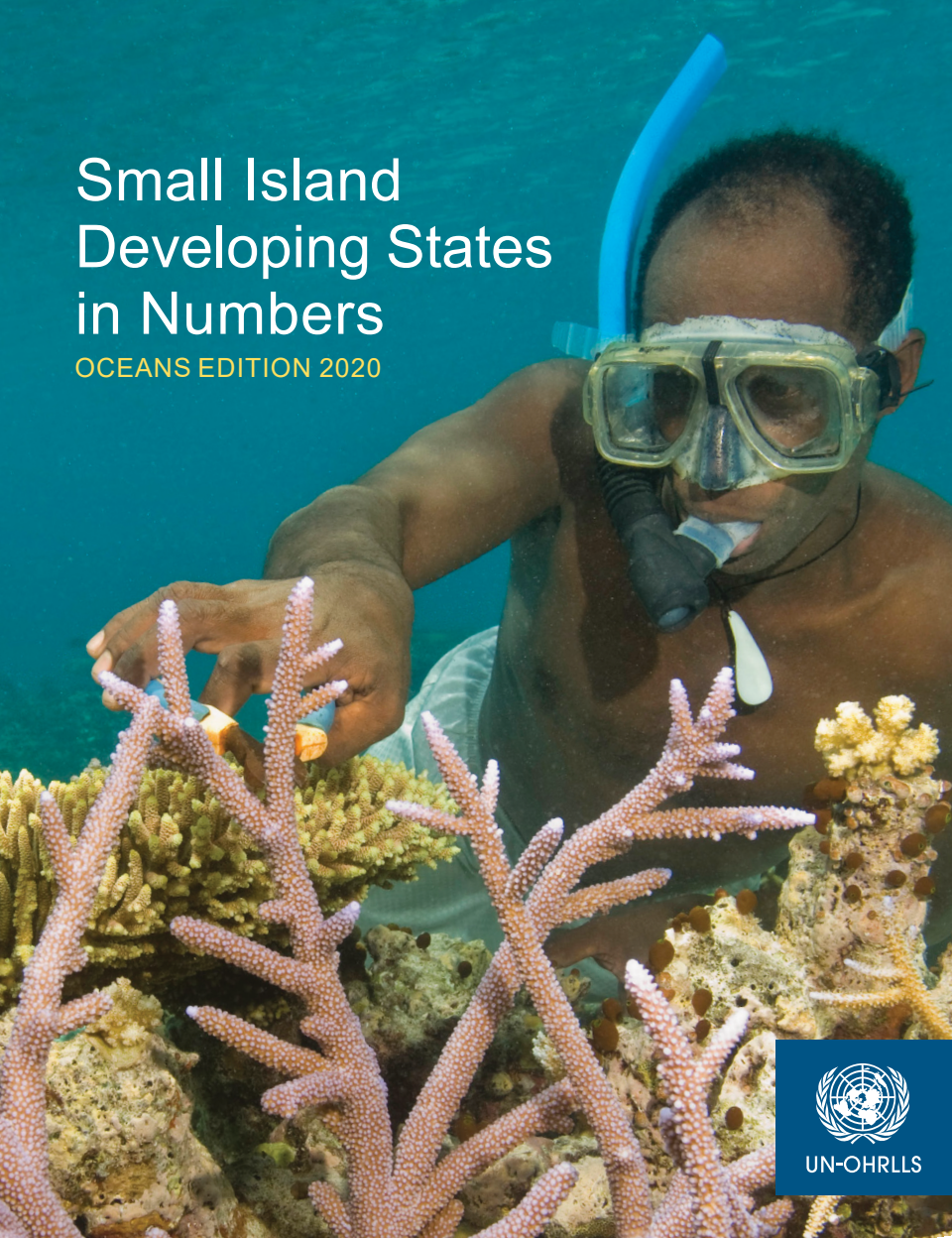
Small Island Developing States in Numbers

OCEANS EDITION 2020



UN-OHRLLS

Front cover: Regon Waren (WorldFish, Nusa tupe) cutting small branches from brood-stock colonies as preparation for planting, Solomon Islands. *Photo: Eran Brokovich, 2010 (CC BY-NC-ND2.0)*

INTRODUCTION

About “SIDS in Numbers: Oceans Edition 2020”

The 2017 Ocean Conference was the first of its kind seeking to "reverse the precipitous decline of the oceans and seas with concrete solutions," while also seeking to promote and evaluate progress on the implementation of SDG14.

SIDS are heavily dependent on oceans, coasts and marine resources for their livelihood and economic growth. SIDS have the potential to utilise the coastal and marine resources under their control to ensure food security through sustainable fisheries, aid in poverty eradication by creating sustainable jobs and livelihoods, and through effective conservation measures to mitigate the impacts of climate change on their societies, all of which support the achievement of the SDGs.

SIDS in Numbers: Oceans Edition 2020 provides, at a glance, a snapshot of select key SIDS indicators under the three dimensions of sustainable development: economic, social and environmental, to highlight the impact oceans have on SIDS.

The presentation of the data and statistics contained in this publication are presented to illustrate and advocate for the special case of SIDS in the context of oceans. Data was collected from a variety of sources, including the Pacific Community’s “Fisheries in the Economies” and recent publications by various UN agencies including the FAO, UNESCO, and UNDP, and the broader scientific community.

While extensive literature on climate change and related issues exist on a global scale, SIDS regions and individual countries in general remain under-researched. As a consequence, specific data on ocean issues, climate change impacts, and other topics is often sparsely available in SIDS.

What are SIDS?

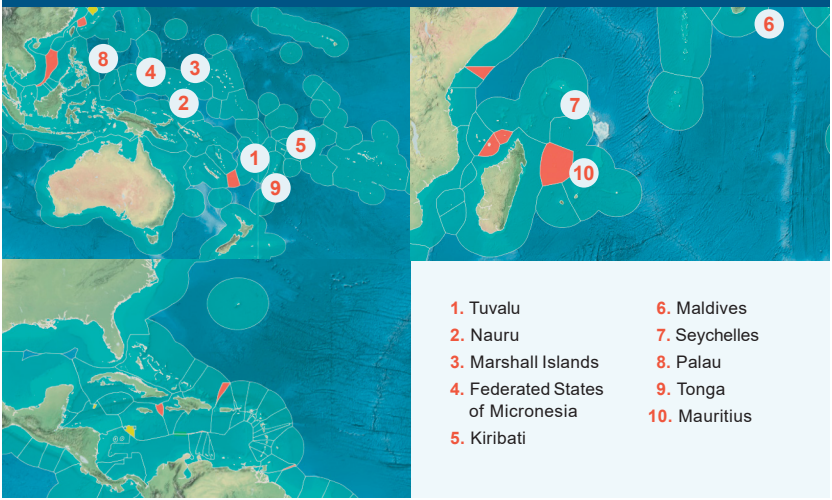
SIDS are a distinct group of 38 UN Member States and 20 Non-UN Members or Associate Members of Regional Commissions that can be found in three different regions: the Caribbean, the Pacific, the Atlantic, Indian Ocean, and the South China Sea (AIS). These nations face distinct economic, social, and environmental challenges. In June of 1992 at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, the SIDS were recognized as a distinct group of developing countries based on the development challenges that they face. These 38 UN Member States are also members of the Alliance of Small Island States (AOSIS), except for Bahrain. This group serves as a negotiating body within the UN, but the body also includes non-UN Member States and non-independent and not self-governing states and territories within their ranks. The Caribbean and Pacific SIDS regions each have their own regional body for intra-regional coordination the Caribbean Community (CARICOM)and the Pacific Island Forum (PIF) respectively, however, the AIS region does not have an official regional coordination organization. These bodies help to address the inherent vulnerabilities in SIDS such as small size, remoteness, narrow resource-based economies, fragile ecosystems, heavy dependence on foreign markets for imports, and high transportation costs. Over the years, SIDS have made development progress but not at the rate and scale that is required to reach the 2030 Agenda. In 2014 in Apia, Samoa, at the Third International Conference on Small Island Developing States the SAMOA Pathway was created. This development strategy recognizes climate change and sea level rise (SLR) are among the greatest threat to SIDS existence and sustainable development goals. The SAMOA Pathway addresses economic development, food security, disaster risk reduction (DRR),and ocean management along with the other challenges that SIDS face.

Ocean and Marine Resources in SIDS

The Small Island Developing States are large ocean states. These nations have vast tracts of oceans surrounding them amounting to 16.1% of the worlds total exclusive economic zone (EEZ)[1].

Within the EEZ, states have special rights regarding the exploration and use of marine resources both living and non-living, including energy production from water and wind. SIDS are well endowed with tropical waters that are home to a wide variety of fish, birds, marine vegetation and more. The wealth of fish in particular are caught by both small-scale and industrial fisheries for local or global markets. SIDS are also home to large portion of the worlds coral reefs that provide a suitable marine habitat for marine life and also attract valuable tourism.

Top 10 Largest Exclusive Economic Zones of SIDS



Source: Land Area to EEZ Ratio (EEZ–Marine Regions divided by Land/Surface Area–UN Data) Map and Top 10 Ratios Table.

Note: The numbers in the maps above are indicative and do not imply exact country locations.

[1] 'Land Area to EEZ Ratio'

Exclusive Economic Zones

For all SIDS, the size of the EEZ is significantly larger than the landmass it occupies. Fiji, for example has a land area of 18,270 km^2, however the EEZ totals about 1.3 million km^2, in turn vastly increasing the area for economic activities. Many SIDS also have economic rights on their extended continental shelf.

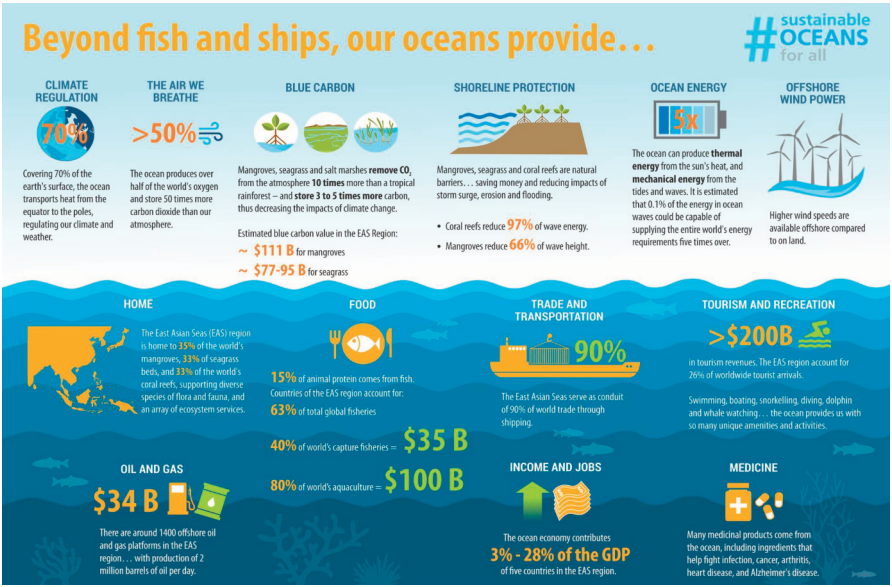
A states EEZ begins at its walkable coastline or islets and extends up to 200 nautical miles (370 km) off the coast. Within this area "a coastal state assumes jurisdiction over the exploration and exploitation of marine resources"[2]. The average EEZ to land area ratio for SIDS is 1922, comparatively, the ratio for the entire world is roughly 1. Take Tuvalu and Nauru for example, the SIDS with two of the highest EEZ to land area ratios. The two have surface areas of 30 and 20 km^2 respectively, their EEZs are 25,210 and 15,532 times larger than surface areas. These figures highlight the important role that oceans play for SIDS economies. Given their small surface area and populations, economies have narrow bases from which to develop and they cannot develop economies of scale that the more populous and larger countries can. Due to their vast EEZ's, the development of blue economies within SIDS would be particularly beneficial to their sustainable development goals. The aim of blue economy is the economic development of marine and coastal resources that also takes ocean health into account. The sectors within this economic system consist of ones whose returns are linked to living "renewable" resources of the oceans, such as fisheries, as well as those related to non-living and "non-renewable" resources, like extractive industries. Activities associated with blue economies are commerce and trade in and around the oceans, ocean monitoring and surveillance, and coastal and marine area management, protection, and restoration[3]. SIDS have created national platforms or plans for action to facilitate the development of domestic blue economy policies with varying priority action areas. SDG target 14.6 specifically aims to increase benefits to SIDS and LDCs from the sustainable use and management of resources and the development of blue economy industries, including fisheries, aqua

[2]OECD, 2003.
[3]World Bank, 2017.

Top 10 Sids EEZto Land Area Ratio (km2)				
Rank	Country	EEZ Area	Surface Area	Ratio
1	Tuvalu	756313	30	25210
2	Nauru	310645	20	15532
3	Marshall Islands	2009620	180	11165
4	Federated States of Micronesia	3023481	700	4319
5	Kiribati	3455259	810	4266
6	Maldives	929335	300	3098
7	Seychelles	1347251	460	2929
8	Palau	617449	460	1342
9	Tonga	6667957	750	891
10	Mauritius	1282422	2040	629
	SIDS EEZ Average Ratio			**1922**
	SIDS EEZ Total	24235995	1211430	20
	World EEZ Total	150952643	132025199	1
	%of SIDS EEZ/World EEZ	**16.10%**		

Source: Land Area to EEZ Ratio (EEZ–Marine Regions divided by Land/Surface Area–UN Data)

culture, tourism, marine transport and emerging activities such as offshore renewable energy, seabed exploration and extractive activities. Transition towards a sustainable blue economy, offers immense potential to promote economic growth, social inclusion and while at the same time ensuring environmental sustainability. At the same time, SIDS too often lack the expertise, institutional capacities, and financial support to derive full benefit from the ocean and its resources in sustainable ways. These streams of revenue will, however, be generally negatively impacted by the effects of climate change. SIDS are among the most vulnerable countries to natural



Source: Partnerships in Environmental Management for the Seas of East Asia. Infographic: Blue Economy Forum 2017.

disasters and climate change. Ocean acidification, deoxygenation, rising sea levels and temperatures, and other human-induced environmental impacts, will deleteriously affect these ocean-based economies as seas rise and marine ecosystems adapt to the changing environment[4]. As such, efforts to scale up adaptation and resilience efforts and Disaster Risk Reduction are critical components in building a sustainable blue economy.

[4]IUCN,2017.

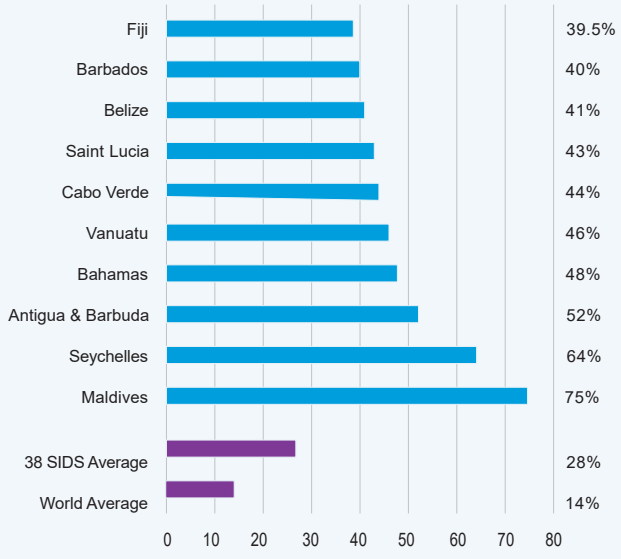
Coastal Tourism

Tourism is often one of the few activities for which their tropical location, coupled with exceptional natural and cultural resources, has a strong competitive advantage for SIDS. Importantly, tourism was among the main contributors to enabling Maldives, Cabo Verde, and Samoa to graduate from the Least Developed Country (LDC) category. Furthermore, tourism is the backbone of many SIDS economies and have a critical role to play in the achievement of all other SDGs. Coastal and ocean related tourism is diverse and segmented, ranging for example from small scale diving or fishing operations to large resort properties and cruise tourism. As of 2018, the top ten countries in this category are all SIDS, the global average for the tourism sector was roughly 15% of a countries GDP. For the average SIDS that value is almost double the global average at almost 30% of GDP. Economies such as the Maldives, Seychelles, and Antigua and Barbuda have tourism sectors that account for more than 50% of GDP in 2018, in the Maldives in particular it was 75% of GDP. It should also be noted that the tourism sector in SIDS is extremely vulnerable to the impacts of global shocks such as the global response to COVID-19 pandemic and climate change. Thus, addressing vulnerabilities and developing resilience through coastal adaptation and economic diversification is important. Within the vast ocean space that surrounds SIDS lie coral reefs which are not only vital to marine ecosystem and protecting the coastline, but they are also popular tourist attractions. Reef tourism makes up a large portion of tourist activities and revenue. In nations like Belize, about 64% of tourist activities are centered around “coral reefs, coralline beaches, or mangroves”. In Palau, which is a hot spot for diving, this sector alone contributed at least 39% of national GDP, amounting to $85.3 million[5]. On average, SIDS rely on reef tourism for over 20% of their overall tourism revenue, while the World average is only 10%. The top three countries in this category: Palau, Micronesia, and the Maldives derive almost 60% of their tourism income from their coral reefs. Tourism is also a significant source of employment for residents across all the SIDS regions and depending on how well developed the nations tourism sector. For examp, it provides jobs for about 15,000 in

[5] The Nature Conservancy, 2017.

Belize, 28,000 in Mauritius and up to 216,000 in the Dominican Republic. In the Pacific region, 90 per cent of the tourism industry is comprised of small and medium enterprises, whilst in others, the industry is dominated by firms which are not based in the country, being part of large international hotel chains, transportation firms, and cruise lines. The extent to which economic benefits flow to local businesses varies accordingly.

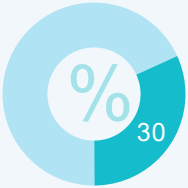
Top 10 Worldwide Travel and Tourism Total Contribution to GDP (%) (2018)



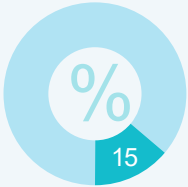
Source: Travel and Tourism Total Contribution to GDP World Bank 2018

Contributions from Tourism Sector to GDP

SIDS Average Contribution from Tourism Sector to GDP



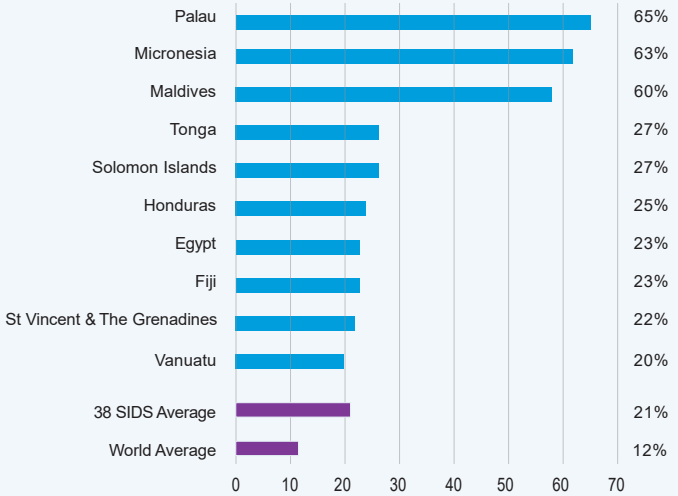
Global Average contribution from Tourism Sector to GDP



As of 2018, the top ten countries in this category are all SIDS, the global average for the tourism sector was roughly 15% of a countries GDP. For the average SIDS that value is almost double the global average at almost 30% of GDP.

Source: Travel and Tourism Total Contribution to GDP World Bank 2018

Top 10 Worldwide Reef Visitor Expenditure as Proportion of Total Tourism (%)



Source: Reef Tourism The Nature Conservancy 2017

Reef Associated Tourism

22-27%
Visitors dive

47-59%
Visitors snorkel

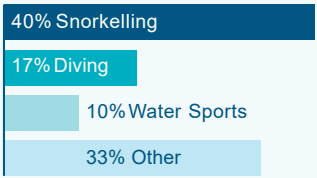
Belize

CORAL-REEF + MANGROVE
associated annual tourism spending

US$ 150-196 million
in revenue generated each year

Most Popular Visitor Activities

19%
Diving is main reason for visiting



Maldives

2006–2008 MANTA RAY ASSOCIATED

143,000
Scuba dives

14,000
Snorkel dives

US$ 8.1 million
in revenue generated each year

Diving as GDP of Palau

Palau

ANNUAL DIVING REVENUE

US$ 85.3 million

51% of visitors are divers

Source: Reef Tourism The Nature Conservancy 2017

Fisheries and Aquaculture

Along with being a prominent revenue generating sector of the economy, fisheries and aquaculture provide staple and nutritious food to locals. In the Pacific Islands, residents consume two to four times more fish than residents from other countries from across the world[6]. The Pacific SIDS are especially dependent on their fisheries and aquaculture. They provide income and food for more than 200 million people across the region. The total percentage of the population employed in the region accounts for 84% of the global labor force employed in the entire sector, in addition to being the primary generator of public revenue for governments in the region[7]. For Kiribati, Tuvalu and the Marshall Islands the government revenue generated from fisheries is 66%, 62%, and 60% respectively. The production and export of tuna is the primary catalyst of the fishing sector in the region. For some country's tuna fisheries can provide more than 10% of national GDP and make up 50% of exports[8]. In the waters surrounding these SIDS, 1.5 million metric tons of tuna are caught each year. This amounts to 30% of the global tuna market[9]. Furthermore, food production associated with small-scale fisheries and coastal fisheries play a crucial role in food security, poverty alleviation, and assuring livelihoods. Measures are needed to enhance food security to lessen impacts of external shocks including climate change.

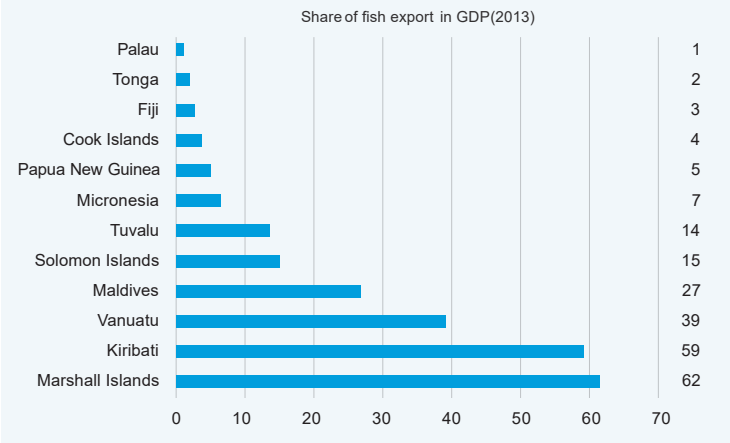
The Economic Benefits of Tuna Fishing for Pacific SIDS Party to the Nauru Agreement

Country	Licence Fees (million $)	Government Revenue (%)
Kiribati	118.3	66
Tuvalu	23.4	62
Marshall Islands	29.2	60
Micronesia (FSM)	63.2	56
Nauru	27.8	28
Solomon Islands	41.6	9.8
Palau	6.8	8.7
Papua New Guinea	128.8	4.9

Source: SPC Policy Brief SPC 2019 Figure 1

[6]Conservation International, 2016.
[7]UNESCAP, 2020.
[8]UN, 2014.
[9]Conservation International, 2016.

Export in Fisheries: A significant source of income for many SIDS



Source: Export in fisheries Chart 5 (SIDSin Numbers 2017)

Estimates of Annual Per Capita Fishery Product Consumption in Pacific SIDS(kg)

Country	Kg-High Estimate	Kg-Low Estimate
Kiribati	210	70
Tuvalu	149.5	87
Micronesia (FSM)	149	70
Palau	147	85
Samoa	146	49.5
Nauru	67	49.5
Fiji	65	48
Marshall Islands	60	40
Solomon Islands	49.5	28
Tonga	30	25
Vanuatu	25	14
Papua New Guinea	20	15

Source: Fisheries in the Economies Pacific Community 2016 Table 34-1,Figure 34.1

Blue Bonds

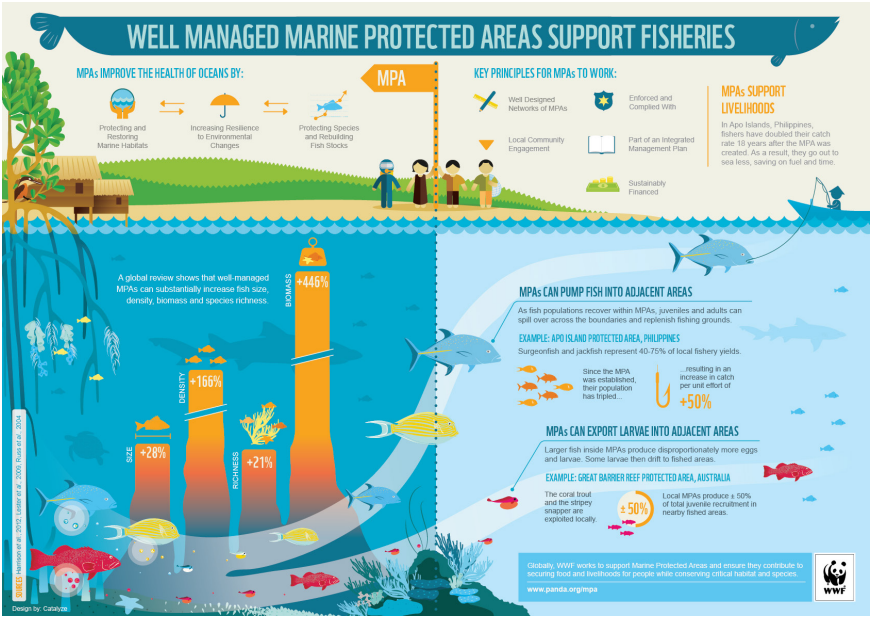
Blue Bonds function similarly to the land-based green bonds with the aim "to raise capital from impact investors to finance marine and ocean-based projects that have positive environmental, economic, and climate benefits"[10]. Blue bonds could allow SIDS access to some of the public and private financial capital needed to further develop their blue economies. The issuance of these debt instruments comes at a crucial time when SIDS face declining development assistance, reduced foreign direct investment (FDI), and climbing external debt levels which all serve as barriers to their substantial development agenda[11]. The first blue bond was issued by the Republic of Seychelles in 2018. With the assistance of the World Bank, the Seychelles was able to raise $15 million from international capital markets to support the financing of marine protection areas[12]. The funds raised from the bond will be used by the Seychelles Conservation and Climate Adaptation Trust (SeyCCAT)to transition towards sustainable fisheries. It could provide benefit to those whose livelihoods are derived from the ocean and the general population by providing food security and a healthier marine environment. It will also aid in economic diversification and decrease the countries vulnerabilities to climate change developing "climate-smart ocean economies"[13]. Blue bonds could not only help the Seychelles develop sustainable fisheries but it could also support the development of other sectors ofthe blue economy such as renewable energy and extractive industries.

[10]World Bank,2018.
[11]World Bank,2017.
[12]World Bank,2018.
[13]World Bank,2018.

Marine Protected Areas

The designation of marine protected areas has an important role to play in preserving unique ecosystems. SIDS can use marine protected areas (MPA) to conserve portions of their oceans. These designated areas are managed "to protect marine ecosystems, processes, habitats, and species" which allows the environment to be conserved and resources to be extracted sustainably, if at all[14]. Depending on the rules and regulations of an area, an MPA might not allow any human economic activity in an area or there might be limits on the amount of activity, such as limiting the amount of fishing within an area[15]. Within SIDS there are 893 Marine Protected and Conserved Areas, some of them were created to help achieve SDG Indicator 14.5.1, which calls for the conservation of at least 10% of a nations marine area[16]. So far, only five of the 38 SIDS have been able to achieve this SDG. Palau has the largest single marine protected area of any SIDS. The Palau National Marine Sanctuary covers an area of 503,522 km^2. These waters are home to vast biodiversity and is among the most valuable parts of the worlds natural heritage due to the high level of biodiversity the ecosystem is home to. Within these waters there are over 1,300 species of fish and more than 700 species of hard and soft coral. This MPA is considered a fully protected sanctuary, meaning that economic activity like fishing is prohibited within the boundaries of the area[17]. MPAs supports climate change mitigation and adaptation while protecting ecosystems and preserving local cultures whose livelihoods are dependent on the ocean[18].

[14] WWF, 2015.
[15] National Geographic, 2019.
[16] UN Statistics Division: SDG Indicators, 2020.
[17] PEW Trusts, 2015.
[18] National Geographic, 2019.



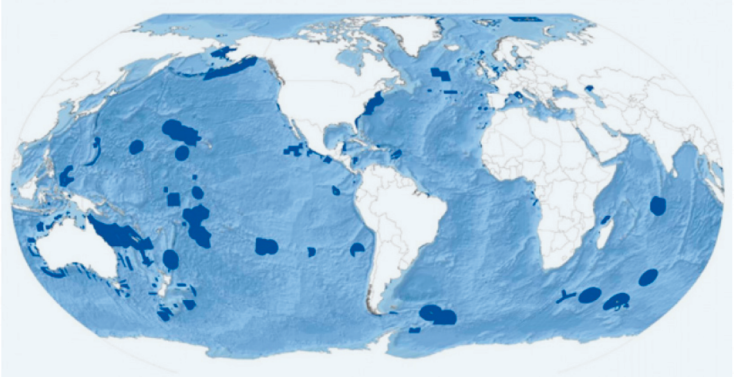
Source: WWF

Top 10 Largest Marine Protected and Conserved Areas in SIDS by Size (2019)			
Rank	Country	Site	Size (km²)
1	Palau	Palau National Marine Sanctuary	503522
2	Kiribati	Phoenix Islands Protected Area	408146
3	Seychelles	Amirantes to Fortune Bank	137482
4	Palau	Domestic Fishing Zone	83080
5	Seychelles	Aldabra Group	69954
6	Dominican Republic	Santuario de los Bancos de La Plata y La Navidad	35472
7	Bahamas	Southeast Bahamas Marine Managed Area	24450
8	Bahamas	Cay Sal Marine Managed Area	16840
9	Palau	Coastal State Waters	13597
10	Guinea-Bissau	Bolama- Bijagòs	9033

Note: There are 893 marine protected and conserved areas in SIDS—5.2% of the total number of marine protected and conserved areas in the world.

Source: Top 10 marine protected and conserved areas in SIDS UNEP-WCMC and IUCN 2019.

IUCN Map of MPAs



Note: 6.35% of the Global Ocean covered by protected areas, 1.89% exclusively no-take.
Source: Official MPA Map IUCN 2017

Top 5 Most Protected: Progress of SIDS with SDG Indicator 14.5.1— To Conserve 10% of Coastal and Marine Areas (2018)

Rank	Country	Marine protected areas (% of the territorial waters)
1	Palau	83
2	Dominican Republic	18
3	Kiribati	11.8
4	Belize	10.1
5	Guinea Bissau	10
	5/38 SIDS have achieved SDG target 14.5.1	
	SIDS Total	13.6
	World Total	17.2

Source: SDG progress 14.5.1 UN Stats 2018

Coasts at Risk

The Coasts at Risk (C@R)Index shows that SIDS were most at risk from exposure and vulnerability to coastal hazards. The index examines how coastal nations are exposed to natural hazards and climate change, while also looking at how social, economic, and ecological factors can magnify the effects of a natural disaster. The index is made up of four components: coastal hazards and the exposure of coastal populations, susceptibility, coping capacity, and the adaptive capacity of local populations. Altogether the components focus on the frequency and magnitude of coastal natural hazards and the number of people who would be impacted, the role socio-economic conditions and ecosystems impact societies and determine the severity of impact a natural disasters or climate change would have on a society, gauging whether a society has the resources and takes the correct steps to manage the short-term fallout of an event, and determines whether a society has the policies in place to adapt to the negative impacts of a natural disaster and the impacts of climate change. Of the ten coastal countries with the highest level of coastal risk, seven countries were SIDS. Members from across all three SIDS regions were present, however, a majority were in the Pacific[19].

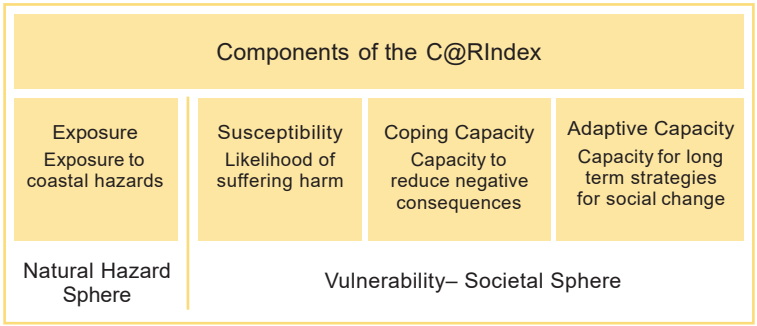
Top 10 Coasts at Risk—Very High	
Rank	Country
1	Antigua & Barbuda
2	Tonga
3	Saint Kitts & Nevis
4	Vanuatu
5	Fiji
6	Brunei Darussalam
7	Bangladesh
8	Philippines
9	Seychelles
10	Kiribati

Source: Nature Conservancy Figure 1,Figure 2, and Table 6

These countries score high on the index not only because of the frequency of natural disasters, but they also have fragile ecosystems, lack necessary infrastructure, policies, and capacity to handle the disasters. Transport infrastructure along the coasts are also at risk from the threats of climate change. In SIDS, their coastal transport infrastructure–seaports and airports–are critical lifelines for external trade, food, energy, and tourism, as well as for disaster risk response. A case study that focused on Caribbean SIDS, Jamaica, and St. Lucia, looked at the impact of cli-

[19]Coasts at Risk,2014.

mate induced sea level rise and the impact it would have in on its coastal transportation systems. The study looked at four seaport and four coastal international airports and found that just with 1.5ºC global warming over the next century all would face increasing levels of coastal inundation[20]. If effective measures are not implemented, these SIDS will lose vital nodes of international connectivity and socioeconomic development, which are particularly critical to the geographically isolated SIDS.



Source: Nature Conservancy Figure 1,Figure 2,and Table 6

[20]Monioudi,I. N et al.,2018.

Exposure	Susceptibility	Coping Capacity	Adaptive Capacity
Population Exposed to	Public Infrastructure	Government and Authorities	Education and Research
A. Cyclones B. Roads C. Sea Level Rise D. Storms Surges E. Tsunamis	A. Percentage of population without access to improved sanitation B. Percentage of population without access to improved water source	A. Corruption Perception index B. Good governance [Failed States Index] C. Fish management effectiveness index	A. Adult literacy rate B. Combined gross school enrolment
	Nutrition	Medical Services	Gender Equity
	C. Percentage of population undernourished D. Percentage of animal protein from fish	D. Number of physicians per 10,000 inhabitants E. Number of hospital beds per 10,000 inhabitants	C. Gender parity in education D. Percentage of female representatives in the National Parliament
	Poverty and Dependences	Economic Coverage	Environmental Status/ Ecosystem Protection
	E. Dependency ratio [share of under 15-and over 65-year-olds in relation to the working population] F. Extreme poverty population living with USD1.5 per day or less [purchasing power parity]	F. Insurance [life insurances excluded] G. Livelihood diversity index	E. Water resources [taken from EPI1] F. Biodiversity and habitat protection [EPI] G. Forest management [EPI] H. Agricultural management [EPI] I. Fish stock status
	Economic Capacity and Income		Investment
	G. Gini-index H. Marine economic revenue (OHI[1])/GDP per country		J. Public health expenditure K. Life expectancy at birth L. Private health expenditure
	Natural Capital		
	I. Fish catch J. Percentage of population that may receive risk reduction from reefs and mangroves [for tropical analyses only]		

Note: EPI[1]= Environmental Performance Index 2012
Source: Nature Conservancy Figure 1,Figure 2,and Table 6

Extreme Weather Events

As the global emissions rise, climate change increasingly result in more extreme weather events in SIDS.

Top 3 Hurricanes/ Cyclones by region 2015–2018				
Pacific				
Year	Tropical cyclone	Country hardest hit	Cost ($USD)	As a %of GDP
2018	Gita	Tonga	164.1 million	38
2016	Winston	Fiji	1.4 billion	30
2015	Pam	Vanuatu	600 million	64
Caribbean				
Year	Hurricane	Country hardest hit	Cost ($USD)	As a %of GDP
2017	Maria	Dominica	1.3 billion	224
2017	Irma	Antigua & Barbuda	155.1 million	10
2016	Matthew	Haiti	2.7 billion	32

Source: Various sources

Scene from Les Cayes, Haiti, in the aftermath of Hurricane Matthew, the category 4 storm which made landfall in the country on 4 October. *Photo: UN Photo / Logan Abassi*

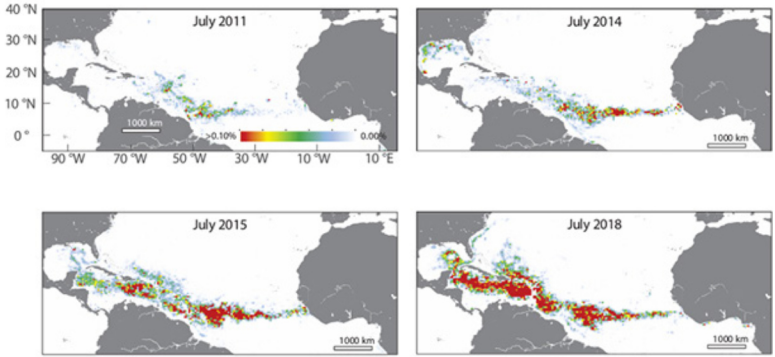
Tropical Cyclones

SIDS are on the front lines of experiencing extreme weather events that are exacerbated due to climate change. As global warming has increased ocean temperatures many tropical regions have experienced more devastating and frequent occurrences of tropical cyclones and hurricanes. In the Caribbean, Antigua and Barbuda have been one of the victims of this phenomenon. In the past two decades the country has dealt with ten hurricanes making landfall on the islands, resulting in billions of dollars in damages, which is greater than 100% of yearly GDP. In 2017, Hurricane Irma hit Antigua and Barbuda and caused $155.1 million in damages and caused the entire island of Barbuda to be evacuated. The Pacific SIDS have also not been spared by the increasingly violent weather events, particularly from tropical cyclones. In 2016, Tropical Cyclone Winston ravaged the island of Fiji. The event resulted in $1.4 billion in damages, roughly equivalent to 30% of GDP. To make matters worse, many of the nations that will feel the effects of these events do not have the resiliency measures or fiscal space to address their impacts[21].

[21] SPREP, 2017.

Sargassum

The floating seaweed, sargassum, that moves with the ocean currents plays an important role in global ocean oxygen production and carbon sequestration. Satellite imagery has found that since 2011 that the volume of sargassum has significantly increased and it has been found in higher concentrations within parts of the Atlantic Ocean and Caribbean Sea[22]. Many experts believe this sargassum expansion, known as the bloom, can be attributed to the impact of climate change is having on oceans. As the sargassum expands, it moves westward towards the Caribbean and the likelihood of it entering those ecosystems and beaching itself increases. This beaching will cause significant environmental, ecological, and economic problems for SIDS in the Caribbean[23]. Influxes of Sargassum seaweed in several Caribbean countries,including in Belize for the fifth consecutive yearis having a major impact on tourism.



Source: Caribbean Wang et al. 2019

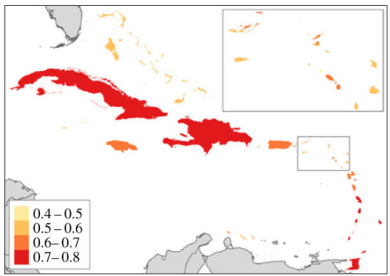
[22]CHM,2015.
[23]Science Magazine,2019.

Drought

Recurrent droughts are one of the impacts that climate change is having on SIDS, especially in Cabo Verde. The phenomenon is not new to the small island state, dating back to the nineteenth century droughts have occurred in the region, with some being so severe that large swaths of the domestic population have emigrated elsewhere. More recently though, as climate changes impacts have become more apparent, the severity of droughts has increased. In 2018, the island experienced its most severe drought since 1977[24]. Human activities on the island have also disrupted the fragile ecosystem which has led to desertification, which further exacerbates the issue of drought[25]. This has evolved into an issue of food security for the island state as minimal amounts of rain make it difficult for rain-fed agriculture to be successful and livestock is also put at risk because of limited grazing resources.[26]

Coral Bleaching

Coral reefs play a vital role in the ecological and economic wellbeing of island communities in SIDS. These natural features are a key defense against beach erosion, protect biodiversity, provide a key source of seafood, and provide various tourism-based activities. These ecosystems are, however, experiencing coral bleaching, a significant effect of climate change. This process occurs when environmental stressors such as temperature increases, acidification, and pollution cause coral to expel the microorganism inside them, thus resulting in the loss of pigmentation. Based on satellite imaging form the NESDIS, the risk of coral bleaching is high across the reefs in the Pacific and the Caribbean.



Source: Coral Bleaching in the Caribbean 2019–Royal Society Figure 3a

[24]The East African, 2018.
[25]Atlantico, 2019.
[26]FAO, 2018.

CORAL BLEACHING

Have you ever wondered how a coral becomes bleached?

HEALTHY CORAL

1 Coral and algae depend on each other to survive.

Corals have a symbiotic relationship with microscopic algae called zooxanthellae that live in their tissues. These algae are the coral's primary food source and give them their color.

STRESSED CORAL

2 If stressed, algae leaves the coral.

When the symbiotic relationship becomes stressed due to increased ocean temperature or pollution, the algae leave the coral's tissue.

BLEACHED CORAL

3 Coral is left bleached and vulnerable.

Without the algae, the coral loses its major source of food, turns white or very pale, and is more susceptible to disease.

WHAT CAUSES CORAL BLEACHING?

Change in ocean temperature
Increased ocean temperature caused by climate change is the leading cause of coral bleaching.

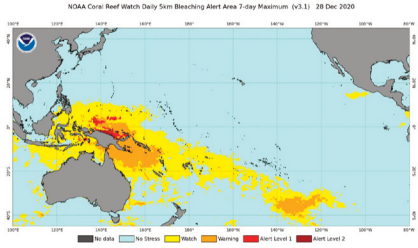
Runoff and pollution
Storm generated precipitation can rapidly dilute ocean water and runoff can carry pollutants –these can bleach near-shore corals.

Overexposure to sunlight
When temperatures are high, high solar irradiance contributes to bleaching in shallow-water corals.

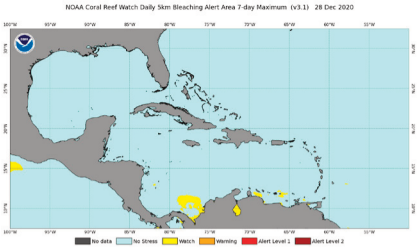
Extreme low tides
Exposure to the air during extreme low tides can cause bleaching in shallow-water corals.

Source: NOAA's Coral Reef Conservation Program

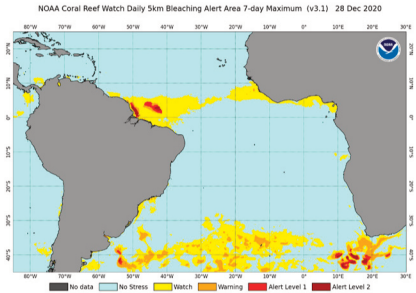
Pacific



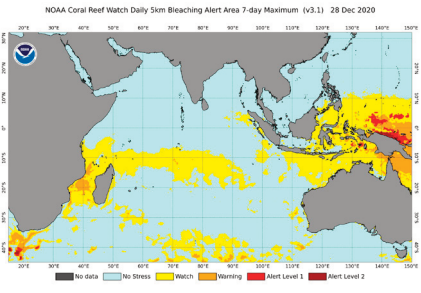
Caribbean



Atlantic Ocean



Indian Ocean



Source: Pacific,Caribbean,Atlantic and Indian Ocean 2019–NOAA

Marine Species and Habitats

Due to their remoteness, many SIDS have organisms that are endemic to their respective regions, resulting in delicately balanced ecosystems. The Seychelles is home to between 300 and 700 total species of fish, along with a wide range of shark and ray spe cies. In the Eastern Caribbean, there are 52 species of seabirds that live in the region, 36 of which have been deemed globally important because of their role in global food chains. In the Pacific, the Phoenix Islands of Kiribati with range of underwater seamounts, has a vibrant deep sea habitats that are home to 800 species of fauna, 200 species of coral, 500 species of fish, 18 marine mammals, and 44 species of birds[27]. The wildlife in these ecosystems is in danger from external shocks and a lack of capacity on the part of national governments to keep up with conservation regulations. In the Seychelles, for example, the Mahe, Alphose, and Amirantes Plateau are under environmental pressures. Overfishing,pollution,and coral bleaching wreak havoc on the ecosystem in the area and the problem is further compounded by the fact that the area lacks an effective management system to protect the marine habitats[28]. In the Caribbean,hard coral cover has decreased by 80% over a 30-year period, this can be attributed to the impacts of climate change and human activities. This reduction will not only impact the organisms that live within the coral, but there will be knock-on effects up the biological chain to animals that feed on them, such as seabirds[29]. Then in the Pacific, the Tongan Archipelago is home to many globally important seabirds but there is only one protected area and overfishing puts pressure on the ecosystem. Some marine protected areas exist but they lack the resources to properly enforce regulations[30].

[27]Convention of Biodiversity,undated.
[28]CHM,2015.
[29]CHM,2015.
[30]CHM,2015.

Ecologically or Biologically Significant Areas (EBSAs) in SIDS		
1	Wider Caribbean and Western Mid-Atlantic	Eastern Caribbean
2		Marine Mammal Sanctuary Banco de la Plata y Banco de la Navidad
3		Caracol/Ft. liberte/Monte Cristi (Nothern Hispaniola Binational Area)
4		Pedro Bank, Southern Channel and Morant
5		The Sargasso Sea
6	Western South Pacific	Kermadec-Tonga-Louisville Junction
7		Tongan Archipelago
8		Palau Southwest
9		Taveuni and Ringgold Islands
10		Nothern New Zealand/South Fiji Basin
11		Vatu-i-Ra/Lomaiviti, Fiji
12		South of Tuvalu/Wallis and Fortuna/North of Fiji Plateau
13		Samoan Archipelago
14		New Hebrides Trench Region
15		New Britain Trench Region
16		Kadavu and the Southern Lau Region
17		Remetau group: South-West Caroline Islands and Nothern New Guinea
18		Phoenix Island
19	Southern Indian Ocean	Saya de Malha Bank
20		Blue Bay Marine Park
21		Mahe, Alphonse and Amirantes Plateau
22		Moheli Marine Park
23		Northern Mozambique Channel

Source: Convention of Biodiversity

Marine Biodiversity

Seychelles

RICH MARINE BIODIVERSITY

300-700+ Reef fish

62 Sharks

22 Rays

Comoros

LARGEST NUMBER OF COELACANTH IN THE WORLD

The largest groups are on the south-west coast of Ngazidja, and notable numbers at Bimbini, Anjouan.

Total number 500.

Eastern Caribbean

HOME TO 500,000 SEABIRDS

52 BirdLife-designated Important Bird Areas (IBAs)

- 36 Globally important
- 16 Caribbean regional important

Belize

LARGEST BARRIER REEF IN THE WESTERN HEMISPHERE AND THE 2ND LARGEST IN THE WORLD

number of species

600+	74	36	5
Marine & inland fish	Hard corals	Soft corals	Seagrass

The reef extends some 220 km from Northern Belize to the Southern Sapodilla Cayes.

11 different types of cayes ecosystems.

Palau

ROCK ISLANDS SOUTHERN LAGOON COVERS 100,200 HA AND 445 ISLANDS

Complex reef system with over 385 coral species. They sustain a large diversity of plants, birds and marine life including dugong and at least 13 shark species.

Kiribati

ONE OF THE WORLD'S LARGEST INTACT OCEANIC CORAL ARCHIPELAGO ECOSYSTEMS

800 Fauna species + 14 Underwater seamounts (presumed to be extinct volcanoes)

- 200 Coral
- 500 Fish
- 18 Marine mammals
- 44 Bird

Source: See page 31 for a list of sources.

Migration and Displacement

SIDS are at the frontline of climate change and its residents will feel the impacts directly. One of the most concerning impacts of climate change are already felt by SIDS will be sea level rise. From 2006–2015, sea levels rose by an average of 3.6mm per year, which is more than double the rate, 1.4mm per year, for throughout most of the 20th century. Depending on green house gas emission levels, sea levels could rise by at least 0.3 meters and 2.5 meters by 2100 if worst case scenarios are met, which does not bode well for SIDS[31]. Many SIDS are low lying islands with densely populated coastlines. On average, 26% of the land area within SIDS is 5 meters above sea level and 29% of the population lives with this area. This will result in vast population displacement and migration within and beyond SIDS. The impact of SLR will be felt most acutely by the SIDS in the Pacific where the rate of SLR is 50% greater than the global average. Populations in the Solomon Islands, Papua New Guinea, and Kiribati have already been displaced by the phenomenon[32]. Loss of territory and statelessness are increasing possibilities as SLR projections continue to be amended upward. Nations like the Maldives, Fiji, Micronesia, the Marshall Islands, and Kiribati have adopted coordinated population migration policies to combat the threat of territorial loss[33].

[31] Climate.gov, 2020.
[32] UN News, 2019.
[33] Hauer, M. Eet al., 2019.

Sources (page 30):

Seychelles–UNEP, 2015, Ecologically or Biologically Significant Areas (EBSAs)–Northern Mozambique Channel, The Clearing-House Mechanism of the Convention on Biological Diversity. Available at: https://chm.cbd.int/database/record?documentID=204009

Comoros – (ibid) (UNEP, 2015, Ecologically or Biologically Significant Areas (EBSAs)–Northern Mozambique Channel, The Clearing-House Mechanism of the Convention on Biological Diversity. Available at: https://chm.cbd.int/database/record?documentID=204009)

Eastern Caribbean– UNEP, 2015, Ecologically or Biologically Significant Areas (EBSAs)–Eastern Caribbean, The Clearing-House Mechanism of the Convention on Biological Diversity. Available at: https://chm.cbd.int/database/record?documentID=200097

Belize– Belize Department of Education. Available at: https://doe.gov.bz/wp-content/uploads/2019/04/Chap-5-Biodiversity.pdf

Kiribati–UNESCO, 2020, World Heritage List, Phoenix Islands Protected Area. Available at: https://whc.unesco.org/en/list/1325/

Palau – UNESCO, 2012, World Heritage List, Rock Islands Southern Lagoon. Available at: https://whc.unesco.org/en/list/1325/

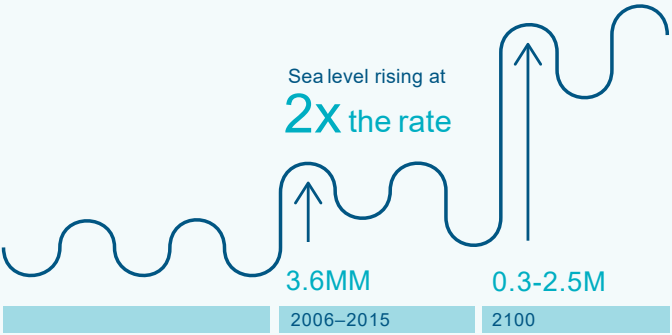
Table 2. Highest and Lowest Share of Land Area Within 5m Above Sea Level	
Country	%of Land Area Within 5m Above Sea Level
Maldives, Tuvalu	100%
Marshall Islands	99%
Kiribati	96%
Cook islands	88%
Average	26%
Haiti	4%
Suriname, Timor-Leste, Guyana	3%
Papua New Guinea	2%

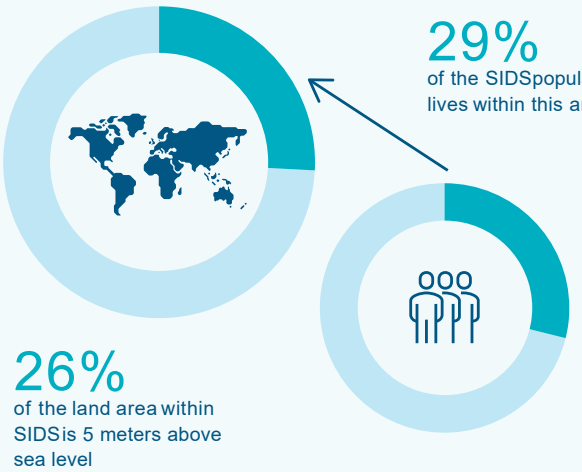
Source: UN-OHRLLS,Small Island Developing States in Numbers,2013.

Table 3. Highest and Lowest Share of Population Living Within 5m Above Sea Level	
Country	%of Population Living Within 5m Above Sea Level
Maldives, Tuvalu	100%
Marshall Islands	99%
Kiribati	95%
Suriname	68%
Average	29%
Mauritius	6%
Haiti	5%
Timor-Leste	4%
Dominican Republic	3%
Papua New Guinea	2%

Source: UN-OHRLLS,Small Island Developing States in Numbers,2013.

Climate Change and Rising Sea Levels





Source: Climate.gov,2020.

Marine World Heritage Sites

As climate change continues to impact oceans there is a greater need for conservation by SIDS. The Marine World Heritage Sites system developed by UNESCO, provides the proper framework for needed for marine conservation. There are 50 Marine World Heritage Sites across the globe, SIDS however, are only home to five of those locations. SIDS are underrepresented on this list because there is a lack of knowledge around SIDS marine and cultural heritage outside of their respective regions, along with the fact that UNESCO holds the countries to high protection standards which SIDS are sometimes unable to meet because of their limited human and financial resources. Without the added support from the international community, these marine ecosystems will fall victim to the threats this system was meant to prevent. Take East Rennell, for example, a region in the Solomon Islands that is part of the longest raised coral atoll in the world and in 1998 it was inscribed to the World Heritage List[34]. In 2013, however, the site was put on the List of World Heritage Danger List due to ecological risks posed by a commercial logging venture and invasive species on the western portion of the island[35]. If international support is not provided, then the biodiversity within this ecosystem cannot be protected.

World Heritage List – Marine and Coastal Sites		
Country	Site	Site Category
Belize	Belize Barrier Reff Reserve	Natural
Kiribati	Phoenix Islands Protected Areas	Natural
Palau	Rock Islands Southern Lagoon	Natural & Cultural
Seychelles	Aldabra Atoll	Natural
Solomon Islands*	East Rennell	Natural

Note: 5/50 Marine Heritage sites are in SIDS.
*East Rennell, Solomon Islands has been inscribed on the list of world heritage.

Source: Marine World Heritage Listed Sites in SIDS: UNESCO 2019

[34] UNESCO, undated.
[35] UNESCO, 2015.

Photo: UNESCO/ East Rennell

Food Security

The issue of food security is an ongoing problem for SIDS given their unique vulnerabilities and will only be further exacerbated by climate change. Between 1990 and 2011 food imports to the Caribbean SIDS increased from 45% to 67.5% and increased from 40% to 60% over the same period for the Pacific States[36]. The reliance on external markets for food supplies puts greater pressure on SIDS given their economic and geographic isolation. Long distances from markets result in high transportation costs and trade deficits as the demand for food imports rapidly outpaces earnings on exports[37]. These factors also reduce the likelihood of attracting private sector investment that could stimulate domestic food production. The impact of climate change will add to the challenge of food security as increasingly frequent natural disasters, sea level rise, and erratic rainfall will make it difficult for populations to meet their food sufficiency needs[38]. The issue of food security also poses a health crisis for SIDS. The residents of SIDS must deal with the 'triple burden' of malnutrition.

[36] FAO, 2017.
[37] FAO, 2017.
[38] FAO, 2017.

Source: FAO2017.

In this scenario undernutrition, micronutrient deficiencies, and obesity are prominent in the population. In some of the poorest SIDS, growth stunting due to undernourishment has affected 20% of the adolescent population. The high proportion of society being diagnosed as obese is also a problem, particularly among women. In the AIS region, a quarter of the countries have rates of female obesity at 40%. The issue of obesity stems in part from high rates of processed imported foods that are high in sugar and fat[39]. These health trends also put stress on national healthcare systems.

[39]FAO,2017.

Imports

FOOD IMPORTS TODAY > 5 billion $/ year

+50% SINCE 2000

Will increase to $8-10 billion by 2020 if nothing changes

Top 5 food imports

- processed foods
- wheat
- corn
- meat
- dairy

All **Caribbean** and **Pacific** SIDS import over 60% of food

50% of islands import over 80%

Domestic Production

52% of the agricultural workforce are women who do not have the same access to land, resources or credit, as men

FISH PROVIDES 50-90% of animal protein in diets

In many **Pacific** SIDS, people consume **3 to 4** times the global average of fish per capita

Food production ranges from 28% to 71% of domestic requirements in the **Caribbean**

Source: FAO 2017.

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The Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (OHRLLS) serves 91 vulnerable Member States to achieve sustainable development and internationally agreed goals.

The Office mobilises international support and advocates in favour of the three vulnerable country groups, raising awareness about the economic, social and environmental potential that exists and ensuring that the pressing needs of the 1.1 billion people who live in them, remain high on the international agenda.

For more information go to **un.org/ohrlls**

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