, climate change, disaster risks, and financing requirements. The aim is to improve the understanding of the relevant issues at stake, identify prevailing gaps and needs and take stock of progress achieved in terms of addressing the persistent and emerging challenges facing the maritime transport of SIDS. Insight gained is key to the formulation of well-designed and adequate maritime transport policies as well as integrated inter-sectoral policies that take into account the strong interlinkages between relevant productive sectors.

The report highlights the main features that are inherent to SIDS and causing their physical, social, economic and environmental vulnerability. These include smallness, remoteness, insularity, vulnerability to external factors, exposure to exogenous shocks, as well as financial constraints resulting from high indebtedness and difficulty in accessing concessional funding. Together, these factors are affecting the performance of the maritime transport sector in SIDS and shaping their ability to effectively participate in relevant transport and trading networks, whether at the domestic, regional or international level.

SIDS are small in terms of land areas and population. Some SIDS have the highest/lowest world population densities and some have high populations in relation to agricultural land; they have small economies as measured by GDP but quite high income per capita in some cases. Remoteness results in SIDS being amongst the most remote countries in the world, away from major economic centres and outside the main international transport networks and trade routes. Vulnerability to external shocks can be illustrated by the negative impact of the 2007–2008 global financial crisis on SIDS GDP growth; excessive openness to trade as illustrated by relatively high ratios of imports of goods and services; high ratios of non-merchandise exports including tourism to GDP; an imbalance between merchandise imports and exports with imports being much larger than exports; and high levels of remittances and ODA. The effects of insularity can be measured by the extreme dependence of SIDS on maritime and air transport for access and mobility and their exposure to natural disasters and climatic factors, in particular sea level rise and extreme weather events.

Remoteness and trade imbalances have a significant impact on SIDS maritime transport as they translate into high transport costs, low shipping connectivity, infrequent shipping services, delays at ports and heavy reliance on indirect connections requiring in some cases several transhipment moves. Combined, these factors undermine the trade competitiveness of SIDS, increase their import costs, drain their national budgets and constrain their key productive sectors such as fisheries and tourism.

The following section sets out a number of measures, approaches and steps to consider when addressing the transport challenges facing SIDS and their marginalisation from relevant trade networks and markets. Priority areas identified and articulated as a way forward have been largely informed by the conclusions of the UNCTAD Ad Hoc Expert Meeting "Addressing the Transport and Trade Logistics Challenges of the Small Island Developing States (SIDS): Samoa Conference and Beyond" held on 11 July 2014 in Geneva. Held in the lead up to the Samoa Conference, the Ad Hoc Expert Meeting provided a renewed opportunity to focus international attention on the unique transport-related challenges facing SIDS and consider ways in which these can be better understood and adequately addressed. At the same time, the Ad Hoc Expert Meeting and related discussions were largely informed by the initial findings of the present report. The preliminary results of this report have helped design the programme of the Ad Hoc Expert Meeting, identify relevant experts and speakers, as well as frame the underlying issues and structure discussions.

Experts at the Ad Hoc Expert Meeting noted that there was a need to address the transport and trade marginalisation of SIDS through a set of policies at national, regional and international levels and viewed the Samoa Conference as an important milestone for furthering the transport agenda of SIDS. However,

they also noted the need to set the ground work and plan for beyond the Samoa Conference to ensure effective progress and implementation of concrete response measures. The meeting concluded that the transport and trade facilitation challenges facing SIDS were yet to be fully understood and required urgent response measures. A broad range of intervention actions spanning the transport sector as well as other areas such as trade, finance, energy efficiency, environmental protection, and climate resilience are required.

Areas for action

1. Maritime transport and trade logistics

- Promote **forward looking research** and seek to foster new ideas to generate a port logistics and development framework that SIDS can use.
- Address **inter-island/domestic shipping** connectivity requirements, including their incorporation as part of the broader regional and international maritime transport connectivity agenda.
- Develop effective means of monitoring the **level and adequacy of shipping and port services** as well as freight rates, ancillary charges and **port charges**.
- Address the problem of an **ageing fleet** and develop regional or bilateral fleets. Examples include the Pacific Forum Line, efforts by the IOC to promote a regional shipping company and Cape Verde Sao Tome and Principe fast ferry.
- Address the issue of **low cargo/trade volumes,** including by increasing vessel efficiency and reducing transport costs and introducing "SIDS port" as a way-port[96] on longer routes to facilitate the use of larger vessels with lower unit costs.
- Address **cargo imbalances** (imports exceeding exports) through traditional measures such as triangular trading, repositioning of empty containers and containerizing unconventional cargoes. Otherwise, the ability to influence cargo imbalances lies outside the scope of the transport sector. Non-transport sector measures include import substitution and export promotion and diversification and development of niche markets.
- Address **shipping market structure aspects** by exploring and considering relevant policy response measures to ensure reasonable service levels and freight rates especially for the smaller SIDS.
- One possible way of reducing the risk of **oligopolistic abuses** is the opening up of national or regional cabotage markets. Allowing international liner companies or regional carriers from neighbouring countries to combine international and national traffic can help provide alternative transport options for shippers. This may also help carriers to reduce operating costs by diminishing the incidence of empty return trips. As long as some level of competition exists, at least some of the cost savings will be passed on to the client through lower freight costs.
- **Remoteness** or distance from **markets:** little can be done about the physical distance to global markets. However, economic distance (cost) can be reduced by improving port infrastructure and increasing efficiency in the logistics chain including through trade and transport facilitation, and more efficient port operations. While little can be done with respect to distance from global liner shipping networks (connectivity), developing regional/subregional hub ports that could be serviced by larger vessels, with a potential to reduce freight costs could, nevertheless, be considered.
- **Port issues** including **port administration:** there is general consensus that subjecting SOEs to private sector discipline, competitive market pressures and clear consequences for non-performance, forces them to improve efficiency and divest any activities that are not commercially viable. Ports that have not yet done so, could consider corporatization; privatizing cargo handling operations; as well as establishing clear operational and financial objectives; and benchmarking operational and financial performance.

- **Port infrastructure:** review and, where necessary, upgrade or redevelop port infrastructure for handling cargo including: depths alongside; quay aprons; access ways; and container yards. Funds need to be made available or earmarked for adequate maintenance of infrastructure assets. Where possible, ports should separate cargo handling and passenger operations. Ideally with separate berthing facilities.
- **Port equipment:** ensure that adequate equipment is provided for efficient operation of all port subsystems and address the causes of poor maintenance. Donors need to bear in mind the compatibility of spare parts and skills of maintenance staff when providing equipment.
- **Port productivity** can be improved, including through greater standardization and transparency of information on port productivities. In this context, the port subsystems need to be studied to identify and remove bottlenecks while benchmarks need to be established to monitor and improve port performance.
- **Transport and trade facilitation:** relevant measures should aim to evaluate the performance of the logistics chain, streamline logistics procedures and build capacity of freight forwarders and logistics service providers. Concrete action may include: (a) benchmarking, monitoring and improving the efficiency of trade and transport, including border control; (b) building capacity of freight forwarders and logistics services providers; (c) evaluating the need to create national facilitation committees to improve coordination between the administrations responsible for clearance of ships, cargoes and passengers in ports. For countries that have not yet done so, accede to and implement the IMO Facilitation of International Maritime Traffic (FAL) Convention.
- **Build capacity** in the field of port efficiency, security, safety, environmental protection, with particular support by the IMO.

2. Climate change impacts and adaptation/disaster risk reduction

- Increase **awareness** about the importance of policies and plans that promote disaster risk reduction and climate change adaptation in coastal transport infrastructure, in particular ports.
- Build the **resilience** of coastal transport infrastructure (in particular ports), including by mainstreaming climate change adaptation and disaster risk reduction into national development plans, sector plans, policies, legislation and budgeting; monitoring and assessing geophysical and climate change risks and incorporating them into development planning; and strengthening and climate proofing infrastructure in coastal zones.
- Ensure a robust vulnerability/resilience **framework** for SIDS that establishes an architecture that is sensitive to their needs; and drives investment in resilience building.
- Collect and analyse relevant **information** on natural disasters and climate change as a basis for informed decision-making.
- Ensure that **risk management** strategies are based on reliable information, including accurate data on economic loss and probabilistic modelling for future disasters and climate events.
- Give priority to risk management strategies that **combine adaptation** to climate change **and risk reduction measures** and integrate relevant measures into national development and public investment plans.
- Provide strong **technical support** to SIDS for the establishment of accurate risk assessments.
- Develop **guidelines,** checklists and other tools in support of disaster risk reduction and climate change adaptation in ports, including through the compilation of existing best practices; and promote dialogue, cooperation, information sharing and partnerships among all stakeholders and interested parties.

3. Energy efficiency and sustainability

- Define national holistic **sustainable transport strategies** that take into account the local and regional conditions in SIDS, including prevailing challenges and opportunities.
- Strengthen domestic, national and regional connectivity and **promote infrastructure development** across all modes of transport that would link farms/rural areas/small islands to national and regional markets. The aim is to reduce transport fuel use and expenditure while enabling domestic links into national markets and regional value chains.
- Reshape **regional transport** configurations and networks to improve efficiency in transport systems connectivity and accessibility at regional and global level (air and maritime).
- Improve **fuel efficiency** by, among others, (a) promoting sustainable shipping; (b) improving freight transport operations (e.g. improved management of transport system flows and capacities); and (c) setting freight logistical systems (e.g. use of smart logistics network concepts).

4. Funding levels and access

- Examine the financing situation of SIDS, including their ability to **access concessional and blending loans to** enable more reliable, efficient, sustainable and resilient transport systems.
- **Revisit the use of the official development assistance** per capita as a criterion to determine SIDS eligibility and access to funding. Also, consider taking into account the economic fundamentals in SIDS to promote investment (risk pooling, guarantees, debt swaps, and counter-cyclical loans).
- Promote **collaborative approaches between public and private** investment partners, including for investment in energy efficient and climate resilient transport systems and services. Regional, subregional and national development banks can play an important **complementary role to that of governments.**
- Build **climate finance readiness** (e.g. develop skills related to identifying effective funds for SIDS). Strengthen **national planning** as well as national public policy and financial systems **for climate response** (e.g. climate change finance assessment tools).
- Draw on **new financing sources** (such as remittances, capital markets, diaspora bonds, impact investments and climate finance). These can be used to complement or leverage investment and cooperation relating to sustainable transport.
- Explore **alternative collaboration models of sustainable PPPs** that integrate environmental criteria (provisions to support sustainable, energy efficient and low carbon transport systems) with appropriate risk sharing frameworks and administrative and institutional arrangements and that are supported by the necessary legal, regulatory and policies. For effective PPPs, there is a need to build capacity in procurement, develop policies and processes that foster greater transparency and predictability, create the appropriate legal and regulatory environment, build robust institutional capacity, develop adequate human capacity and create fiscal management and accounting frameworks.

5. The role of development partners

- A **new framework where SIDS could effectively integrate the transport and trade systems** at regional and international should be promoted. This requires SIDS to work together, pool their resources and maximize value and share gains. But it also requires the commitment and active involvement of development partners in providing technical assistance and finance to develop SIDS transport infrastructure and services.
- Development partners have an important role to play to ensure effective implementation of the recommendations set out above.
- For its part, UNCTAD will continue to support SIDS through its three pillars of work, notably consensus building, research, and technical assistance. UNCTAD will also promote and support partnerships for sustainable and resilient transport. Relevant activities may include, among others:
    - **Collecting transport data pertaining to SIDS** and gathering information for wider dissemination among SIDS and for capacity building purposes. Relevant thematic areas may include for example, port performances, trade facilitation, financing transport and climate change.
    - **Examining the lessons** drawn from regional initiatives on infrastructure and disseminating among SIDS.
    - Helping **strengthen regional cooperation** to build strong institutional partnerships.
    - Deepening **research on the infrastructure financing** requirements of SIDS, examining the potential for innovative approaches to financing; and sharing lessons learned from the implementation of current regional approaches in SIDS.
    - Continuing to provide technical assistances, including through ongoing **technical assistance projects** aimed at: (a) **enhancing the understanding/technical knowledge** among policy makers, transport planners and transport infrastructure managers from SIDS of the **impacts of climate change on coastal transport infrastructure** - in particular seaports and airports - **and to build their capacity to develop adequate adaptation** response measures; and (b) building the capacities of policymakers, transport operators and key financial institutions in developing countries to promote **sustainable freight transport** and develop **finance strategies and mechanisms** (c) assisting SIDS in **the field of trade** and **transport facilitation** overall.

ANNEXES

Annex I: Size distribution of SIDS

Table A I Size distribution of each country's islands (km^2)

	0.001–0.01	0.01–0.1	0.1–1.0	1.0–10	10–100	100–1,000	1,000–10,000	10,000–100,000	Total
Antigua and Barbuda		7	7	2		2			18
Bahamas	23	821	786	226	26	11	4		1 897
Barbados						1			1
Cape Verde		19	2	5	2	7	1		36
Comoros		11	4	3		2	1		21
Dominica						1			1
Fiji		203	151	64	38	5	1	1	463
Grenada		32	22	2	1	1			58
Jamaica		22	23	1				1	47
Kiribati	1	84	43	39	16				183
Maldives	2	281	563	54					900
Marshall Islands		488	385	50	1				924
Mauritius		28	20	4		1	1		54
Micronesia (Federated States of)		287	153	30	5	2			477
Nauru					1				1
Palau		55	45	9	4	1			114
Papua New Guinea	3	612	572	225	79	22	5	1	1 519
Samoa		4	4	3			2		13
Sao Tome and Principe		9	5	2		2			18
Seychelles		41	33	24	10	2			110
Solomon Islands	2	673	509	139	35	15	6		1 379
Saint Kitts and Nevis					1	1			2
Saint Lucia		5	3			1			9
Saint Vincent and the Grenadines		42	15	6	1	1			65
Timor-Leste			2		1	1			4
Tonga		75	66	21	8	2			172
Trinidad and Tobago		20	10	5		1	1		37
Tuvalu		28	31	10					69
Vanuatu		45	52	27	18	12	2		156
Total	31	3 892	3 506	951	247	93	24	3	8 747

Source: UNEP World Conservation Monitoring Centre, "Global Distribution of Islands (2010)" dataset.

Annex II: Direction of trade

(a) Caribbean

Within the Caribbean, Trinidad and Tobago is by far the largest exporter, followed by the Bahamas, Jamaica and Barbados. Table A.2 shows the exports of Caribbean SIDS in 2012. On the import side, the differences are not as marked; with the Bahamas, Trinidad and Tobago and Jamaica being the three largest importers (table A.3).

In 2000, Northern America was the most important export partner of Trinidad and Tobago (57.7 per cent) followed by Caribbean SIDS (16.8 per cent) and Central America and the North Coast of South America (9.7 per cent). By 2012 the share of Northern America had fallen to 42.2 per cent and Caribbean SIDS to 10.5 per cent. The regions that gained in shares were the East and West Coasts of South America (table A.4).

Table A.2 Exports of Caribbean SIDS, 2012 ($ million)

Country	$ million
Trinidad and Tobago	20 985
Bahamas	2 831
Jamaica	1 430
Barbados	446
Antigua and Barbuda	223
Dominica	208
Saint Lucia	151
Grenada	112
Saint Kitts and Nevis	99
Saint Vincent and the Grenadines	77
Caribbean SIDS	26 562

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.3 Imports of Caribbean SIDS, 2012 ($ million)

Country	$ million
Bahamas	11 701
Trinidad and Tobago	7 364
Jamaica	6 030
Saint Lucia	2 233
Antigua and Barbuda	1 897
Barbados	1 707
Saint Vincent and the Grenadines	517
Dominica	495
Saint Kitts and Nevis	407
Grenada	388
Caribbean SIDS	32 741

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

In 2000, Europe and the Mediterranean were the most important destination for the exports of Bahamas and Other Caribbean (with 57.5 and 42.9 per cent respectively). By 2012, however, there was a significant decline in exports to Europe and the Mediterranean to the benefit of South Eastern Asia and Caribbean countries (table A.4).

Table A.4 Caribbean SIDS: Share of exports (destinations) and imports (origins)

	Exports						Imports					
	Trinidad and Tobago		Bahamas		Other Caribbean		Trinidad and Tobago		Bahamas		Other Caribbean	
	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012
01 Pacific SIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
02 Oceania	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03 Australia and New Zealand	0.0	0.0	0.5	0.1	0.2	0.4	0.9	0.9	0.2	0.0	1.0	0.5
04 South Eastern Asia	0.4	0.6	0.1	27.2	0.4	1.0	0.8	2.2	3.6	9.1	2.0	5.5
05 Eastern and Central Asia	0.2	4.4	3.4	4.2	4.6	6.7	5.1	8.7	24.3	14.2	7.0	16.6
06 Caribbean SIDS	16.8	10.5	0.4	2.1	7.1	19.9	1.1	2.0	0.7	1.1	12.4	17.8
07 Other Caribbean	2.3	3.9	0.2	20.5	0.7	3.2	0.5	0.9	2.0	2.7	1.2	1.1
08 Northern America	56.7	42.2	30.1	26.6	39.3	31.2	40.6	37.8	30.7	35.1	39.0	27.3
09 Central America and NCSA	9.7	7.7	3.7	4.1	2.1	9.4	29.5	15.2	4.8	6.5	7.2	11.6
10 East Coast South America	1.3	12.7	3.3	0.2	0.4	0.5	3.6	8.7	1.0	2.2	2.4	12.2
11 West Coast of South America	0.5	7.5	0.0	5.2	0.2	0.6	0.7	0.6	0.2	0.1	1.8	0.2
12 Europe (excluding Mediterranean)	6.6	5.2	44.6	6.4	41.4	14.4	10.2	10.6	11.3	6.0	22.9	5.1
13 Mediterranean	4.4	4.7	12.9	2.0	1.5	5.2	3.6	1.2	20.3	1.1	2.3	0.9
14 Western Asia	0.1	0.1	0.5	0.3	0.3	3.9	0.2	0.7	0.6	1.1	0.4	0.7
15 Southern Asia	0.0	0.0	0.3	0.0	0.1	0.4	0.3	1.3	0.2	20.7	0.4	0.4
16 Indian Ocean SIDS	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
17 Eastern and Southern Africa	0.2	0.0	0.1	0.9	0.4	0.2	0.1	0.2	0.1	0.1	0.1	0.1
18 Western Africa	0.0	0.1	0.0	0.1	1.2	2.7	2.7	9.0	0.1	0.0	0.1	0.0
19 Atlantic Ocean SIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20 Other	0.7	0.3	0.0	0.0	0.1	0.3	0.1	0.1	0.0	0.0	0.1	0.0
Grand total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

(b) Indian Ocean

In 2012, Mauritius was the largest Indian Ocean SIDS exporter, with nearly six times the value of the second country, Seychelles (table A.5). Mauritius is also the largest importer followed by the Maldives and Seychelles (table A.6). The share of Europe and the Mediterranean in the exports of Indian Ocean SIDS declined over 2000–2012 but remained at 60 per cent. These decreases were offset by an increase of Eastern and Southern Africa that is, countries located closer to the Indian Ocean SIDS (table A.7). On the import side, the share of Europe and the Mediterranean also fell over the period. This difference was made up by increases in Eastern and Central Asia and Southern Asia (table A.7).

Table A.5 Exports of Indian Ocean SIDS, 2012 ($ million)

Country	$ million
Mauritius	2 402
Seychelles	440
Maldives	230
Comoros	112
Indian Ocean SIDS	3 184

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.6 Imports of Indian Ocean SIDS, 2012 ($ million)

Country	$ million
Mauritius	4 746
Maldives	1 287
Seychelles	970
Comoros	220
Indian Ocean SIDS	7 223

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.7 Indian Ocean SIDS: Share of exports (destinations) and imports (origins)

	Exports		Imports	
	2000	2012	2000	2012
01 Pacific SIDS	0.0	0.0	0.0	0.0
02 Oceania	0.1	0.0	0.0	0.0
03 Australia and New Zealand	0.2	0.6	3.2	3.0
04 South-Eastern Asia	1.0	2.8	15.1	14.0
05 Eastern and Central Asia	1.4	4.0	10.8	14.2
06 Caribbean SIDS	0.0	0.0	0.0	0.1
07 Other Caribbean	0.0	0.0	0.0	0.0
08 Northern America	20.5	10.0	1.5	2.3
09 Central America and NCSA	0.1	0.1	0.0	0.0
10 East Coast South America	0.1	0.1	0.8	1.7
11 West Coast of South America	0.1	0.0	0.1	0.0
12 Europe (excluding Mediterranean)	61.7	44.4	30.6	16.2
13 Mediterranean	6.4	15.5	5.1	6.5
14 Western Asia	0.4	1.4	7.4	11.1
15 Southern Asia	1.1	2.3	11.7	23.0
16 Indian Ocean SIDS	0.4	1.7	0.2	0.7
17 Eastern and Southern Africa	6.3	16.6	13.1	7.1
18 Western Africa	0.2	0.2	0.4	0.1
19 Atlantic Ocean SIDS	0.0	0.0	0.0	0.0
20 Other	0.1	0.0	0.0	0.0
Grand total	100.0	100.0	100.0	100.0

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.
Note: There were some anomalies in the "as partner exports 2000" for the Maldives, so "as reporter exports 2000" was used.

(c) Pacific

Of the 13 Pacific SIDS, International Monetary Fund (IMF) data are available for 11 countries (Fiji, Kiribati, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu). Data are not available for Marshall Islands and the Federated States of Micronesia. The export trade of the Pacific SIDS is dominated by Papua New Guinea, which accounted for around 73 per cent of the region's exports in 2012 and 63 per cent of its imports. Following Papua New Guinea, the three main exporters are Fiji, Solomon Islands and Timor-Leste (tables A.8 and A.9).

Table A.8 Exports of Pacific SIDS, 2012 ($ million)

Country	$ million
Papua New Guinea	8 137
Fiji	974
Solomon Islands	696
Timor-Leste	647
Vanuatu	388
Nauru	151
Samoa	67
Kiribati	62
Palau	24
Tuvalu	23
Tonga	16
Pacific SIDS	11 185

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.9 Imports of Pacific SIDS, 2012 ($ million)

Country	$ million
Papua New Guinea	7 919
Fiji	1 861
Vanuatu	649
Timor-Leste	540
Solomon Islands	485
Samoa	445
Tuvalu	239
Tonga	195
Kiribati	172
Nauru	38
Palau	26
Pacific SIDS	12 568

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

(d) West Africa

The exports of West Africa SIDS totalled $100 million in 2012, with Cape Verde exporting 86 per cent of this total (table A.11). Imports of West African SIDS were eight times the value of exports at $800 million with Cape Verde importing around 89 per cent of the total (table A.12). The principal trading partners of the West African SIDS (for both imports and exports) are Europe and the Mediterranean. Other trading partners included North America, although shares declined between 2000 and 2012, and Eastern and Central Asia, whose share of imports increased to 9.6 per cent in 2012 (table A.13)

Table A.10 Pacific SIDS: Share of exports (destinations) and imports (origins)

	Exports				Imports			
	Papua Guinea	New	Other Pacific		Papua Guinea	New	Other Pacific	
	2000	2012	2000	2012	2000	2012	2000	2012
01 Pacific SIDS	0.3	0.5	6.4	8.6	0.4	0.3	5.8	7.2
02 Oceania	0.1	0.0	0.3	0.4	0.0	0.0	0.2	0.5
03 Australia and New Zealand	45.6	48.1	28.6	15.1	54.4	39.7	50.4	24.0
04 South-Eastern Asia	4.4	6.4	7.1	23.5	29.0	30.2	12.5	37.4
05 Eastern and Central Asia	32.4	26.3	17.2	30.5	8.8	16.1	13.9	22.2
06 Caribbean SIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
07 Other Caribbean	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
08 Northern America	1.9	1.5	19.0	7.9	2.3	5.3	8.8	4.9
09 Central America and NCSA	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0
10 East Coast South America	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
11 West Coast of South America	0.0	0.1	0.0	0.1	0.1	0.0	0.5	0.1
12 Europe (excluding Mediterranean)	12.9	12.4	14.7	3.6	2.8	3.5	3.5	1.5
13 Mediterranean	2.3	3.3	0.3	1.3	0.4	3.8	0.3	0.3
14 Western Asia	0.0	0.0	0.1	0.5	0.1	0.1	0.0	0.1
15 Southern Asia	0.1	1.4	5.4	1.8	0.6	0.4	1.7	1.3
16 Indian Ocean SIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17 Eastern and Southern Africa	0.0	0.0	0.0	0.1	0.9	0.4	0.1	0.3
18 Western Africa	0.0	0.0	0.5	6.0	0.0	0.0	2.1	0.1
19 Atlantic Ocean SIDS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20 Other	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Grand total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.11 Exports of West African SIDS, 2012 ($ million)

Country	$ million
Cape Verde	86
Sao Tome and Principe	13
West African SIDS	100

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.12 Imports of West African SIDS, 2012 ($ million)

Country	$ million
Cape Verde	711
Sao Tome and Principe	87
West African SIDS	799

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Table A.13 West African SIDS: Share of exports (destination) and imports (origin)

	Exports		Imports	
	2000	2012	2000	2012
01 Pacific SIDS	0.0	0.0	0.0	0.0
02 Oceania	0.0	0.0	0.0	0.0
03 Australia and New Zealand	0.0	0.9	0.1	0.0
04 South-Eastern Asia	5.4	1.7	0.4	1.5
05 Eastern and Central Asia	1.7	0.2	2.3	9.6
06 Caribbean SIDS	0.0	0.0	0.0	0.2
07 Other Caribbean	0.2	4.0	0.0	0.2
08 Northern America	15.5	6.5	2.9	1.2
09 Central America and NCSA	0.0	3.6	0.0	0.1
10 East Coast South America	0.1	0.0	1.4	5.0
11 West Coast of South America	0.3	0.1	0.1	0.0
12 Europe (excluding Mediterranean)	63.7	19.6	81.7	70.1
13 Mediterranean	4.9	58.7	7.7	8.9
14 Western Asia	4.7	0.0	1.3	0.8
15 Southern Asia	0.0	3.2	0.0	0.3
16 Indian Ocean SIDS	0.0	0.0	0.0	0.0
17 Eastern and Southern Africa	2.0	0.4	0.5	0.1
18 Western Africa	1.5	1.1	1.6	2.0
19 Atlantic Ocean SIDS	0.0	0.0	0.0	0.0
20 Other	0.0	0.0	0.0	0.0
Grand total	100.0	100.0	100.0	100.0

Source: Based upon the IMF Direction of Trade Statistics, first quarter of 2014. The annual data is complete up to 2012. The tables have been prepared based upon "partner" data except for the exports of Indian Ocean Island SIDS in 2000 where there were anomalies in the partner data. For the intraregional trade, partner data was the primary source, supplemented by reporter data. No data was available for trade between non-reporters which included Kiribati, Marshall Islands, Micronesia, Nauru, Palau and Timor-Leste.

Annex III: Indirect shipping services/transhipments in SIDS

Caribbean to Africa

Only two direct connections are available from the Caribbean to Africa. These are from Antigua and Barbuda to Angola and from Bahamas to South Africa. Most Caribbean SIDS require at least 2 transhipment moves to connect to African top 2012 LSCI performers. Connections requiring at least 1 transhipment moves are predominant to Djibouti and Egypt. Trinidad and Tobago and Jamaica are the countries with the lowest average number of required transhipment moves to reach these African countries: 1.67 and 1.73 respectively. On the other side of the spectrum, Saint Vincent and the Grenadines and Grenada are the countries with the highest average of required transhipment moves to reach the top 15 African countries: 2.27 and 2.20 respectively. These averages however hide the incidence of connections requiring at least 3 transhipment moves (e.g. Grenada to Ghana) or direct connections (e.g. Bahamas to South Africa).

Caribbean to America

The Bahamas, Jamaica and Trinidad and Tobago have direct connections to most American top LSCI performers with an average of at least 0.1 transhipment moves. Except for Dominica, most Caribbean SIDS can connect to all American LSCI top performers with at least 2 transhipment moves. The Dominican Republic and the United States of America are the only American countries from this list with direct connections to all SIDS. Panama and Colombia are also directly connected to a significant number of SIDS. Panama requires at least one transhipment move to connect to all SIDS. Colombia requires at least two transhipment moves to connect to connect to all SIDS. Dominica is the Caribbean SIDS with the highest average number of required transhipment moves to top LSCI performers in America (1.6). Connections require at least three transhipment moves to countries in the west coast of South America such as Chile, Peru and Ecuador.

Caribbean to Asia

Jamaica, Trinidad and Tobago and Bahamas are the countries with the least average of required transhipment moves to reach top Asian LSCI performers: 0.9, 0.9, and 1.0 respectively. They have direct connections to countries such as China, Japan, Republic of Korea, and, in the case of Bahamas, also to Singapore. This is because China and Japan are amongst the main trading partners for Jamaica while Singapore is the country with the highest imports from Bahamas[97]. Similar to the connections to American countries, Dominica remains as the Caribbean SIDS requiring the highest number of transhipment moves to reach important Asian markets: at least three transhipment moves to reach Taiwan, China, Japan and the Republic of Korea. All other SIDS require one or two transhipment moves to reach most connected Asian countries.

Caribbean to Europe

All Caribbean SIDS have direct connections to France and the United Kingdom, the two major trading partners of several SIDS in the Caribbean.[98] The Caribbean SIDS and Europe are generally linked by historical ties and preferential trade agreements. Both France and the United Kingdom are used as intermediate points to reach the rest of Europe. Caribbean SIDS can connect to most highly European countries with at least one transhipment move. Europe is thus one of the most accessible regions from the Caribbean SIDS perspective. Jamaica, Trinidad and Tobago, and Bahamas remain as the countries with the least average of required transhipment moves to reach these European countries: 0.5, 0.5, and 0.6 average transhipment moves respectively. In addition to France and the United Kingdom, these SIDS have direct connections to Germany, Italy, Belgium, Portugal and Spain.

Caribbean to the Pacific

Jamaica is the Caribbean SIDS with the most number of direct connections to the Pacific region, namely to Australia, Fiji, French Polynesia, New Caledonia, and New Zealand. Besides Antigua and Barbuda's direct connection to Australia, no other

Caribbean SIDS has direct connections to these countries in the Pacific. Bahamas and Trinidad and Tobago require mostly two transhipment moves to reach this region. Other Caribbean SIDS require at least three transhipment moves. Compared to Africa, America, Asia, and Europe, trade with the Pacific region requires the largest number of transhipment moves. To sum up, Jamaica, Trinidad and Tobago are identified as the countries most connected both to other SIDS and to external regions. In spite of a high connectivity to other regions, Bahamas lacks direct connections to other Caribbean SIDS. The United States of America, the Dominican Republic, France and the United Kingdom are the only countries external to the Caribbean SIDS classification with direct connections to all Caribbean SIDS. Interestingly, Jamaica has no direct connectivity to Bahamas in 2012 but has direct connections on the 2013 data set

Table A.14 Africa/Indian Ocean SIDS to the Rest of Africa: Required number of transhipment moves

Required Transhipment moves	From					
To	Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
Africa						
Angola	1.0	1.0	2.0	1.0	0.0	1.0
Benin	1.0	1.0	2.0	1.0	1.0	1.0
Cameroon	1.0	1.0	2.0	1.0	0.0	1.0
Côte d'Ivoire	1.0	1.0	2.0	0.0	1.0	1.0
Djibouti	1.0	1.0	1.0	0.0	3.0	1.0
Egypt	1.0	1.0	1.0	1.0	2.0	1.0
Ghana	1.0	1.0	2.0	0.0	1.0	1.0
Mauritius	2.0	0.0	2.0		2.0	0.0
Morocco	0.0	2.0	2.0	1.0	1.0	2.0
Namibia	2.0	1.0	1.0	1.0	1.0	1.0
Nigeria	1.0	1.0	2.0	0.0	0.0	1.0
Senegal	1.0	1.0	2.0	1.0	1.0	2.0
South Africa	2.0	0.0	1.0	0.0	1.0	0.0
Sudan	1.0	1.0	2.0	1.0	2.0	1.0
Togo	1.0	1.0	2.0	0.0	1.0	1.0
Average	**1.1**	**0.9**	**1.7**	**0.6**	**1.1**	**1.0**
Scale	0.0	1.0	2.0	3.0		

Source: Data sourced from Lloyds List Intelligence.

Table A.15 Africa/Indian Ocean SIDS to the Americas: Required number of transhipment moves

Required Transhipment moves	From					
To	Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
America						
Argentina	1.0	1.0	2.0	1.0	1.0	1.0
Bahamas	1.0	1.0	2.0	1.0	4.0	2.0
Brazil	0.0	1.0	2.0	1.0	1.0	1.0
Canada	1.0	2.0	2.0	2.0	1.0	2.0
Chile	1.0	2.0	5.0	2.0	2.0	2.0
Colombia	1.0	3.0	2.0	2.0	4.0	2.0
Dominican Republic	1.0	2.0	2.0	1.0	3.0	2.0
Ecuador	2.0	2.0	3.0	2.0	5.0	3.0
Guatemala	1.0	2.0	2.0	2.0	4.0	2.0
Jamaica	2.0	2.0	2.0	1.0	3.0	2.0
Mexico	1.0	1.0	2.0	1.0	4.0	2.0
Panama	1.0	3.0	2.0	2.0	5.0	2.0
Peru	2.0	2.0	3.0	2.0	5.0	2.0
United States of America	1.0	2.0	2.0	1.0	1.0	2.0
Uruguay	1.0	1.0	2.0	1.0	2.0	1.0
Average	**1.1**	**1.8**	**2.3**	**1.5**	**3.0**	**1.9**
Scale	0.0	1.0	2.0	3.0	4.0	5.0

Source: Data sourced from Lloyds List Intelligence.

Table A.16 Africa/Indian Ocean SIDS to Asia: Required number of transhipment moves

Required Transhipment moves	From					
To	Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
Asia						
Taiwan Province of China	1.0	2.0	1.0	0.0	2.0	2.0
China	1.0	1.0	1.0	0.0	1.0	1.0
India	1.0	0.0	0.0	0.0	2.0	0.0
Japan	1.0	2.0	1.0	1.0	2.0	2.0
Lebanon	1.0	2.0	2.0	1.0	2.0	2.0
Malaysia	1.0	1.0	0.0	0.0	1.0	1.0
Oman	1.0	1.0	1.0	0.0	2.0	0.0
Republic of Korea	1.0	2.0	1.0	1.0	2.0	2.0
Russian Federation	1.0	2.0	1.0	1.0	2.0	2.0
Saudi Arabia	1.0	1.0	1.0	1.0	2.0	1.0
Singapore	1.0	1.0	0.0	0.0	1.0	1.0
Sri Lanka	1.0	1.0	0.0	0.0	2.0	1.0
Thailand	2.0	2.0	1.0	1.0	2.0	2.0
United Arab Emirates	1.0	0.0	1.0	0.0	2.0	0.0
Viet Nam	1.0	2.0	1.0	1.0	2.0	2.0
Average	**1.1**	**1.3**	**0.8**	**0.5**	**1.8**	**1.3**
Scale	0.0	1.0	2.0			

Source: Data sourced from Lloyds List Intelligence..

Table A.17 Africa/Indian Oceans SIDS to Europe: Required number of transhipment moves

Required Transhipment moves	From					
To	Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
Europe						
Belgium	1.0	2.0	2.0	2.0	0.0	2.0
Denmark	2.0	3.0	3.0	3.0	1.0	3.0
France	0.0	1.0	1.0	1.0	1.0	1.0
Germany	1.0	2.0	2.0	2.0	2.0	2.0
Greece	1.0	2.0	2.0	1.0	2.0	2.0
Italy	1.0	1.0	1.0	1.0	1.0	1.0
Malta	1.0	2.0	1.0	2.0	1.0	2.0
Netherlands	0.0	2.0	2.0	2.0	2.0	2.0
Poland	1.0	2.0	2.0	2.0	1.0	2.0
Portugal	0.0	2.0	2.0	2.0	0.0	2.0
Spain	0.0	1.0	1.0	1.0	1.0	1.0
Sweden	1.0	2.0	2.0	2.0	1.0	2.0
Turkey	1.0	2.0	1.0	1.0	2.0	2.0
Ukraine	1.0	2.0	1.0	2.0	2.0	2.0
United Kingdom	1.0	0.0	2.0	2.0	0.0	2.0
Average	**0.8**	**1.7**	**1.7**	**1.7**	**1.1**	**1.9**
Scale	0.0	1.0	2.0	3.0		

Source: Data sourced from Lloyds List Intelligence.

Table A.18 Africa/Indian Oceans SIDS to Pacific SIDS: Required number of transhipment moves

Required Transhipment moves To	From Cape Verde	Comoros	Maldives	Mauritius	Sao Tome and Principe	Seychelles
Australia	1.0	2.0	1.0	1.0	3.0	2.0
Fiji	3.0	3.0	1.0	1.0	3.0	2.0
French Polynesia	2.0	4.0	2.0	2.0	5.0	3.0
Guam	2.0	3.0	2.0	2.0	3.0	2.0
Kiribati	3.0	4.0	2.0	3.0	3.0	3.0
Marshall Islands	3.0	4.0	2.0	1.0	3.0	3.0
New Caledonia	3.0	3.0	1.0	1.0	2.0	2.0
New Zealand	2.0	3.0	2.0	1.0	3.0	2.0
Palau	3.0	3.0	2.0	2.0	3.0	2.0
Papua New Guinea	4.0	3.0	1.0	1.0	2.0	2.0
Samoa	3.0	4.0	2.0	2.0	3.0	3.0
Solomon Islands	3.0	3.0	1.0	1.0	2.0	2.0
Tonga	3.0	4.0	2.0	2.0	4.0	3.0
Vanuatu	3.0	3.0	1.0	2.0	2.0	2.0
Average	**2.7**	**3.3**	**1.6**	**1.6**	**2.9**	**2.4**
Scale	0.0	1.0	2.0	3.0	4.0	5.0

Source: Data sourced from Lloyds List Intelligence.

Table A.19 Pacific SIDS to Africa: Required number of transhipment moves

Required Transhipment moves To	From Fiji	Kiribati	Marshall Islands	Nauru	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Africa										
Angola	1.0	2.0	5.0	2.0	1.0	1.0	5.0	1.0	2.0	1.0
Benin	3.0	3.0	2.0	2.0	1.0	1.0	5.0	1.0	5.0	2.0
Cameroon	2.0	2.0	2.0	2.0	1.0	1.0	5.0	1.0	5.0	1.0
Côte d'Ivoire	5.0	4.0	2.0	2.0	1.0	1.0	5.0	1.0	5.0	2.0
Djibouti	2.0	3.0	1.0	3.0	2.0	2.0	3.0	2.0	3.0	2.0
Egypt	2.0	3.0	1.0	3.0	2.0	2.0	3.0	2.0	3.0	2.0
Ghana	3.0	3.0	3.0	2.0	2.0	1.0	5.0	1.0	5.0	2.0
Mauritius	2.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	3.0	1.0
Morocco	3.0	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.0	3.0
Namibia	1.0	2.0	2.0	2.0	3.0	1.0	2.0	1.0	2.0	1.0
Nigeria	2.0	2.0	2.0	2.0	2.0	1.0	3.0	1.0	3.0	1.0
Senegal	3.0	3.0	3.0	3.0	2.0	1.0	3.0	3.0	3.0	3.0
South Africa	1.0	2.0	1.0	2.0	1.0	1.0	2.0	1.0	2.0	1.0
Sudan	2.0	3.0	2.0	3.0	2.0	2.0	3.0	2.0	3.0	2.0
Togo	3.0	1.0	1.0	2.0	1.0	1.0	5.0	1.0	5.0	3.0
Average	**2.3**	**2.5**	**2.1**	**2.3**	**1.7**	**1.3**	**3.6**	**1.5**	**3.5**	**1.8**
Scale	0.0	1.0	2.0	3.0	4.0	5.0				

Source: Data sourced from Lloyds List Intelligence.

Table A.20 Pacific SIDS to the Americas: Required number of transhipment moves

Required Transhipment moves	From									
To	Fiji	Kiribati	Marshall Islands	Nauru	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
America										
Argentina	2.0	2.0	1.0	3.0	1.0	1.0	2.0	2.0	2.0	2.0
Bahamas	2.0	2.0	2.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0
Brazil	2.0	2.0	2.0	3.0	1.0	1.0	2.0	2.0	2.0	2.0
Canada	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Chile	1.0	2.0	2.0	3.0	1.0	2.0	2.0	2.0	2.0	2.0
Colombia	1.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0
Dominican Republic	2.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0
Ecuador	1.0	2.0	2.0	3.0	1.0	2.0	2.0	2.0	2.0	2.0
Guatemala	2.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0
Jamaica	0.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0
Mexico	1.0	1.0	1.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0
Panama	0.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0
Peru	1.0	2.0	2.0	3.0	1.0	2.0	2.0	2.0	2.0	2.0
United States of America	0.0	1.0	1.0	2.0	1.0	2.0	0.0	1.0	1.0	1.0
Uruguay	3.0	3.0	1.0	3.0	1.0	1.0	3.0	3.0	3.0	3.0
Average	**1.3**	**1.8**	**1.6**	**2.7**	**1.4**	**1.9**	**1.7**	**1.8**	**1.8**	**1.8**
Scale	0.0	1.0	2.0	3.0						

Source: Data sourced from Lloyds List Intelligence.

Table A.21 Pacific SIDS to Asia: Required number of transhipment moves

Required Transhipment moves	From									
To	Fiji	Kiribati	Marshall Islands	Nauru	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Asia										
Taiwan Province of China	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
China	0.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	1.0	0.0
India	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0
Japan	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Lebanon	3.0	4.0	2.0	2.0	2.0	3.0	2.0	3.0	4.0	3.0
Malaysia	0.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0
Oman	1.0	2.0	2.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0
Republic of Korea	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Russian Federation	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Saudi Arabia	1.0	2.0	1.0	2.0	1.0	1.0	2.0	1.0	2.0	1.0
Singapore	0.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0
Sri Lanka	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0
Thailand	0.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	0.0
United Arab Emirates	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0
Viet Nam	0.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
Average	**0.6**	**1.3**	**0.9**	**1.6**	**1.1**	**0.7**	**1.1**	**0.7**	**1.3**	**0.7**
Scale	0.0	1.0	2.0	3.0	4.0					

Source: Data sourced from Lloyds List Intelligence.

Table A.22 Pacific SIDS to Europe: Required number of transhipment moves

Required Transhipment moves	From									
To	Fiji	Kiribati	Marshall Islands	Nauru	Palau	Papua New Guinea	Samoa	Solomon Islands	Tonga	Vanuatu
Europe										
Belgium	0.0	2.0	2.0	2.0	3.0	0.0	2.0	4.0	0.0	0.0
Denmark	3.0	3.0	2.0	2.0	2.0	5.0	3.0	5.0	3.0	1.0
France	0.0	2.0	1.0	1.0	2.0	3.0	2.0	3.0	2.0	0.0
Germany	0.0	2.0	2.0	2.0	3.0	0.0	2.0	4.0	2.0	1.0
Greece	3.0	2.0	1.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Italy	1.0	2.0	1.0	2.0	2.0	1.0	2.0	1.0	3.0	1.0
Malta	1.0	2.0	2.0	1.0	2.0	3.0	3.0	3.0	3.0	3.0
Netherlands	0.0	2.0	2.0	2.0	3.0	4.0	2.0	4.0	2.0	1.0
Poland	3.0	3.0	2.0	2.0	2.0	4.0	2.0	3.0	2.0	1.0
Portugal	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0
Spain	2.0	2.0	2.0	3.0	3.0	3.0	2.0	3.0	2.0	2.0
Sweden	3.0	3.0	2.0	2.0	3.0	4.0	3.0	4.0	2.0	1.0
Turkey	3.0	4.0	1.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0
Ukraine	3.0	4.0	1.0	2.0	2.0	3.0	2.0	3.0	3.0	3.0
United Kingdom	0.0	2.0	2.0	2.0	2.0	0.0	2.0	4.0	2.0	0.0
Average	**1.6**	**2.5**	**1.7**	**1.9**	**2.3**	**2.6**	**2.3**	**3.3**	**2.3**	**1.5**
Scale	0.0	1.0	2.0	3.0	4.0	5.0				

Source: Data sourced from Lloyds List Intelligence.

Annex IV: Port profiles

Table A.23 (a) Selected data fields from World Port Index 2014

Country	Port	Harbour size	Harbour type	Shelter afforded	Channel depth	Cargo pier depth	Tide	Maximum size vessel	Load/offload wharves	Load/offload anchor	Load/offload Med moor	Cranes fixed	Cranes mobile	Lifts more than 100 tons	Lifts 50–100 tons	Lifts 25–49 tons	Lifts less than 25 tons
Antigua and Barbuda	St John's	M	Or	F	k	g	0	L	Y			Y	Y	Y	Y		Y
Bahamas	Freeport	S	Rb	F	g	j	1	L	Y	Y	Y		Y		Y	Y	Y
Bahamas	Nassau	M	Cn	G	j	j	1	L	Y			Y	Y	Y	Y	Y	Y
Barbados	Bridgetown	S	Cb	G	h	j	1	L	Y			Y	Y		Y	Y	Y
Cape Verde	Mindelo	V	Cn	F		j	1	M	Y	Y	Y	Y	Y		Y	Y	Y
Cape Verde	Praia	S	Cb	F	m	l	1			Y		Y	Y			Y	Y
Comoros	Moroni	V	Or	P	a	o	3	M		Y							
Comoros	Mutsamuda	V	Or	F	k	l	2	M		Y		N	N				
Dominica	Roseau	V	Cn	F	a	k	2	L	Y						Y	Y	Y
Fiji	Lautoka	V	Cb	G	k	m	2	M	Y				Y				Y
Fiji	Suva	S	Cn	G	a	l	2	L	Y	Y			Y				Y
Grenada	St George's	S	Cn	F	h	d	1	L	Y								
Jamaica	Kingston	M	Cn	E	e	g	0	L	Y			Y	Y	Y	Y		
Jamaica	Montego Bay	S	Cb	E	k	k	0	L	Y			Y					Y
Kiribati	Kiritmati	V	Cn	F	a		1	M		Y		Y					Y
Kiribati	Tarawa	V	Or	F	l	m	3	M		Y		Y	Y			Y	Y
Maldives	Male	V	Cn	F	a	k	1	M		Y	Y		Y			Y	Y
Marshall Islands	Kwajalien	V	Or	G	g	l	1	M	Y				Y			Y	Y
Marshall Islands	Majuro	V	Or	G	g	f	2		Y	Y			Y				Y
Mauritius	Port Louis	S	Cb	G	j	l	1	M	Y	Y	Y	Y	Y			Y	Y
Micronesia (Federated States of)	Chuuk	V	Or	G	l	l	1		Y	Y		Y					Y
Micronesia (Federated States of)	Kosrae	V	Cn	F	g	l	1			Y							
Micronesia (Federated States of)	Pohnpei	S	Cn	F	k	k	2	M									
Micronesia (Federated States of)	Yap	V	Cn	G	a	l	1	M		Y		N	N	N	Y	N	N
Nauru	Nauru	V	Or	F	a	a	1	M		Y	Y						
Palau	Koror	V	Or	G	h	m	4	M	Y	Y			Y		Y		Y
Papua New Guinea	Alotau	V	Cn	F	m	k	1	M	Y	N		N	N	N	N	N	N
Papua New Guinea	Kimbe	V	Cn	F		j	1	M	Y	N		N	N	N	N	N	N
Papua New Guinea	Lae	V	OR	G	j	g	1	M	Y			N	N	N	N	N	N
Papua New Guinea	Madang	V	Cn	G	k	k	1	M	Y	Y			Y				Y
Papua New Guinea	Oro Bay	V	Cn	G	j	j	4	M	Y				Y				Y
Papua New Guinea	Port Moresby	S	Or	F	k	k	2	M	Y			Y	Y				Y

Country	Port	Harbour size	Harbour type	Shelter afforded	Channel depth	Cargo pier depth	Tide	Maximum size vessel	Load/offload wharves	Load/offload anchor	Load/offload Med moor	Cranes fixed	Cranes mobile	Lifts more than 100 tons	Lifts 50–100 tons	Lifts 25–49 tons	Lifts less than 25 tons
Papua New Guinea	Rabaul	S	Cn	E	a	a	0	M	Y	Y							
Samoa	Apia	V	Cn	G	j	l	1	L	Y				Y				Y
Sao Tome and Principe	Sao Tome	V	Or	F	n	p	0			Y		Y			Y	Y	
Seychelles	Port Victoria	V	Cn	F	p	k	2	M	Y	Y		Y			Y	Y	Y
Solomon Islands	Honiara	V	Or	G	l	l	1	L	Y	Y			Y				Y
Solomon Islands	Noro	S	Or	F	a	l	0	L									
Saint Kitts and Nevis	Basseterre	V	Or	F	b	l	0	L	Y			Y	Y	Y	Y	Y	Y
Saint Kitts and Nevis	Charlestown	V	Or	F	h	l	1			Y							Y
Saint Lucia	Castries	S	Cn	G	j	k	1	L	Y			Y	Y	Y		Y	Y
Saint Lucia	Vieux Fort	V	Cn	G	j	k	1	L	Y				Y				Y
Saint Vincent and the Grenadines	Kingstown	S	Cn	F		j	1	L	Y	Y			Y			Y	
Timor-Leste	Dili	S	Cn	G	a	m	5	M		Y			Y				Y
Tonga	Nuku'alofa	V	Cn	G	j	g	1	M	Y								
Tonga	Vavau	V	Cn	G	n	l	1	M	Y	Y	Y	N	N				
Trinidad and Tobago	Point Lisas	S	Cn	G	h	j	1	L	Y			Y	Y		Y	Y	Y
Trinidad and Tobago	Port of Spain	M	Cn	E	j	j	1	L	Y	Y			Y	Y	Y	Y	Y
Tuvalu	Funifuti	V	Cn	G	n	n	4	M	Y		Y		Y				Y
Vanuatu	Port Vila	V	Cb	E	j	k	1	M		Y			Y				Y
Vanuatu	Santo	S	Cn	G	h	k	1	L					Y				Y

Source: World Port Index 2014, National Geospatial-Intelligence Agency, United States of America.

Table A.23 (b) Selected data fields from World Port Index 2014 - Codes

Codes

Harbour size	Harbour type	Shelter afforded	Maximum size vessel
L - Large	Cn - Coastal natural	E - Excellent	L - Over 500 ft (152.4 m) length
M - Medium	Cb - Coastal breakwater	G - Good	M - Up to 500 ft (152.4 m) length
S - Small	Ct - Coastal tide gate	F - Fair	
V - Very small	Rn - River natural	P - Poor	
	Rb - River basin	N - None	
	Rt - River tide gate		
	Lc - Lake or canal		
	Or - Open roadstead		
	Th - Typhoon harbour		

Depths

Code	Feet	Metres	Code	Feet	Metres
a	76–over	23.2–over	j	36–40	11.0–12.2
b	71–75	21.6–22.9	k	31–35	9.4–10.7
c	66–70	20.1–21.3	l	26–30	7.9–9.1
d	61–65	18.6–19.8	m	21–25	6.4–7.6
e	56–60	17.1–18.2	n	16–20	4.9–6.1
f	51–55	15.5–16.8	o	11–15	3.4–4.6
g	46–51	14.0–15.2	p	6–10	1.8–3.0
h	41–45	12.5–13.7	q	0–5	0–1.5

Tides: Mean range in metres

Table A.24 Berths and equipment at ports in SIDS

Country	Port	Berths	Equipment
Antigua & Barbuda	St John's	Deep Water Harbour: L366m; D10.6m; 3 berths; cruise, container, roro vessels Nevis Street Pier: L300m; D9-10.7m; 2 berths, cruise vessels Heritage Quay, L201m, D9.9-10m, 2 berths, cruise vessels	Authority owns 1x150 ton and 1x104 ton mobile crane. 2x75 ton cranes are available on dockside, provided by a private contractor.
Bahamas, The	Freeport-Bahamas	L1036m, D15.85m (min); 4 berths; container; area 49 ha.Separate cruise and cargo berths.	10 (super post-Panamax); 2 mobile cranes
Bahamas, The	Marsh Harbour		
Bahamas, The	Nassau	Nassau Container Port. Separate cruise and cargo berths.	
Barbados	Bridgetown	Berth #4 L184m; D11.0m; container vessels. Berth #5 L65m; D11.0m; container vessels. Separate cruise and cargo berths.	1x35 tonnes gantry crane1x104 tonnes mobile crane
Dominica	Roseau	Woodbridge Bay Port L243.86m; D9.75m; wharf level 3.05 m (1.6 km north of Rosseau) Roseau Cruise Ship Berth is a 'T' jetty in the center of Rouseau L49m; D12.2m. Woodbridge Bay Port is also used for cruise vessels.	Containers up to 40 tonnes can be handled ashore if placed on port trailers by ship's gear.
Grenada	St. George's	St. George's Commercial Berth (Inner Harbour): L335m; D8.3-9.8m; Quay height 2.1-2.7m above water. Melville Street Cruise Terminal: North Berth: L375m; D10.3m: South Berth: L375m; D 10.5m. Max vessel size: L325m; Draft10.0m	Loading and discharging are done with ship's gear.
Jamaica	Kingston	Multipurpose Terminal Berths 1-7 operated by Kingston Wharves Ltd North Terminal Berths 8-11 L535m; D15.2m West Terminal L475m; D14.5mSouth Terminal L1300m; D14.0m	North Terminal 4 super-Post Panamax ship-to-shore gantry cranesWest Terminal 4 super-Post Panamax ship-to-shore gantry cranesSouth Terminal 5 post-Panamax gantry cranes and 6 super post-Panamax ship-to-shore gantry cranes
Jamaica	Montego Bay	Berth #2: L182m; D9.1m; tankers Berth #3: L178m; 6.2m; roro Berth #4: L175m; D5.9m; roro Berth #5 & # 6: L426m; D9.6m; exclusively for cruise vessels	
St. Kitts and Nevis	Basseterre	Main berth: L121.9m; D9.14mRoro berth: L117.3m; D5.0m Port Zante (Cruise Ship Terminal): L487.6m; D9.14-15.85m	1x100 ton mobile craneLoading and discharge with ship's gear
St. Kitts and Nevis	Charlestown		
St. Lucia	Castries	Berth #1: L60.96m; D5.48–6.09m; cruise Berth #2 & 3: L219.45m; D8.23m; cruise Berth #4: L151.79m; D9.75m; containers Berth #5: L158.49m; D9.75m with a RoRo Ramp W14.63m; breakbulk, roro	1x104 ton mobile crane

Country	Port	Berths	Equipment
		Berth #6: L136.55m; D9.14m; multipurpose Pointe Seraphine #1: L121.92m; D10.97m; cruise Pointe Seraphine #2: L91.44m; D10.36m; cruise	
St. Lucia	Vieux Fort	A Finger Pier L163m; W15m; D11.0m. It can accomodate vessels on either side. The height of the quay from the water level at low tide is 2.3m and at high tide it measures 2m. A Lolo container berth L210m; D11m. The height of the quay from the water level at low tide 2.5m and high tide it measures 2m.	1x80 ton mobile crane
St. Vincent and the Grenadines	Kingstown	Port Kingstown, deepwater pier: L274m; D9.75m(mainly used for the handling of bananas, fresh produce, imported vehicles, lumber and cement). Campden Park Container Park (CPCP): L100m; D12.0m. The terminal can accommodate vessels of up to 12,000 dwt. With two approach bridges measuring 50 meters by 60 meters, free circulation of traffic prevails between the quay and the stacking area. Cruise Ship Terminal: Cruise ships berth on either side of a piled concrete jetty, L162m; W20m; North Berth D11.35-28.0m and South berth D7.1-28.0m.	1x35 ton mobile craneCampden Park 100-ton Gottwald harbour crane (fixed shore crane)
Trinidad and Tobago	Point Lisas	Point Lisas Industrial Port: Berth #1: L35m; D5.0m; General, breakbulk, Ro-Ro Berth #1A: L30m; D6.6;General, breakbulk, Ro-Ro, Lo-Lo Berth #2: L165; D5.0 General, breakbulk Berth #3: L105m; D7.30; General, breakbulk, Ro-Ro, Lo-Lo Berth #4: L110m; D12.8M General, breakbulk, Ro-Ro, Lo-Lo Berth #5: L200m; D12.8M Containers	2xShip to Shore Gantry Cranes (LIEBHERR), Safe Working Load (S.W.L.) under telescopic spreader: 40 tonnes (Single Lift), 50 tonnes (Twin Lift). 3x100 ton mobile cranes
Trinidad and Tobago	Port of Spain	Berth #1: L198m; D9.75m; Cruise ship complex Berth #2: L152m; D9.20m; Multipurpose, breakbulk, containers Berth #3: L161m; D8.50m; Multipurpose, breakbulk, containers Berth #4: L161m; D9.00m; Multipurpose, breakbulk, containers Berth #5: L185m; D9.00m; Multipurpose, breakbulk, containers Berth #6: L135m; D9.00m; Containers Berth #6E: L179m; D11.00m; Containers Berth #6W: L189m; D11.00m; Containers Berth #7: L143m; D12.00m; Containers Berths 5-7 constitute the container terminal.	2x 40 ton Panamax cranes capable of handling vessels up to 12 containers wide2x40/50 ton Post Panamax cranes capable of handling vessels up to 18 containers wide1x41 ton mobile crane
Comoros	Moroni	Lighterage port. Discharging and loading by lighters and dhows.	1x18 ton and 1x 5ton multipurpose crane
Comoros	Mutsamudu	Berth #1A: L173m; D9.0m; used for foreign trade	
Maldives	Male	Alongside berth (Magathu Faalan): L101m; D10.5m; can berth vessels of 15,000 displacement 150 m (LOA) 9 m draft Containers and conventional cargo are handled at Berth and at Anchorage	1x160t; 1x40t; 5x30t; 4x25t mobile cranes
Mauritius	Port Louis	Mauritius Container Terminal: L560m; D14.0m; turning circle 450m Back-up storage for 13,815 containers	5x40.8tonnes post panamax gantry cranesTwo more ship to shore container cranes are planned
Seychelles	Port Victoria	Commercial Port (Mahe Quay): L370m; D11.5m Container handling performed at conventional quays with ship's gear or mobile cranes	1x41t; 2x15t mobile cranes
Fiji	Lautoka	Queens Wharf: L290m; D11.5m; berth height above chart datum 3.9m	1x30t mobile crane
Fiji	Suva	Kings Wharf: L495m; D11.0m three berths (South, Central, North); Berth height above CD 6.5m Walu Bay: L183m; D9.0m; Berth height above CD 6.4m	Two Gottwald HMK300E 52t cranes
Kiribati	Kiritmati		
Kiribati	Tarawa	Betio Port: currently lighterage port; max vessel size LOA 195m, 9.4m draftAlongside berth under construction, scheduled for completion 2014	25t crane stationed permanently on the wharf.
Marshall islands	Kwajalien	Ebeye Docks	
Marshall islands	Majuro	Delap Berth (International): L309m; D11.5m	
Micronesia (Federated States of)	Chuuk	Weno Harbour, Chuuk: Max vessel size 25,000GT	
Micronesia (Federated States of)	Kosrae	Okat Port:	
Micronesia (Federated States of)	Pohnpei	Commercial Wharf: L331m; D10.0m Max vessel size draught 8.0m, 10,000 GT	Mobile crane 10 t capacity
Micronesia (Federated States of)	Yap	Yap Colonia International Port, Commercial Wharf: L2x129m; D9.0-10.0m Max vessel size: LOA 183m, beam 13m, draught 11.0m, 13,000GT.	There are cranes with a capacity of 50-75 t
Nauru	Nauru	Lighterage portMax vessel size LOA 192m, beam 28.3m, 35,000 dwt	Can handle 20' TEUs to a max weight of 24 t

Country	Port	Berths	Equipment
Palau	Koror	Malakal Dock Pier #1: L160m; D8.84m Malakal Dock Pier #2: L168m; D8.84m	1x16t and 1x20t mobile crane
Papua New Guinea	Alotau	Berth 1 (Overseas): L93m; D10m; deck height 2.4m (above LAT)	
Papua New Guinea	Kimbe	Berth 1 (Main Wharf): L117m; D10.7m; deck height 3.1m (above LAT)	There are no wharf mounted, however,cranes are available capable of lifting up to fourteen (14) tonne containers
Papua New Guinea	Lae	Berth 1 (Overseas Wharf): L123m; D11.0m; deck height 2.7m (above LAT) Berth 2 (Overseas Wharf): L123m; D11.0m; deck height 2.7m (above LAT) Berth 3 (Overseas Wharf): L184m; D11.0m; deck height 2.7m (above LAT)	There are no wharf mounted gantry crane
Papua New Guinea	Madang	Berth #1: L137m; D10.1m; deck height 3.1m bove (LAT)	There are no wharf mounted container handling cranes therefore ships' cranes are utilized
Papua New Guinea	Oro Bay	Berth 1 (Main Wharf): L70m; D11.4m; deck height 2.82m (above LAT) Berth 2 (Small ships): L23m; D10.5m; deck height 2.5m (above LAT)	There are no wharf mounted cranes however, mobile cranes are available capable of lifting up to 20 tonne containers.
Papua New Guinea	Port Moresby	Port website shows: Berth 1 (Main Wharf): L70m; D11.4m; deck height 2.82m (above LAT) Berth 2 (Small ships): L23m; D10.5m; deck height 2.5m (above LAT) [NB Two other sources show Berth #1 & #2: L213m; D8.5m]	There are no wharf mounted cranes, however, mobile cranes are available capable of lifting up to twenty (20) tonne containers.
Papua New Guinea	Rabaul	Berth 1 (Blanche St): L122m; D7.0m; deck height 2.8m (above LAT) Berth 2 (Bay Road): L152m; D10.2m; deck height 2.8m (above LAT)	There are no wharf mounted cranes however, mobile cranes are available capable of lifting up to 20 tonne containers.
Samoa	Apia	Main Wharf: L184m; D10.0m New Wharf: L169m; D13.0m	
Solomon Islands	Honiara	Overseas berth: L120m; D10-13m	
Solomon Islands	Noro	Noro Overseas Berth: L70m; D14m	
Timor Leste	Dili	Port of Dili: L288m; D7.2m	
Tonga	Nuku'alofa	Queen Salote Wharf No. 1: L94m; D12.2m Queen Salote Wharf No. 2: L110m; D10.0m In December 2012, the new $18.3 million Vuna passenger wharf was opened, allowing cargo and cruise vessels to be worked simultaneously.	1x25 t mobile crane
Tonga	Vavau		
Tuvalu	Funifuti	Government Deepsea Wharf: L50m; D8.0m	
Vanuatu	Port Vila	Government/Main Wharf: L212m; D10.7m; Ro-Ro, passengers, containers, general, LPG;ILoading/discharging by ship's gear Ardimanni/Star Wharf: L55m; D8.2m; Ro-Ro, passengers, containers, general, LPG, petroleum	
Vanuatu	Santo	Salt Water Berth: L140m; D10.5m (LWS) A new berth has been built to the east of the Salt Water Berth	
Cape Verde	Mindelo	aka Porto Grande: 4 berths with lengths between 205 and 315 m and depths between 11.5 and 12.0m; 4 berths with lengths between 60 and 122 m and depths between 3.5 and 8.5mContainer vessels must be self-sustaining.	1x60 ton heavy lift floating crane
Cape Verde	Praia	2 berths with lengths 217 and 314 m and depths 9.0 and 7.5m respectively; 3 berths with lengths between 55 and 80 m and depths between 3.0 and 5.0m	
Cape Verde	Sal Rei (Boa Vista)	L80.0m; D5.0m; includes roro ramp	
Cape Verde	Santa Maria (Sal)	Port of Palmeira (NB Santa Maria is the capital in the south of Sal Island. The port is in the north-east of the island)L124m; D1.0-4.1m	
São Tomé & Príncipe	Sao Tome	Lighterage port	1x23t multipurpose crane; 1x5t mobile crane

Source: UNCTAD secretariat based on information available from respective port authorities and port directories.

Endnotes

[1] The United Nations has never established criteria to determine an official list of SIDS. Therefore, throughout this document and unless otherwise specified, reference to SIDS means the island countries included in the unofficial list used by UNCTAD for analytical purposes. The list comprises namely the following countries: Antigua and Barbuda, Palau, Bahamas, Papua New Guinea, Barbados, Samoa, Cape Verde, Sao Tome and Principe, Comoros, Seychelles, Dominica, Solomon Islands, Fiji, St. Kitts and Nevis, Grenada, St. Lucia, Jamaica, St. Vincent and the Grenadines, Kiribati, Timor-Leste, Maldives, Tonga, Marshall Islands, Trinidad and Tobago, Micronesia (Federated States of), Tuvalu, Mauritius, Vanuatu, Nauru.

[2] The Nauru Agreement concerning cooperation in the management of fisheries of common interest was established in 1982. The members are: Kiribati, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu.

[3] See also UNCTAD publication (2014), The oceans economy: opportunities and challenges for SIDS, UNCTAD/DITC/TED/2014/5, available at http://unctad.org/en/PublicationsLibrary/ditcted2014d5_en.pdf.

[4] Gibson J (2006). Are Pacific Island Economies Growth Failures? Working Paper #3. Pasifika Interactions Project.

[5] Read R (2010). Trade, Economic Vulnerability, Resilience and the Implications of Climate Change in Small Island and Littoral Developing Economies, ICTSD Issue Paper No. 12.

[6] Ashoff, G (1989). Economic and Industrial Development Options for Small Third World Countries. German Development Institute. Occasional Paper No. 91.

[7] Annex II also contains matrices of intra-regional trade for each of the Caribbean, Indian Ocean SIDS and Pacific SIDS regions (West African SIDS are not included as the trade between Cape Verde and Sao Tome and Principe is negligible.

[8] Another indicator of the efficiency of a country's trade facilitation measures is the World Bank's Logistics Performance Index. In 2014, the Bahamas and Jamaica were ranked 66th and 70th respectively; Comoros, Maldives and Mauritius 128th, 82nd and 115th respectively; Fiji, Papua New Guinea and Solomon Islands 111th, 126th and 106th respectively; and Sao Tome and Principe 84th.

[9] Hub-and-spoke: Transfer between larger mainline vessels and smaller feeder vessels.

[10] Interlining: Transfer between two mainline services that cover a different set of ports in the same range.

[11] Relaying: Transfer between two different mainline services for onward shipment.

[12] Brand names of the various global operators are shown in brackets: CMA CGM (Delmas, ANL, US Lines, Feeder Associate System, Cagema, MacAndrews, Cheng Lie Navigation Co and CoMaNav); Maersk Line (Safmarine, MCC-Transport, Seago Line and Mercosul Line); and MSC (WEC Lines).

[13] Include: Comoros (Faboni, Moroni and Mutsamuda), Maldives (Male), Mauritius (Port Louis) and Seychelles (Port Victoria).

[14] UNCTAD's Liner Shipping Connectivity Index (LSCI) measures supply of container shipping capacities deployed by shipping lines on given routes and builds upon five components: the number of ships, the average TEU capacity, the number of shipping companies, the number of services and the maximum ship size made available for a given country at any given time.

[15] However, a little caution needs to be exercised with this observation, as not all connections are bidirectional. For example, the inter-island service offered by Geest follows the specific rotation: Fort de France, Martinique; Castries, Saint Lucia; St John's, Antigua; Basseterre, Saint Kitts; Bridgetown, Barbados; Roseau, Dominica; Port of Spain, Trinidad; St George's, Grenada; Kingstown, Saint Vincent; and Vieux Fort, Saint Lucia. So, for example, Bridgetown is connected to Port of Spain but the reverse is not true.

[16] Defined here as the top 15–20 countries that scored the highest LSCI values in 2012.

[17] Wilmsmeier G, Monios J and Pérez G (2013). Port System evolution – the case of Latin America and the Caribbean. IAME 2013 Conference, 3–5 July, Marseille, France. Paper ID 57.

[18] The evidence that is available suggests that this is also the case for weight-based data. UNCTAD estimates for instance that the total volume of goods unloaded in developing Oceania (i.e. the Pacific SIDS) at 13.1 million metric tons in 2013, nearly twice the weight of goods loaded (7.5 million metric tons).

[19] Saipan and Guam also part of Micronesia shipping commission as non-voting members.

[20] Secretariat of the Pacific Community, Regional Maritime Programme. Available at: http://www.spc.int/maritime/index.php?option=com_content&task=view&id=204& Itemid=1.

[21] Australian Agency for International Development (AusAID) (2004). Pacific Regional Transport Study. Country Reports. Canberra. (available at http://www.forumsec.org/resources/uploads/attachments/documents/Pacific%20Regional%20Transport%20Study,%20June%202004.pdf); and Asian Development Bank (2007). Oceanic Voyages, Aviation and Shipping in the Pacific (available at: http://www.forumsec.org/resources/uploads/attachments/documents/Oceanic%20Voyages,%20Aviation%20and%20Shipping%20in%20the%20Pacific,%20Executive%20Summary.pdf and http://www.adb.org/publications/oceanic-voyages-aviation-and-shipping-pacific-region).

[22] UNCTAD (2010). Oil prices and maritime freight rates: An empirical investigation. Technical Report. UNCTAD/DTL/TLB/2009/2. 1 April.

[23] Sanchez RJ et al. (2003). Port Efficiency and International Trade: Port Efficiency as a Determinant of Maritime Transport Costs. Maritime Economics and Logistics. 5(2):199–218. See also Sourdin P (2012). Trade Facilitation. Edward Elgar Publishing. Cheltenham, UK and Northampton, MA, USA. See also UNCTAD (2008). The modal split of international goods transport. Transport Newsletter no. 38. UNCTAD/SDTE/TLB/MISC/2008/1.

[24] Conventional sources of information on port facilities include port websites, World Port Index (2014) of the National Geospatial-Intelligence Agency (NGA, USA) and various directories including Guide to Port Entry and IHS Fairplay Ports and Terminals Guide.

[25] Annex III contains two tables. The first shows selected data fields from the World Port Index 2014 for the main international ports of SIDS (51 ports) and the second is more detailed information on berths and equipment compiled from various sources,

including those mentioned above (54 ports). In view of the above, the data in Annex III and the analysis made on this basis (derived from World Port Index 2014) is indicative rather than definitive.

[26] *The analysis in this section is based on the review of shipping services contained in Annex III, vessel frequencies and vessel sizes.*

[27] *Whilst these may seem low, a 2008 APM Terminals brochure for Kingston Container Terminal also states that vessel moves per hour were 26.4 in 2007. http://www.apmterminals.com. Currently, Kingston Container Terminal claims a crane productivity of 28 moves per hour. http://www.kctjm.com.jm.*

[28] *World Port Index.*

[29] *Available at: http://www.adb.org/sites/default/files/publication/27906/ports.pdf.*

[30] *Available at: http://ppp.worldbank.org/public-private-partnership/library/port-reform-toolkit-ppiaf-world-bank-2nd-edition.*

[31] *ADB (2014). Finding Balance 2014: Benchmarking the Performance of State-Owned Enterprises in Island Countries. http://www.adb.org/publications/finding-balance-2014; and Finding Balance 2012: Benchmarking the Performance of State-Owned Enterprises in Papua New Guinea; and Finding Balance 2011: Benchmarking the Performance of State-Owned Enterprises in Fiji, Marshall Islands, Samoa, Solomon Islands, and Tonga (Volumes 1 and 2).*

[32] *ADB (2012). Finding Balance 2012: Benchmarking the Performance of State-Owned Enterprises in Papua New Guinea.*

[33] *Service ports have a predominantly public character where the port authority offers the complete range of services required for the functioning of the seaport system. The port owns, maintains, and operates every available asset (fixed and mobile), and cargo handling activities are executed by labor employed directly by the port authority. However, the number of service ports is declining. Many former service ports are in transition toward a landlord port structure. Landlord port model is characterized by its mixed public-private orientation. The public sector is typically responsible for port planning, regulatory functions, and ownership of port-related land and basic infrastructure. The private sector is, in turn, responsible for marine and terminal operations and construction, acquisition, and ownership of superstructure and equipment. In the tool port model, the port authority owns, develops, and maintains the port infrastructure as well as the superstructure, including cargo handling equipment such as quay cranes and forklift trucks. Port authority staff usually operates all equipment owned by the port authority. Other cargo handling on board vessels as well as on the apron and on the quay is usually carried out by private cargo handling firms contracted by the shipping agents or other principals licensed by the port authority. Fully privatized ports (which often take the form of a private service port) are few in number. It suggests that the state no longer has any meaningful involvement or public policy interest in the port sector. In fully privatized ports, port land is privately owned, unlike the situation in other port management models. This requires the transfer of ownership of such land from the public to the private sector. In addition, along with the sale of port land to private interests, some governments may simultaneously transfer the regulatory functions to private successor companies. http://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Portoolkit/Toolkit/module3/port_functions.html#7.*

[34] *http://www.jica.go.jp/english/news/press/2012/120613.html.*

[35] *Sanchez RJ and Wilmsmeier G (2009). Series Recursos naturales e infrastructura No. 140, Maritime sector and ports in the Caribbean: the case of CARICOM countries. UN CEPAL, Natural Resources and Infrastructure Division, Santiago, Chile.*

[36] *There is no such thing as a "natural" disaster, only natural hazards. Disaster risk reduction (DRR) aims to reduce the damage caused by natural hazards like earthquakes, floods, droughts and cyclones, through an ethic of prevention (http://www.unisdr.org/who-we-are/what-is-drr).*

[37] *For additional information about the science of climate change and climate change impacts on transport, including maritime transport, see relevant earlier work carried out by UNCTAD, including for example: the intergovernmental expert meetings held in 2009, 2011 and 2014 as well as the Workshop held in 2010 in collaboration with the United Nations Commission for Europe (UNECE). Relevant documentation (background notes prepared by the secretariat to inform the discussions and presentations delivered at the meetings) is available at http://unctad.org/en/Pages/DTL/TTL/Legal/Climate-Change-and-Maritime-Transport.aspx. See in particular the background note prepared by the UNCTAD secretariat to inform the Third Session of the Multi-Year Expert Meeting on Transport, Trade Logistics and Trade Facilitation held on November 24-26 2014 and which focused on the transport and trade logistics challenges facing SIDS. The background note entitled "Small island developing States: Challenges in transport and trade logistics" (TD/B/C.I/MEM.7/8) is available for downloading at http://unctad.org/meetings/en/SessionalDocuments/cimem7d8_en.pdf. See also the UNECE report published in 2014 and entitled "Climate Change Impacts and Adaptation for International Transport Network" (ECE/Trans/238), http://www.unece.org/fileadmin/DAM/trans/main/wp5/publications/climate_change_2014.pdf). More generally, additional information about UNCTAD's work in the field is available at www.unctad.org/ttl.legal.*

[38] *See relevant information available at http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap29_FGDall.pdf.*

[39] *IPCC (2007). Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Cambridge University Press. Cambridge. Available at: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm.*

[40] *It must be noted, however, that temperature does not increase uniformly: the temperature close to the poles rises faster than at the equator.*

[41] *Forced by a range of possible greenhouse gas concentration scenarios (IPCC, 2013), the mean estimate for the warming has been predicted to be 1.0–2.0 °C higher for the period 2046–2065 compared with the 1986–2005 mean, whereas by the late twenty-first century (2081–2100), increases of 1.0–3.7 °C are projected. However, the projection range broadens to 0.3–4.8 °C when model uncertainty is included.*

[42] *The recent IPCC Assessment Report AR5 (2013) forecasts are made on the basis of the Representative Concentration Pathways-RCP scenarios and not the IPCC SRES scenarios. The CO2 equivalent concentrations (in ppm, parts per million) have been set to: RCP*

8.5, 1370 ppm C02-equivalent in 2100; RCP 6.0, 850 ppm CO2-equivalent in 2100; RCP 4.5, 650 ppm CO2-equivalent in 2100; and RCP 2.6, peak at 490 ppm CO2-equivalent before 2100.

[43] See Overseas Development Institute and Climate and Development Knowledge Network, 2014, The IPCC's Fifth Assessment Report: What's in it for Small Island Developing States? Available at http://cdkn.org/resource/whats-in-it-for-small-island-developing-states-sids.

[44] See E Hanna et al., 2013. Ice sheet mass balance and climate change, Nature, 498:51–59.

[45] JA Church and NJ White, 2011. Sea-level rise from the late 19th to the early 21st Century. Surveys in Geophysics 32:585–602.

[46] See TM Cronin, 2012, Rapid sea-level rise, Quaternary Science Reviews 56:11–30. Future change can also be amplified by reinforcing feedbacks, that is to say, climate change-driven processes that can induce further global warming and, consequently sea-level rise (for example, the mobilization of currently inert carbon reservoirs such as the tropical peat lands, the methane stores of the Arctic permafrost and the reduction in the spatial coverage of Arctic Ocean ice).

[47] Between 1990 and 2012, for instance, there were 21 earthquakes, 7 tsunamis and 20 volcano eruptions in those regions in total.

[48] Becker A, Fischer M and Matson P (2010). Impacts of climate change on seaports: A survey of knowledge, perceptions, and planning efforts among port administrators. Paper presented at The Coastal Society's 22nd International Conference "Shifting Shorelines: Adapting to the future". Available at: http://aquaticcommons.org/3883/1/Becker_papers.pdf

[49] PIANC (2010). Mitigation of Tsunami Disasters in Ports, Report no. 112-2010.

[50] These includes for instance: United Nations Conference on Trade and Development and Economic Commission for Europe Workshop on Climate Change Impacts on International Transport Networks, 8 September 2010; UNCTAD, Ad Hoc Expert Meeting on Climate Change Impacts and Adaptation: A Challenge for Global Ports, 29–30 September 2011; Economic Commission for Europe International Conference on Adaptation of Transport Networks to Climate Change, Alexandroupolis, Greece, 25–26 June 2012; European Commission/Joint Research Centre, Scoping Workshop on Seaports and Climate Change, Brussels, 4–5 March 2013.

[51] Becker A, Fischer M and Matson P (2010). Impacts of climate change on seaports: A survey of knowledge, perceptions, and planning efforts among port administrators. Paper presented at The Coastal Society's 22nd International Conference "Shifting Shorelines: Adapting to the future". Available at: http://aquaticcommons.org/3883/1/Becker_papers.pdf

[52] SARUA (2014). Climate Change Counts Mapping Study, Seychelles Country Report, Volume 2, Country Report 7. Southern African Regional Universities Association.

[53] UNISDR and UNDP (2012) Disaster Risk Reduction and Climate Change Adaptation in the Pacific: An Institutional and Policy Analysis.

[54] IPCC (2014). Climate Change 2014: Impacts, Adaptation and Vulnerability. Fifth Assessment Report. Chapter 29, Small Islands.

[55] ADB (2005). ADB Pacific Studies Series Climate proofing: A risk-based approach to adaptation.

[56] ADB (2008). Proposed Loans, Cook Islands: Avatiu Port Development Project, Project Number: 40287. Available at: http://www.adb.org/sites/default/files/projdocs/2008/40287-COO-RRP.pdf.

[57] Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, and Trinidad and Tobago.

[58] IOC (2012). Document cadre pour la stratégie régionale d'adaptation au changement climatique des pays membres de la Commission de l'océan Indien, 2012-2020 (Framework document for regional adaptation strategy to climate change in member countries of the Indian Ocean Commission, 2012–2020). Available at: http://www.acclimate-oi.net/files/documentation/STRATEGIE_Acclimate.pdf.

[59] Relevant work includes: United Nations Conference on Trade and Development and Economic Commission for Europe Workshop on Climate Change Impacts on International Transport Networks, 8 September 2010; UNCTAD, Ad Hoc Expert Meeting on Climate Change Impacts and Adaptation: A Challenge for Global Ports, 29–30 September 2011; Economic Commission for Europe International Conference on Adaptation of Transport Networks to Climate Change, Alexandroupolis, Greece, 25–26 June 2012; European Commission/Joint Research Centre, Scoping Workshop on Seaports and Climate Change, Brussels, 4–5 March 2013; and the UNCTAD edited Maritime Transport and the Climate Change Challenge (co-published by the UN with Earthscan (Routledge/Taylor & Francis) in May 2012. Additional information about UNCTAD's work in the field is available at www.unctad.org/ttl.legal. See also footnote 37 above.

[60] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6, based on data from "Key World Energy Statistics, 2012", International Energy Agency. http://unctad.org/en/PublicationsLibrary/rmt2012_en.pdf.

[61] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6, based on the Fourth Assessment Report of the IPCC, 2007.

[62] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6 based on "Decarbonizing Local Logistics: the Challenges Ahead", Logistics & Supply Chain Industry Agenda Council Final Report 2010–2011.

[63] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6, based on "Air pollution from ground transportation: An assessment of causes, strategies and tactics, and proposed actions for the international community", by Roger Gorham. The Global Initiative on Transport Emissions: A Partnership of the United Nations and the World Bank Division for Sustainable Development Department of Economic and Social Affairs United Nations, 2002. Available at: http://www.un.org/esa/gite/csd/gorham.pdf.

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[65] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6.

[66] UNCTAD (2011). Review of Maritime Transport 2011, Chapter 1.

[67] Ibid.

[68] Newell A et al. (2014). Turning the tide: The need for sustainable sea transport in the Pacific. Sustainable Sea Transport Research Programme, University of the South Pacific, Fiji Islands.
[69] Ibid.
[70] Bola A (2014). Potential for Sustainable Sea Transport: A Case Study of the Southern Lomaiviti, Fiji Islands. Sustainable Sea Transport Research Programme, University of the South Pacific, Fiji Islands.
[71] A collective institutional mechanism aimed at assisting the SIDS to transform their national energy sectors into a catalyst for sustainable economic development.
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[74] http://sidsdock.org/why-is-sids-dock-needed
[75] Figures published in UNCTAD Review of Maritime Transport 2012, Chapter 6, based on data from International Monetary Fund (2010) from http://www.itdp.org/wp-content/uploads/2014/07/A_Paradigm_Shift_toward_Sustainable_Transport.pdf.
[76] Partners in this initiative are AfDB, ADB, Development Bank of Latin America (CAF), European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, Islamic Development Bank and the World Bank.
[77] Indian Ocean Commission (2013). Placing the Indianoceanic region on the world map. Available at: http://www.commissionoceanindien.org/fileadmin/resources/Partenaires/Booklet_IOC_English_nov13-GR.pdf.
[78] Ibid.
[79] IOC (2013). Placing the Indianoceanic region on the world map. Available at: http://www.commissionoceanindien.org/fileadmin/resources/Partenaires/Booklet_IOC_English_nov13-GR.pdf.
[80] World Bank (2011). Migration and Remittances Factbook 2011. Washington DC.
[81] In common trade parlance, Mode 4 or the temporary movement of persons, under the WTO's General Agreement on Trade in Services (GATS).
[82] Secretariat of the Pacific Community (see http://www.spc.int/maritime/index.php?option=com_content&task=view&id=14&Itemid=34).
[83] Protocol VI (Articles 136–140) of the Revised Treaty of Chaguaramas.
[84] Pacific Islands Forum Secretariat (2013). Update on Services Trade Liberalization in Forum Island Countries, PIFS (13) FEMT.08, July 2013.
[85] Statement of UNCTAD Secretary-General at the Blue Economy Summit, Abu Dhabi, 20 January 2014.
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[87] Vella I (2009). The Price of Competitiveness of Small Island States as Tourist Destinations. Islands and Small States Institute. Occasional Papers on Islands and Small States, No. 6/2009. ISSN 1024-6282.
[88] See: http://www.cepal.org/portofspain/noticias/paginas/1/44351/Green_Economy_in_SIDS_Challenges_Opportunities_2011.pdf.
[89] IOC consists of SIDS: Comoros, Madagascar, Mauritius, Comoros, Réunion and Seychelles.
[90] IOC (2013). Placing the Indianoceanic region on the world map. Available at: http://www.commissionoceanindien.org/fileadmin/resources/Partenaires/Booklet_IOC_English_nov13-GR.pdf.
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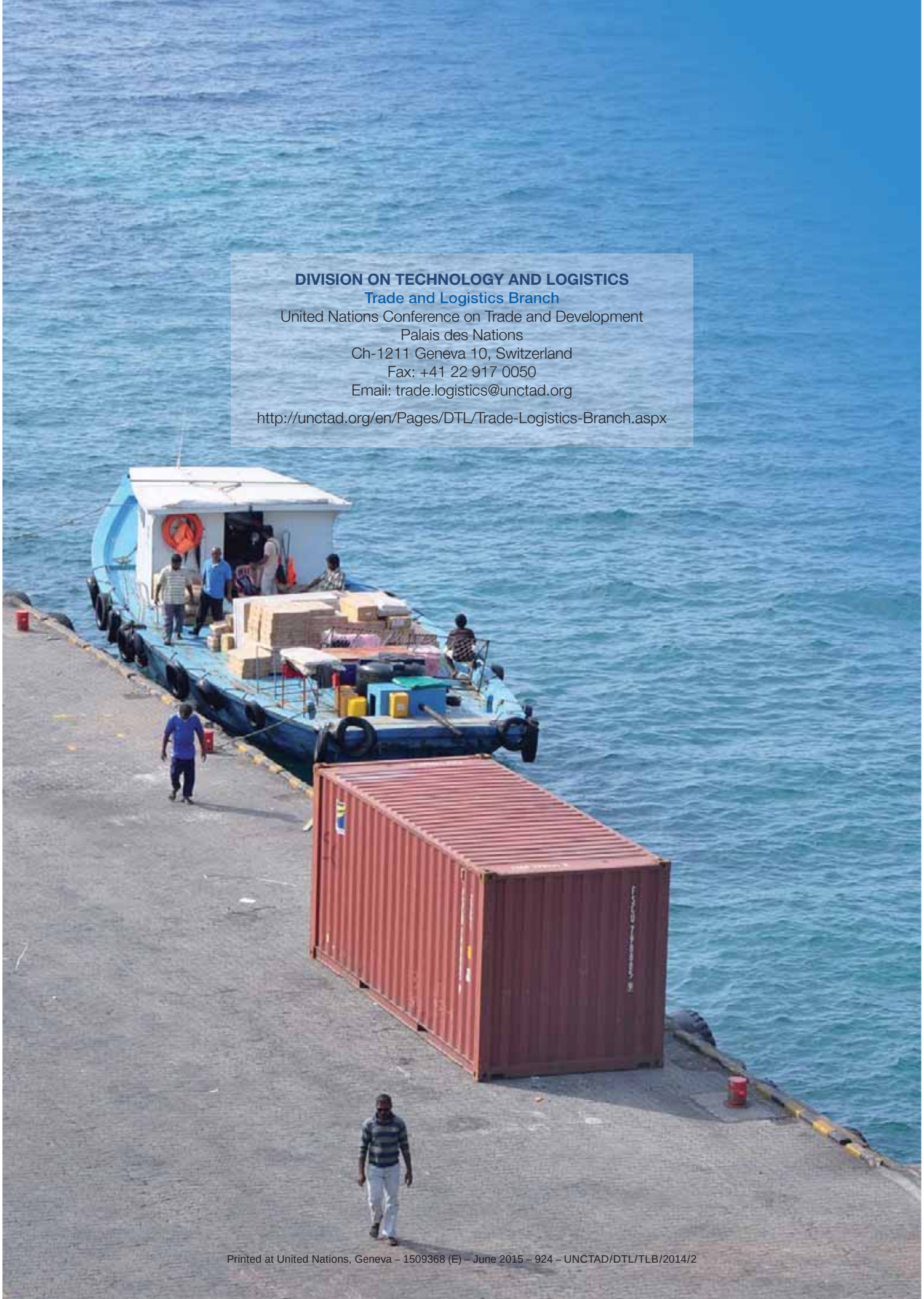
[95] UNESCAP (2013). Strengthening Inter-island Shipping in Pacific Island Countries and Territories. Background Paper. Available at: http://www.unescap.org/sites/default/files/Background-Paper.pdf.
[96] The term "way-port trade" is drawn from liner conference terminology which referred to any trade from or to a port, which is served by conferences as a part of a longer route. The liner conference system. Report by the UNCTAD Secretariat, TD/B/C.4/62/Rev.1, United Nations, New York, 1970.
[97] UN COMTRADE.
[98] France is major trading partner for: Trinidad and Tobago, Jamaica, and Grenada.
UK is major trading partner for St. Vincent and the Grenadines, St. Lucia, St. Kitts and Nevis, Dominica, and Barbados.



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