

GLOBAL LAND OUTLOOK

Small Island Developing States Thematic Report

Integrated Solutions for a More Resilient Future



United Nations
Convention to Combat
Desertification

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Foreword



Yasmine Fouad

UNCCD Executive Secretary

In Small Island Developing States (SIDS), land tells a powerful story. It is a history of deep connections — between people and places, mountains and reefs, soils and seas — and cultural legacies that have long understood that healthy land is essential for healthy communities. It is also a story of growing pressures and scarcity, as climate change, biodiversity loss and land degradation converge, threatening livelihoods, food security and the very future of island societies.

Nevertheless, this report is a story of hope and possibilities. Despite their immense challenges, SIDS hold great potential to take the lead on more resilient and sustainable development pathways. While their landscapes may be small, their natural wealth, cultural diversity, and ecological knowledge are vast. Their strength lies in the understanding that land restoration is not an isolated environmental objective, but the basis for food and water security, resilient economies, and healthy ecosystems that span from ridge to reef.

The Global Land Outlook Small Island Developing States Thematic Report clearly shows that restoring land in SIDS is about far more than repairing degraded soils or replanting forests. It is about restoring balance — between land and ocean, between people and nature, and between present needs and future generations. Healthy land supports freshwater systems, coastal protection, sustainable agriculture and fisheries, and vibrant cultural identities. In island contexts, these connections are immediate and visible.

This report puts sustainable land and water management at the heart of sustainability — not as standalone interventions, but as integrated actions that provide multiple benefits in terms of climate adaptation and mitigation, biodiversity conservation, food security and livelihoods. It makes a strong case for synergies between the Rio conventions, between sectors, and between policies and people. This collaboration is essential to achieving lasting impact, particularly in those island states where capacity and resources are stretched to their limits.

It also emphasises that transformation will not come from top-down prescriptions. Real and lasting change in SIDS will be driven by communities, indigenous peoples, women and youth who manage land resources every day. Their knowledge, leadership and innovation must be recognised, supported and amplified. The international community has a responsibility to listen, to partner, and to align its support with locally defined priorities — enabling SIDS to shape more resilient futures.

Finally, this report is a call to action — for governments, development partners and communities alike — to invest in land stewardship, strengthen synergies, and place people and ecosystems at the centre of development priorities. In doing so, we do more than protect land: we nurture hope, sustain life, and secure a future in which both people and nature can thrive.

Executive Summary



Photo: © Envato Elements

Small Island Developing States (SIDS) are a diverse group of countries that boast some of the world's most extraordinary natural assets, cultural heritage and traditional ecological knowledge, which form the basis of their long-term sustainable development. Comprising 39 states and 18 territories, SIDS are home to around 74 million people in the Caribbean, Pacific, Atlantic and Indian Oceans, as well as the South China Sea. These states and territories are custodians of unique and valuable natural capital on land and at sea. This includes nearly 30% of the world's coral reefs, 11% of mangroves, extensive seagrass ecosystems, and many intact tropical forests.

For SIDS, land is much more than just a productive economic asset. Land is integral to their community identity and social cohesion, as well as their commitment to intergenerational equity. Their land supports rich biodiversity, vegetation, forests, mangroves and wetlands which are essential for sustaining food systems, freshwater supplies, diverse livelihoods and marine environments. Healthy soil, water and biodiversity resources form the backbone of island economies, shaping the productivity and resilience of key sectors such as agriculture, fisheries, forestry, tourism and energy.

SIDS face unique challenges regarding their land and water resources. These challenges arise from their inherent characteristics, such as small landmasses,

extreme isolation and stark geomorphology, and are exacerbated by converging climatic and environmental pressures. In 2019, SIDS reported that 18.8 million hectares — equivalent to 16.5% of their total land area — was degraded to varying extents, slightly above the global average. The consequences of land degradation and drought are rapidly felt across tightly interconnected ecosystems, with significant repercussions for human health, livelihoods and economies.

SIDS are experiencing growing competition for increasingly scarce natural resources. This is primarily due to changes in land use, driven by urbanisation, unsustainable agricultural practices, mining operations and rapid growth in the tourism sector. Biodiversity loss, unmitigated pollution and invasive species are also undermining the ecological integrity of island landscapes. The already high vulnerability of SIDS to natural hazards and disasters is further exacerbated by the cascading impacts of climate change, including rising sea levels and more intense hurricanes, droughts and floods.

SIDS must overcome numerous barriers to adopting and implementing integrated land and water management approaches. These include limited human, technical and financial resources, which hinder effective planning and responses to the confluence of development challenges. A lack of institutional capacity and access to high-resolution spatial data, skills shortages, and

high emigration rates limits investments in integrated land use planning and policy support for inclusive land governance. Furthermore, the erosion of traditional ecological knowledge, which began during the colonial era, continues to undermine the potential of customary management practices that have long sustained highly productive island ecosystems.

Despite these challenges and barriers, SIDS have unique comparative advantages that can enable them to achieve integrated, nature-positive, climate-resilient and culturally grounded sustainable development. These include their traditional management practices, customary natural resource governance, strong community networks, and rich cultural and natural endowments which can be used as transformative levers to enhance the effectiveness of integrated ridge-to-reef approaches.

Transformative Levers for Enhancing Resilience in SIDS

This report describes how SIDS can restore their natural capital, strengthen climate resilience and achieve economic prosperity by using seven transformative levers that place land at the centre of sustainable and inclusive economic development. These levers are strategic, mutually reinforcing points of influence that enable systemic change by reshaping decision-making, resource allocation and implementation processes. In this report, the term 'transformative' refers to integrated land and water management approaches that are rooted in local contexts and strive for long-term sustainable development outcomes. Many of these transformative levers can be employed together to catalyse small-scale, community-led actions, as well as large-scale landscape and seascape programmes.

Restoring Land and Natural Resources

The limited landmass of SIDS and the strong ecological connectivity between the highlands and coastal areas make soil health and water conservation key policy priorities. Restoring farmland, forests, wetlands, mangroves and coral reefs is akin to rebuilding the natural infrastructure that underpins food security, freshwater availability, diverse livelihoods and island economies. For example, traditional agroforestry systems can play an important role in enhancing community resilience and preserving cultural heritage, particularly in the Pacific region, where they account for nearly a quarter of the agricultural land.

Mainstreaming Sustainability

Integrating sustainable land and water management practices into multiple sectors, including agriculture, fisheries, tourism, energy, construction, waste management and urban planning, can help to diversify the green and blue economies of SIDS and reduce environmental pressures at their source. For example, increasing water use efficiency and adopting a circular approach to water management, such as harvesting rainwater and recycling, can safeguard local freshwater supplies. Raising public awareness and building resilient infrastructure will also be necessary to alleviate future water stress.

Inclusive Governance and Integrated Land Use Planning

Responsible land use practices and inclusive governance frameworks that combine supportive policies and long-term spatial planning with secure tenure and resource rights are critical for scaling up integrated land and water management practices.



Photo: © Javier Acebal

For example, incorporating customary tenure systems into formal land administration, engaging and empowering communities in land stewardship, and adopting ridge-to-reef approaches to spatial planning can transform the management of natural resources from fragmented to coherent. This enables long-term, ecosystem-based decision-making that enhances island resilience.

Technology Transfer and Digitalisation

The development and expansion of digital technology infrastructure and applications can significantly improve resource use efficiency, strengthen economic resilience and provide essential tools for agricultural and environmental planning and monitoring. SIDS require high-resolution, locally relevant and openly accessible spatial data to budget for, plan, design, implement and monitor integrated landscape and seascape programmes. The co-design of data and information systems, that combine Indigenous knowledge with robust scientific methods, can also help ensure cultural grounding and the consideration of social equity in decision-making.

Advocacy and Partnerships for Regional Cooperation

Despite their small geographic and economic size, SIDS have developed a strong, coordinated voice that commands significant global attention. It has increased their visibility and moral authority in

international fora and sets an example for other vulnerable groups. The SIDS Partnership Framework was created to encourage more effective cooperation, support regional approaches, strengthen relationships between donors and recipients, and monitor commitments across multiple programmes and platforms. By uniting governments, the private sector, multilateral institutions and civil society organisations, the framework strives for more coordinated, long-term engagement specifically tailored for SIDS contexts.

Finance for Integrated Land and Water Management

To mitigate the challenges and overcome the barriers outlined in this report, SIDS require adequate, predictable and flexible financing from public and private sources to support the conservation, restoration, and integrated management of land and water resources. Experience across SIDS shows that, no matter how successful they are individually, isolated or scattered initiatives cannot overcome the structural drivers of land degradation and freshwater stress. Innovative financing, including concessional finance, direct access mechanisms, resilience bonds, debt-for-nature swaps and remittance-matching schemes, can break cycles of debt and transition away from fragmented, short-term project funding. To attract long-term private capital, including remittances, SIDS must address institutional capacity issues while ensuring that investments align with national development priorities.



Synergies Across Conventions

Significant opportunities exist for SIDS to strengthen synergies across the Rio conventions — the UNFCCC, the CBD and the UNCCD — by simply leveraging complementarities in their national strategies and implementation plans. Many of these commitments include spatially explicit targets for land-based restoration activities, which also recognise the importance of integrated spatial planning. For example, multi-convention coordination platforms at the national level can increase collaboration between different focal points, their respective ministries, and the technical advisory teams responsible for implementing their plans under the Rio conventions and related processes. This could enable greater access to limited finance while reducing duplication and administrative burdens, particularly important for SIDS, which have high reporting requirements relative to their size and often have limited capacity and dispersed institutions.

SIDS have repeatedly demonstrated their ingenuity, leadership and ambition in global climate and environmental diplomacy. However, they cannot — nor should they be expected to — confront the growing confluence of environmental and economic pressures alone. The path to transformative, locally driven solutions grounded in island realities will require sustained and coordinated efforts among governments, civil society, regional bodies and international partners.

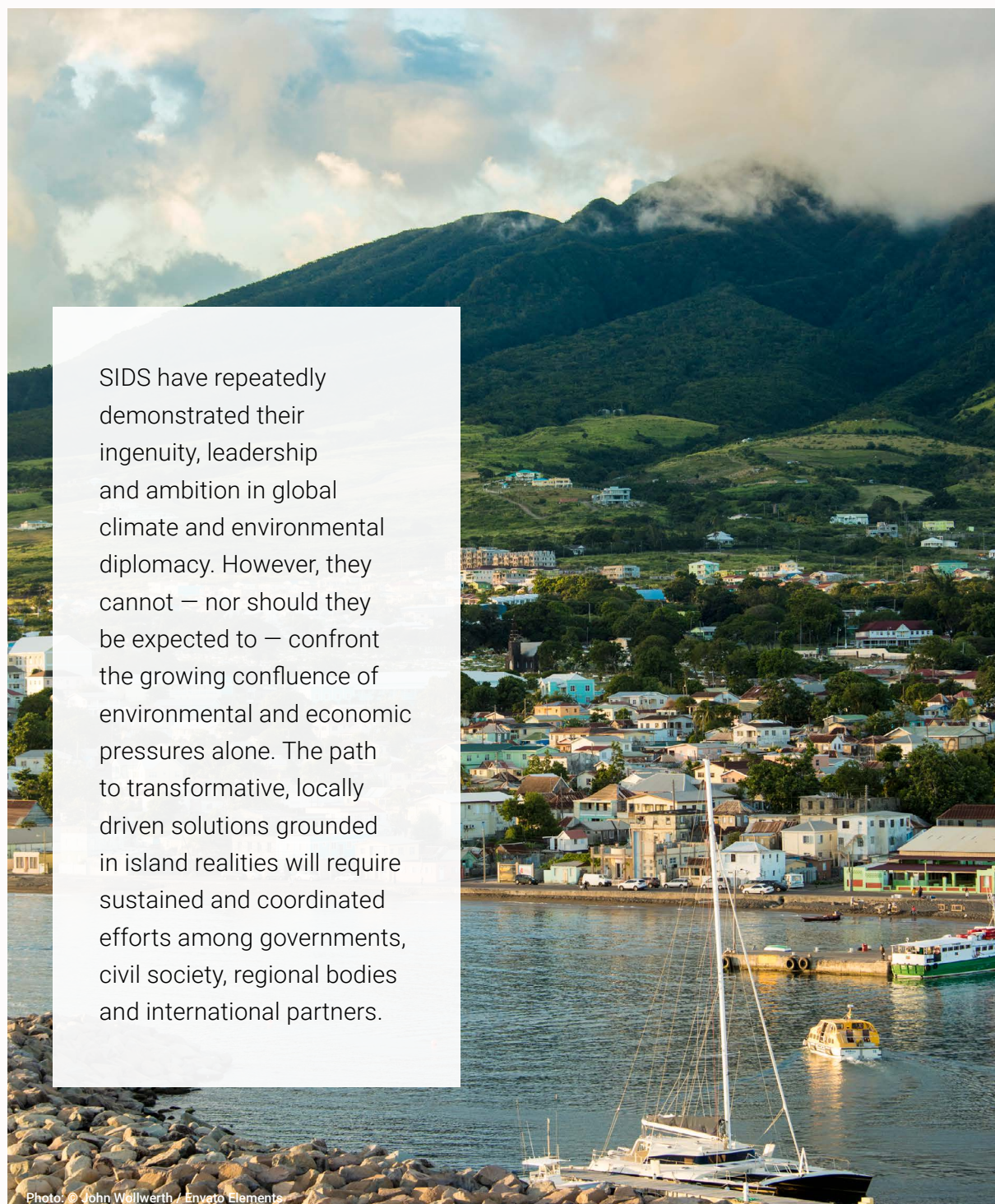


Photo: © John Wellwerth / Envato Elements

Introduction



Photo: ©Adobe Stock

Small Island Developing States: A Distinct Grouping based on Common Challenges

Small Island Developing States (SIDS) comprise 39 states and 18 territories and are home to around 74 million people in the Caribbean, Pacific, Atlantic, and Indian Oceans, and South China Sea.¹ They are diverse in size and composition:² some are tiny atoll nations, while others are sprawling archipelagos with large areas of intact nature or highly urbanised city-states.³ Their economies also vary considerably: some depend heavily on tourism, while others export high-value commodities to global markets⁴ — only a few are classified as Least Developed Countries (LDCs).⁵

What unites SIDS is their unique role as custodians of rich natural resources — including biodiversity, forests, coral reefs and fish stocks — and the similar challenges they share.⁶ SIDS sit at the intersection of three defining characteristics: they are islands, they are small states, and they are developing or least-developed economies. Each of these dimensions presents significant challenges to sustainable development, collectively making SIDS among the most vulnerable nations in the world. It was in recognition of these common circumstances that SIDS were acknowledged as a distinct grouping of Member States at the 1992 UN Conference on Environment and Development.⁷

SIDS are formally recognised as requiring special attention in climate finance, development cooperation and capacity-building initiatives. This has been reflected in a series of dedicated UN frameworks, beginning with the Barbados Programme of Action (1994), followed by the Mauritius Strategy (2005), and the SAMOA Pathway (2014), which remain central to SIDS development agendas. The Fourth International Conference on SIDS, held in Antigua and Barbuda in 2024, launched the Antigua and Barbuda Agenda for SIDS (ABAS), setting a new ten-year roadmap. SIDS development priorities are also increasingly integrated into broader UN conventions and agreements, such as the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change, and the Kunming-Montreal Global Biodiversity Framework. The UN Office of the High Representative for Least Developed Countries, Landlocked Developing Countries and SIDS (UN-OHRLLS) supports the mobilisation of resources to advance these priorities throughout the UN system.

Small Island Developing States

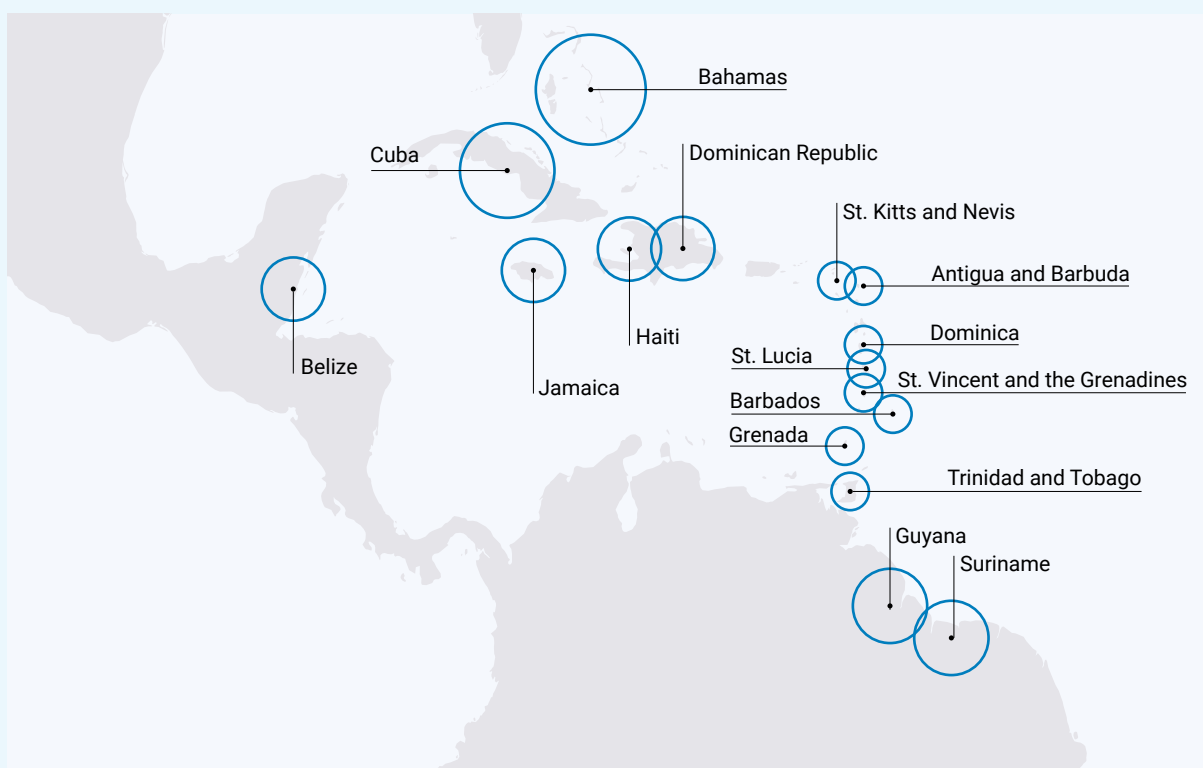
	Antigua and Barbuda		Mauritius
	Bahamas		Nauru
	Barbados		Niue
	Belize		Palau
	Cabo Verde		Papua New Guinea
	Comoros		Samoa
	Cook Islands		São Tomé and Príncipe
	Cuba		St. Kitts and Nevis
	Dominica		St. Lucia
	Dominican Republic		St. Vincent and the Grenadines
	Fiji		Seychelles
	Grenada		Singapore
	Guinea-Bissau		Solomon Islands
	Guyana		Suriname
	Haiti		Timor-Leste
	Jamaica		Tonga
	Kiribati		Trinidad and Tobago
	Maldives		Tuvalu
	Marshall Islands		Vanuatu
	Micronesia (Federated States of)		

Associate Members of United Nations Regional Commissions: American Samoa, Anguilla, Aruba, Bermuda, British Virgin Islands, Cayman Islands, Commonwealth of Northern Marianas, Curacao, French Polynesia, Guadeloupe, Guam, Martinique, Montserrat, New Caledonia, Puerto Rico, Saint Maarten, and the US Virgin Islands.

Regional Snapshots of People, Islands and Economies

The Caribbean Region

FIGURE 1 Map of the Small Island Developing States of the Caribbean Region



The nearly 7,000 islands, islets, cays and reefs in the Caribbean region are spread over a vast geographic area that is surrounded by the Caribbean Sea and the Atlantic Ocean. Caribbean SIDS include 16 countries, the majority of which are islands of various sizes that are classified into the Greater Antilles and Lesser Antilles. In addition, three continental countries (Belize, Guyana and Suriname) are included in the Caribbean SIDS. As a group, Caribbean SIDS and associate members have a population of more than 46 million inhabitants,⁸ with 91% living in the five largest countries of the region.⁹ Populations range from 47,000 in Saint Kitts and Nevis to around 11.9 million in Haiti (Table 1). Guyana has the greatest land area with 214,970 km², while Saint Kitts and Nevis only has 260 km².

Since the early 2000s, the Caribbean SIDS have undergone considerable demographic, socio-economic and political changes. The Human Development Index (HDI) represents three main dimensions of human development: a decent standard of living, knowledge and a long and healthy life. The HDI in Caribbean SIDS is higher on average than other SIDS regions with limited variation between countries, Haiti being the outlier.

FIGURE 2 Human Development Index in Caribbean SIDS based on UNDP data¹⁰

Country	2008	2011	2014	2017	2020	2023
Antigua and Barbuda	0.83	0.828	0.837	0.845	0.84	0.851
Saint Kitts and Nevis	0.776	0.8	0.829	0.834	0.828	0.840
Bahamas	0.801	0.802	0.807	0.81	0.797	0.820
Barbados	0.794	0.794	0.799	0.804	0.803	0.811
Trinidad and Tobago	0.782	0.792	0.805	0.806	0.8	0.807
Saint Vincent and the Grenadines	0.741	0.749	0.759	0.778	0.781	0.798
Grenada	0.771	0.773	0.779	0.784	0.782	0.791
Dominican Republic	0.704	0.721	0.737	0.77	0.767	0.776
Guyana	0.632	0.659	0.678	0.696	0.722	0.776
Cuba	0.788	0.781	0.77	0.767	0.762	0.762
Dominica	0.745	0.745	0.748	0.735	0.753	0.761
Saint Lucia	0.749	0.755	0.746	0.757	0.734	0.748
Suriname	0.701	0.708	0.715	0.715	0.714	0.722
Belize	0.724	0.725	0.721	0.722	0.713	0.721
Jamaica	0.711	0.711	0.712	0.715	0.711	0.720
Haiti	0.528	0.536	0.549	0.559	0.555	0.554
Average Caribbean	0.736	0.742	0.749	0.756	0.754	0.766

HDI LEVEL: **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH**

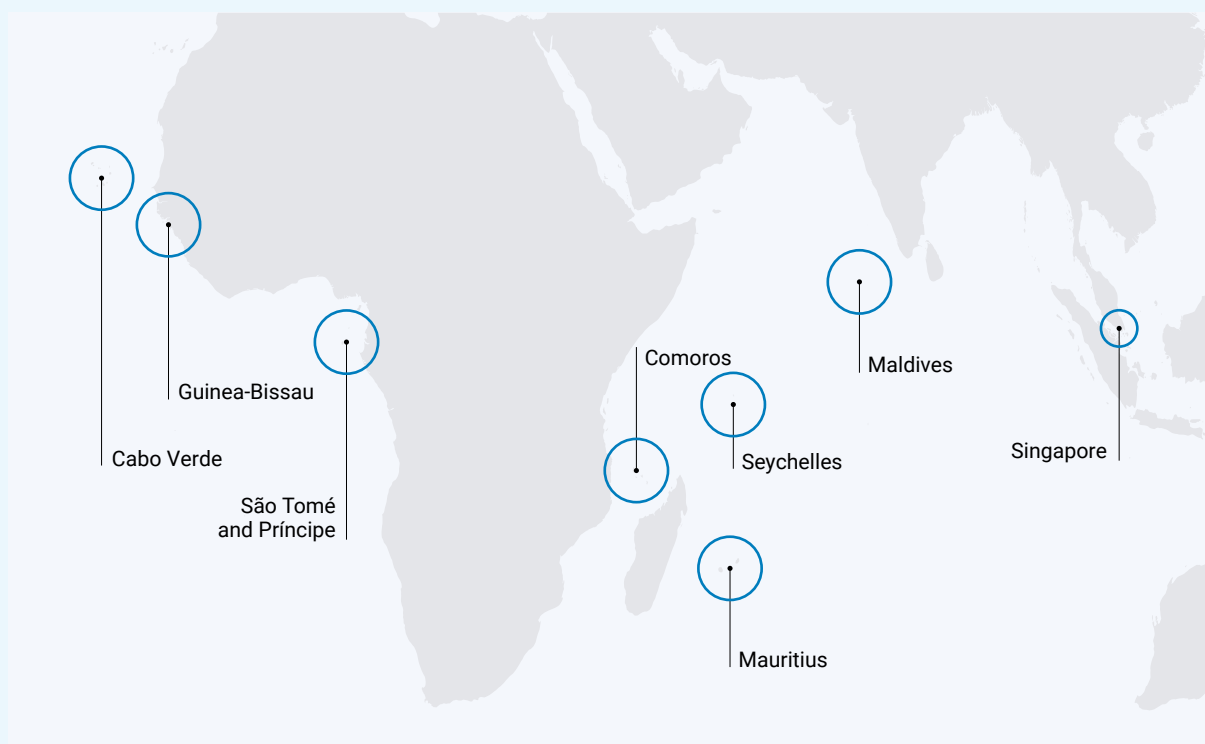
Caribbean SIDS are organised into several political organisations and federations, including the Caribbean Community (CARICOM) and the Organisation of Eastern Caribbean States (OECS).¹¹ CARICOM and OECS hold formal governance roles and implement key resource management policies, such as the Caribbean Community Agricultural Policy, which promotes food security through diversified, climate-resilient agricultural practices.¹² CARICOM also hosts the Caribbean Disaster Emergency Management Agency (CDEMA) and the Caribbean Institute for Meteorology and Hydrology (CIMH).¹³ The Partnership Initiative on Sustainable Land Management (PISLM) supports the Caribbean SIDS in their engagement with UNCCD processes.¹⁴

TABLE 1 Overview of SIDS in the Caribbean Region including land area,¹⁵ lithology,¹⁶ population size¹⁷ and income status.¹⁸

GREATER ANTILLES AND THE BAHAMAS		
	The Bahamas¹⁹	10,010 km ² , 700 islands and 2,400 cays Population: 403 000 across 30 islands High Income Country
	Cuba	103,800 km ² , continental island Population: 10.937 million Upper-Middle Income Country
	Dominican Republic	48,198 km ² , part of a continental island Population: 11.52 million Upper-Middle Income Country
	Haiti	27,760 km ² , part of a continental island Population: 11.906 million Lower-Middle Income Country / Least Developed Country
	Jamaica	10,830 km ² , continental island Population: 2.837 million Upper-Middle Income Country
LESSER ANTILLES		
	Antigua and Barbuda	440 km ² , volcanic (Antigua) and limestone (Barbuda) island Population: 94 000 High Income Country
	Barbados	430 km ² , limestone accretionary island Population: 283 000 High Income Country
	Dominica	750 km ² , volcanic island Population: 66 000 Upper-Middle Income Country
	Grenada	340 km ² , volcanic island Population: 117 000 Upper-Middle Income Country
	Saint Kitts and Nevis	260 km ² , 2 volcanic islands Population: 47 000 High Income Country
	Saint Lucia	610 km ² , volcanic island Population: 180 000 Upper-Middle Income Country
	St. Vincent and the Grenadines^{20 21}	390 km ² , 35 volcanic islands Population: 100 000 across 9 inhabited islands (91% on St. Vincent) ²² Upper-Middle Income Country
	Trinidad and Tobago²³	5,130 km ² , continental (Trinidad) and volcanic island (Tobago) Population: 1.511 million with 96% living on Trinidad ²⁴ High Income Country
CONTINENTAL LATIN AMERICA		
	Belize	22,810 km ² in Central America Population: 423 000 Upper-Middle Income Country
	Guyana	211,140 km ² in South America Population: 836 000 High Income Country
	Suriname	160,508 km ² in South America Population: 640 000 Upper-Middle Income Country

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

FIGURE 3 Map of the Small Island Developing States of the Atlantic, Indian Ocean and South China Sea Region



The Atlantic, Indian Ocean, and South China Sea (AIS) region consists of 8 small islands (Table 2) with around 11.7 million people²⁵ — ranging from 133,000 people in the Seychelles to almost 6 million in Singapore. The largest country is Guinea Bissau with 28,120 km², while the smallest, the Maldives, only has 298 km² of land scattered over 26 atolls (1,192 islands).

A defining characteristic of the AIS region is its significant geographic dispersion and economic stratification compared to the Caribbean and Pacific SIDS. The region contains both some of the world's poorest countries and one of the wealthiest, Singapore with a per capita income roughly 28 times higher than that of the African SIDS.²⁶ This disparity is also visible in human development levels as Singapore ranks 13th globally, while Guinea-Bissau, also a least developed country, ranks 174th globally with 'low' human development (Figure 4).

FIGURE 4 Human Development Index in AIS SIDS based on UNDP data²⁷

Country	2008	2011	2014	2017	2020	2023
Singapore	0.924	0.933	0.934	0.935	0.944	0.946
Seychelles		0.772	0.814	0.844	0.853	0.848
Mauritius	0.742	0.762	0.79	0.799	0.795	0.806
Maldives	0.681	0.698	0.718	0.739	0.73	0.766
Cabo Verde	0.643	0.654	0.659	0.663	0.647	0.668
Sao Tome and Principe	0.557	0.569	0.596	0.617	0.628	0.637
Comoros	0.519	0.541	0.56	0.577	0.592	0.603
Guinea-Bissau	0.436	0.46	0.476	0.491	0.498	0.514
AIS Average	0.659	0.674	0.693	0.708	0.711	0.724

HDI LEVEL: **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH**

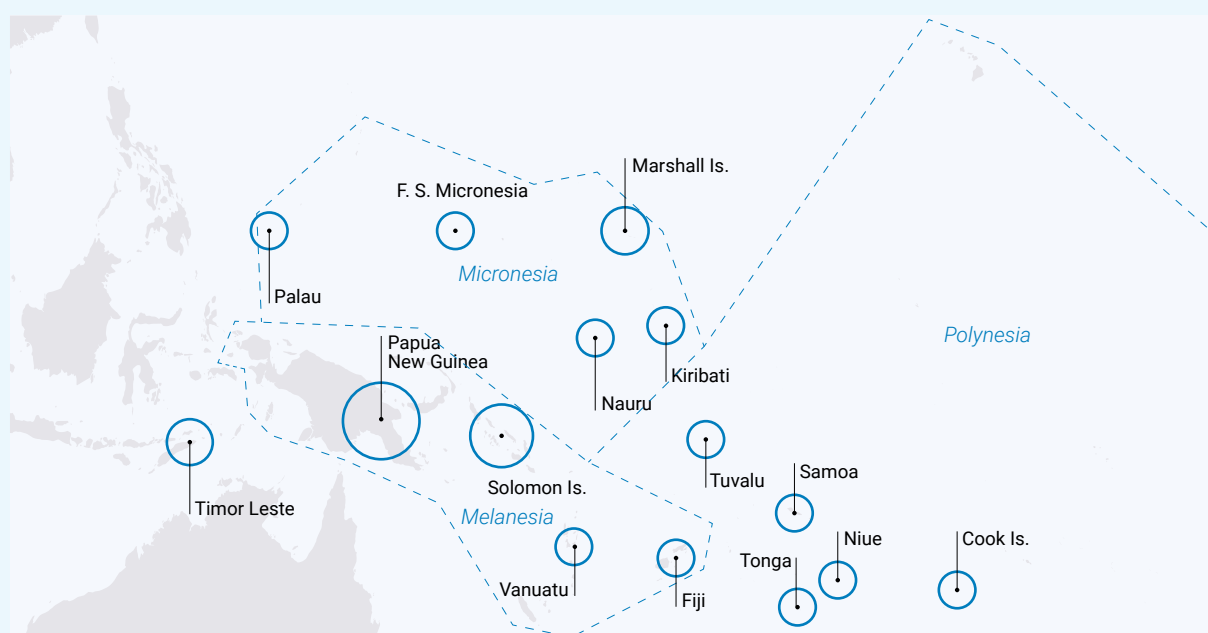
TABLE 2 Overview of SIDS in the AIS Region including land area,²⁸ lithology,²⁹ population size³⁰ and income status.³¹

ATLANTIC OCEAN		
	Cabo Verde	4,030 km ² , 10 volcanic islands Population: 527 000 across 9 inhabited islands ³² Upper-Middle Income Country
	Guinea-Bissau	28,120 km ² in Western Africa, continental and 90 islands and islets ³³ Population: 2.25 million Least Developed Country
	São Tomé and Príncipe	960 km ² , 2 volcanic islands Population: 240 000 Lower-Middle Income Country
INDIAN OCEAN		
	Comoros	1861 km ² , 3 volcanic islands Population: 883 000, about half on the island of Grande Comore ³⁴ Lower-Middle Income Country / Least Developed Country
	Maldives	298 km ² , 26 atolls (1,192 islands) ³⁵ Population: 530 000 across 200 inhabited islands ³⁶ Upper-Middle Income Country
	Mauritius	1,997 km ² , 2 volcanic islands Population: 1.268 million Upper-Middle Income Country
	Seychelles	460 km ² , 41 granite (continental fragment) and 74 coral islands ³⁷ Population: 133 000 High Income Country
SOUTH CHINA SEA		
	Singapore	718 km ² , continental fragment island Population: 5.871 million High Income Country

Unlike the other SIDS regions, there is no pan-regional organisation for the AIS region. However, the Indian Ocean Commission (IOC) comprises three SIDS (the Seychelles, Comoros and Mauritius), as well as Madagascar and France (on behalf of Réunion). The IOC aims to reduce the vulnerability of SIDS to climate change, and to promote sustainable development, by mobilising resources and strengthening capacities.³⁸ The SIDS Youth AIMS Hub (SYAH) is a youth-led non-governmental organisation that focuses on advancing and implementing youth-led development initiatives in states in the Atlantic and Indian Oceans, Mediterranean and South China Seas.³⁹

The Pacific Region

FIGURE 5 Map of the Small Island Developing States of the Pacific Region



The Pacific region consists of 15 SIDS, which are often divided into three sub-regions: Melanesia, Micronesia and Polynesia.⁴⁰ Collectively, the Pacific SIDS and associate members have a population of around 15.8 million⁴¹ with Papua New Guinea hosting more than two-thirds of the total population (around 10.8 million),⁴² while Niue has the smallest population with just 2,000 inhabitants (Table 3). While the Pacific SIDS together make up less than 2% of the global landmass – with the largest country Papua New Guinea having 452,860 km² of land and the smallest Nauru having only 20 km² – they have a massive ocean area of around 32 million km² with over 7,500 volcanic islands and atolls.⁴³ The Melanesian sub-region generally has larger land areas and populations with a higher ethnic-cultural diversity. In contrast, the Polynesian sub-regions have smaller landmasses and smaller, more homogenous populations. Countries in the Micronesian sub-region are very small, geographically scattered and particularly low lying with limited natural resources.⁴⁴ Most Pacific SIDS have medium to high levels of human development (Figure 6).

The Secretariat of the Pacific Community (SPC) supports sustainable development in the Pacific by conducting applied research, building capacity, and providing data services.⁴⁵ Similarly, the Secretariat of the Pacific Regional Environment Programme (SPREP) promotes regional cooperation, provides guidance on protecting and managing the environment and natural resources, and assists Pacific SIDS with climate change,

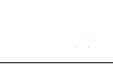
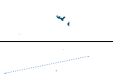
waste and pollution issues.⁴⁶ Both organisations are supported by external members from Australia, New Zealand, the United States and France. Another regional organisation, the Pacific Islands Forum Secretariat (PIFS), seeks to enhance cooperation and collaboration to ensure “*peace, harmony, security, social inclusion and prosperity*”.⁴⁷

FIGURE 6 Human Development Index in Pacific SIDS based on UNDP data

Country	2008	2011	2014	2017	2020	2023
Palau	0.773	0.784	0.795	0.804	0.799	0.786
Tonga	0.717	0.731	0.74	0.755	0.765	0.769
Marshall Islands		0.666	0.681	0.702	0.722	0.733
Fiji	0.69	0.701	0.712	0.725	0.718	0.731
Samoa	0.702	0.711	0.706	0.712	0.708	0.708
Nauru	0.614	0.624	0.655	0.67	0.684	0.703
Tuvalu	0.636	0.641	0.65	0.668	0.681	0.689
Kiribati	0.596	0.603	0.615	0.63	0.632	0.644
Timor-Leste	0.634	0.655	0.637	0.621	0.65	0.634
Vanuatu	0.578	0.587	0.597	0.607	0.617	0.621
Micronesia (F. S.)	0.6	0.605	0.602	0.607	0.609	0.615
Solomon Islands	0.556	0.567	0.575	0.581	0.579	0.584
Papua New Guinea	0.489	0.508	0.534	0.555	0.567	0.576
Average Pacific	0.583	0.645	0.654	0.664	0.672	0.676

HDI LEVEL: **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH**

TABLE 3 Overview of SIDS in the Pacific Region including land area,⁴⁸ lithology,⁴⁹ population size⁵⁰ and income status.⁵¹

MELANESIA AND TIMOR-LESTE		
	Fiji ⁵²	18,270 km ² , more than 330 composite and volcanic islands Population: 933 000 across 110 inhabited islands (87% on 2 main islands) Upper-Middle Income Country
	Papua New Guinea	452,860 km ² , part of a continental island, ~600 composite and volcanic islands ⁵³ Population: 10.763 million Lower-Middle Income Country
	Solomon Islands ⁵⁴	27,990 km ² , 6 major and 992 minor mostly composite and volcanic islands Population: 839 000 people on 147 inhabited islands (across 460 000 km ² of ocean) Lower-Middle Income Country / Least Developed Country
	Timor-Leste	14,870 km ² , part of a composite island Population: 1.419 million Lower-Middle Income Country / Least Developed Country
	Vanuatu ⁵⁵	12,190 km ² , 83 composite and volcanic islands Population: 335 000 on 65 inhabited islands Lower-Middle Income Country
MICRONESIA		
	Federated States of Micronesia ⁵⁶	700 km ² , 607 mostly volcanic islands Population: 114 000 on 74 inhabited islands (across ~2.5 million km ² of ocean) Lower-Middle Income Country
	Kiribati ⁵⁷	810 km ² , 32 atolls and 1 raised limestone island Population: 136 000 on 20 inhabited islands ⁵⁸ (across 3.5 million km ² of ocean) Lower-Middle Income Country / Least Developed Country
	Marshall Islands ⁵⁹	180 km ² , 29 atolls (1,225 islands) and 5 volcanic islands Population: 36 000 on 24 inhabited atolls and islands (1.9 million km ² of ocean) ⁶⁰ Upper-Middle Income Country
	Nauru	20 km ² , limestone island Population: 12 000 High Income Country
	Palau	460 km ² , 340 coral and volcanic islands ⁶¹ Population: 18 000 (70% on main island Koror) ⁶² High Income Country
POLYNESIA		
	Cook Islands ⁶³	240 km ² , 15 composite islands Population: 13 000, 72% on Rarotonga Island ⁶⁴ (over 2.2 million km ² of ocean) High Income Country
	Niue	260 km ² , limestone island Population: 2000 Lower-Middle Income Country
	Samoa ⁶⁵	2,780 km ² , 2 major and 7 minor volcanic islands Population: 219 000 on 4 inhabited islands Upper-Middle Income Country
	Tonga ⁶⁶	720 km ² , ~170 mostly limestone and volcanic islands Population: 104 000 on 36 inhabited islands Upper-Middle Income Country
	Tuvalu	30 km ² , 9 reef atolls ⁶⁷ Population: 9000 Upper-Middle Income Country / Least Developed Country

Land, Water and Livelihood Resilience

SIDS are characterised by small landmasses, remoteness, closely linked ecosystems, oceans, people, and cultures,⁶⁸ and a high susceptibility to natural disasters.⁶⁹ Their economies are often highly dependent on natural resources and functional terrestrial and aquatic ecosystems, making them sensitive to unsustainable resource management and climate change.^{70 71} Increasing demand for land, coupled with poor management, has led to land degradation and drought, considered to be major drivers of slow-onset environmental crises.⁷²

SIDS have considerable natural assets and abundant indigenous knowledge. They also have a young population and the potential for agile governance and innovation. These factors can drive sustainable development and ensure that the land and natural resources are managed in a sustainable, productive and equitable manner.^{73 74} Due to their unique characteristics and the close interdependence between nature and people, SIDS are well-placed to incubate scalable, ecosystem-based approaches.

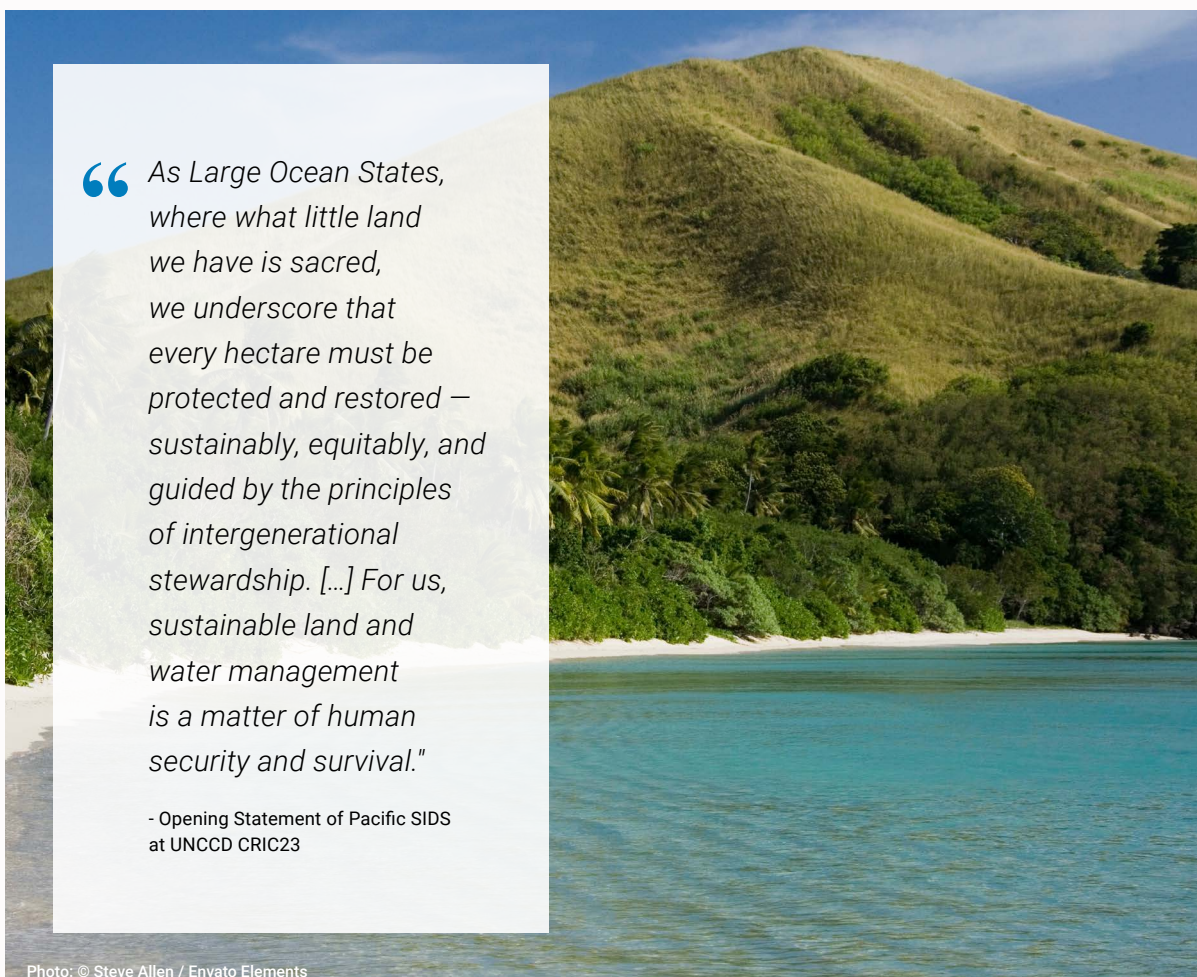
They offer valuable opportunities to advance holistic, sustainable land and water management, and develop integrated environmental governance systems from reef to ridge. By doing so, they can contribute to global efforts to address the triple crisis of land degradation, biodiversity loss, and climate change.⁷⁵

SIDS have already received significant attention through the UNFCCC and CBD frameworks. Land degradation and drought are increasingly important issues on the SIDS development agenda. This has resulted in calls for strategic investments in land restoration, water management, and integrated spatial planning approaches, in order to build island resilience and adapt to future existential challenges. At the sixteenth session of the Conference of the Parties (COP16) of the United Nations Convention to Combat Desertification (UNCCD), SIDS were recognised as requiring special attention to integrate sustainable land management (SLM) practices into climate and resilience planning, to better respond to desertification, land degradation and drought (DLDD) (Decision 2/COP16).

“ As Large Ocean States, where what little land we have is sacred, we underscore that every hectare must be protected and restored – sustainably, equitably, and guided by the principles of intergenerational stewardship. [...] For us, sustainable land and water management is a matter of human security and survival.”

- Opening Statement of Pacific SIDS at UNCCD CRIC23

Photo: © Steve Allen / Envato Elements



Global Land Outlook Small Island Developing States Thematic Report

This report examines the unique role of land for people and island economies, the mounting pressures on these limited natural resources, and the main obstacles to sustainable land management and restoration in SIDS. It highlights good practices and identifies transformative levers to support integrated approaches to island resilience and human security.

Chapter 2 introduces the unique land and water resources of SIDS, emphasising how these remote and limited landmasses support rich biodiversity in the form of forests, mangroves, wetlands and freshwater systems that are closely linked to coastal and ocean environments. This chapter highlights the vital role these natural assets play in sustaining livelihoods, underpinning island economies and preserving cultural heritage and traditional knowledge.

Chapter 3 outlines the reinforcing environmental and socio-economic pressures facing SIDS, highlighting how rising demand and competition for scarce land and freshwater intersect with the challenge of ensuring food security on limited landmasses. The chapter examines the growing threats of land and ecosystem degradation, drought, sand and dust storms, climate change, pollution, biodiversity loss and invasive species, all of which compound vulnerabilities and place unprecedented strain on island environments and communities.



Photo: © Envato Elements

Chapter 4 highlights the key barriers to sustainable land management and restoration in SIDS. These include fragmented land governance systems, the erosion of traditional knowledge and limited human capacity to design and implement effective interventions. The chapter also examines the complex dynamics that lead to a chronic shortage of financial resources for sustainable development, as well as the challenges posed by unsuitable or insufficient data for informed planning. These obstacles collectively constrain SIDS' ability to advance transformative and resilient land and water management solutions.

Chapter 5 introduces transformative levers that can help SIDS overcome existing barriers and advance sustainable land and water management. It highlights pathways to regenerate degraded land, optimise the use of natural resources and strengthen governance and integrated land use planning. It also explores how technology transfer and digitalisation can enhance self-sufficiency and equitable outcomes, and how partnerships, advocacy and improved resource mobilisation can increase the scale of action. The chapter also emphasises the importance of creating synergies, such as aligning work across multilateral environmental agreements, to maximise impact and free up resources.

Chapter 6 summarises the key findings of the report, highlighting what the seven transformative levers collectively mean for the future of SIDS. It synthesises the core insights that emerge when these levers are considered together, emphasising the systemic changes needed for resilient, nature-positive development.

Land: A Precious Resource for SIDS



Photo: © Envato Elements

Land and natural resources play a central role in sustaining healthy ecosystems, vibrant cultures and resilient island economies. The limited landmasses of Small Island Developing States (SIDS) make land a highly valuable resource, supporting rich biodiversity in their vegetation, forests, mangroves, wetlands, and freshwater ecosystems. These terrestrial systems are deeply interconnected with the health of surrounding coastal and marine ecosystems. This chapter highlights the unique land resources of SIDS and their essential contribution to island economies and cultural heritage.

The Importance of Ocean and Marine Resources

While this report focuses on land and terrestrial natural resources, it is important to briefly highlight the extraordinary scale of SIDS' ocean resources, particularly in contrast to their limited land areas. When the ocean space encompassed by their Exclusive Economic Zones (EEZs) is taken into account, SIDS collectively control around 21 million km². Their combined land-and-ocean area — representing roughly 8.7% of the global total — is therefore second in size only to the largest individual country, Russia. Pacific SIDS hold the majority of this area (71%), followed by AIS SIDS (22%) and Caribbean SIDS (7%), whose more compact geography restricts the extent of their EEZs.⁷⁶ Many SIDS identify as “large ocean states”, jointly stewarding around 30% of the world's oceans. The scale of these maritime areas is striking: the small island of Saint Lucia (620 km²) manages a marine reserve comparable in size to Germany; the combined EEZs of Seychelles and Mauritius exceed the size of India, despite their land areas being only 460 km² and 2,010 km² respectively. Tuvalu's EEZ is 27,000 times larger than its 30 km² landmass. Overall, only 4.1% of the total area of SIDS is land, while 95.9% is ocean.⁷⁷

Land and Water Resources

Although individual SIDS are often characterised by small landmasses and populations, together they cover approximately 117,901 km² – which would place them 53rd in the world if considered a single country. Pacific SIDS account for 67% of this combined land area, followed by the Caribbean (25%) and the AIS region (8%). The amount of arable land within SIDS is considerably smaller (Figure 7), especially compared to other developing nations, LLDCs, or LDCs.⁷⁸

Water resources vary significantly across SIDS, depending on their geography and climate. Several SIDS experience high rainfall, contain extensive aquifers, and have relatively abundant surface water.⁷⁹ Although SIDS

have relatively small land masses, they are renowned for their unique natural resources and landscapes. These are characterised by their geology and soils, vegetation, biodiversity and freshwater systems.

Lithology and Soils

The ecological and hydrological characteristics of SIDS differ depending on their lithological origin (volcanic, limestone, reef or composite), as well as their size and elevation.⁸⁰ The soil and water resources in SIDS are influenced by the size and origin of the islands. Volcanic islands tend to have fertile soils, with good water-holding capacity and mineral content resulting from the weathering of volcanic rocks.⁸¹ In contrast, coral and limestone islands tend to have sandy, nutrient-poor soils and small aquifers (Figure 8).⁸²

FIGURE 7 Available landmass compared to the size of exclusive economic zones (EEZ) and agricultural land (see Annex 2)

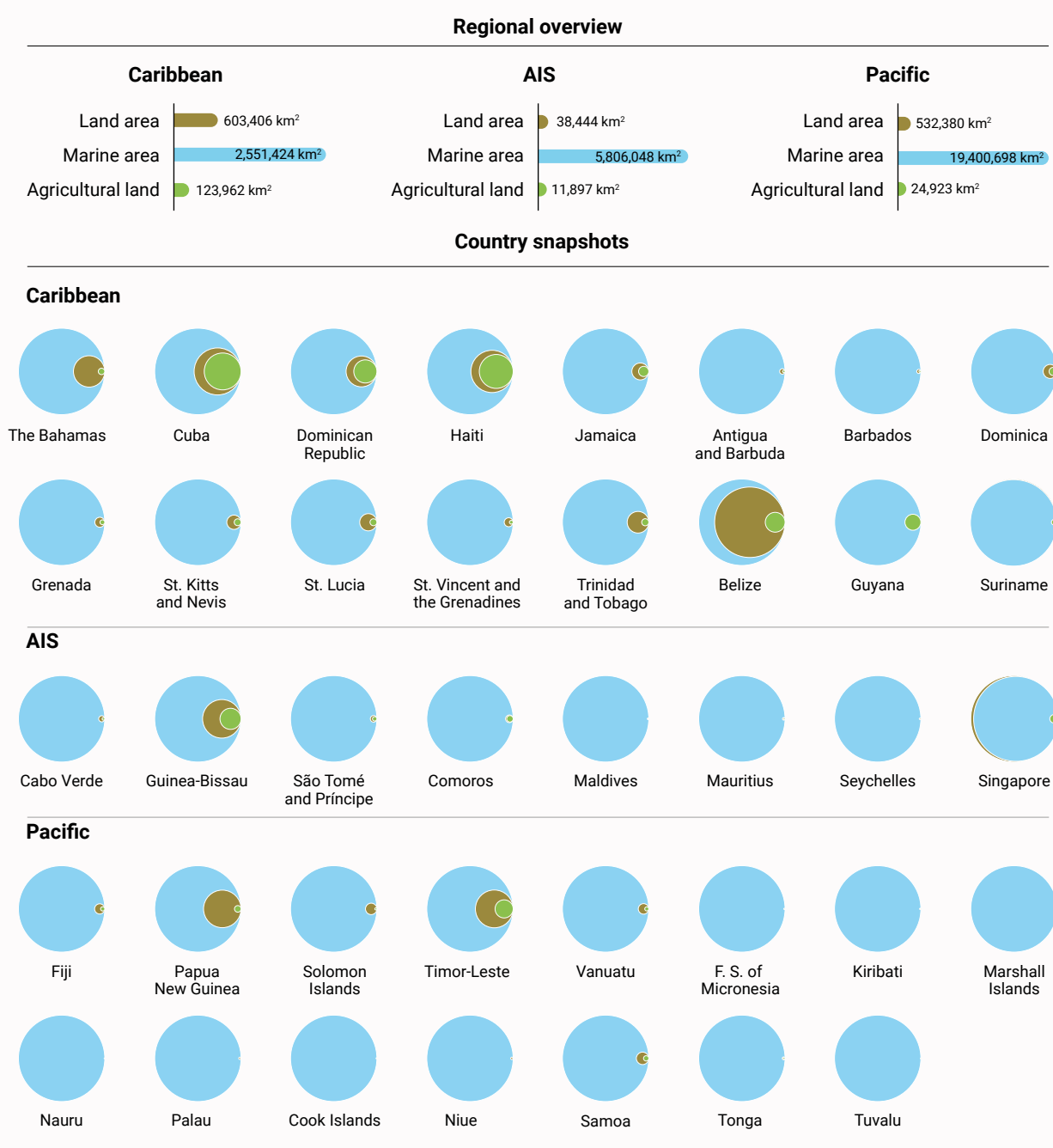
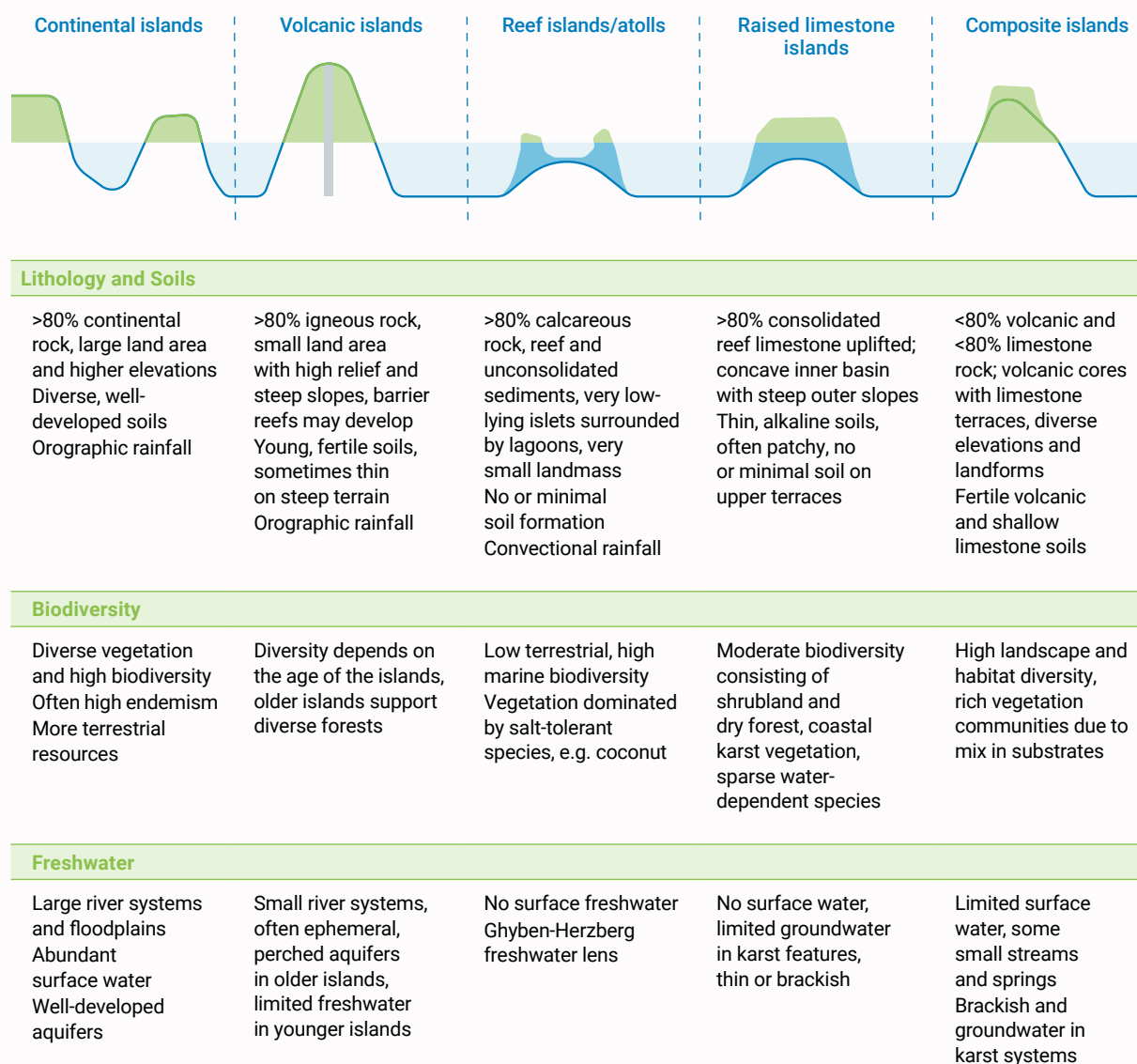


FIGURE 8 Lithological Origins of SIDS (adapted from Mycoo et al. 2022 and Nurse et al. 2014)



Vegetation

In line with their diverse climates (Tables 4 to 6), SIDS exhibit a wide range of vegetation types – from rainforests, dry forests, woodlands and mangroves to arid shrublands, savannas and coastal plains. In 2021, eight of the twelve countries with the highest levels of forest cover were SIDS, home to globally significant forest biomes.⁸³ These forests provide essential ecosystem services, including soil and water protection, carbon storage and tourism value, and support the majority of terrestrial biodiversity. Often situated in areas that are not suitable for agriculture, these forests are crucial for local livelihoods and island ecosystems, providing clean drinking water in many SIDS.⁸⁴ Trees outside of forests, such as in traditional agroforestry systems, also deliver crucial ecosystem services.⁸⁵

Coconut trees, for instance, provide food, oil and timber for local communities,⁸⁶ while other important tree crops such as banana, breadfruit and pandanus are dietary staples.⁸⁷

Many SIDS support rare and globally threatened mangrove ecosystems.⁸⁸ These critical habitats connect land, freshwater and the ocean, and often host exceptional biodiversity which underpins the livelihoods of coastal communities.⁸⁹ Mangroves play a vital role in supporting fisheries and tourism by filtering nutrients and sediments, and protecting coastlines from erosion,⁹⁰ high tides and storm surges.⁹² Their complex physical structure creates habitats for numerous terrestrial and aquatic species, enhancing both biodiversity and ecological complexity.⁹³

Biodiversity

Some of the most concentrated biodiversity hotspots on Earth are found on small, isolated islands, which are characterised by high levels of endemic terrestrial flora and fauna.^{94 95} Despite covering less than 0.5 per cent of the world's total surface area, SIDS are home to over 20 per cent of the world's biodiversity,⁹⁶ with 9.5 times more endemic species richness than mainland areas.⁹⁷ Biodiversity plays a vital role in supporting island cultures and economies, including sectors such as tourism, fisheries, agriculture and forestry. However, 50 per cent of 'threatened' biodiversity globally occurs on islands.⁹⁸

Freshwater Ecosystems

The availability of water resources varies significantly across SIDS, depending on their geography and climate.⁹⁹ Groundwater resources are particularly important and can be characterised by two main types of aquifers: perched aquifers and freshwater lenses. Perched aquifers typically form above horizontal confining layers with low permeability or within compartments created by vertical volcanic dikes. By contrast, freshwater lenses develop where freshwater floats above denser seawater that saturates the deeper parts of islands, with a thin transition zone separating the two. These lenses are usually thickest at the centre of an island and become progressively thinner towards the coast. The presence of these lenses depends on a delicate balance between water inputs, such as rainfall, seepage from lakes and rivers, or irrigation return flows, and water extraction or natural discharge into the ocean.¹⁰⁰

SIDS also contain extensive wetlands, which play a vital role in stabilising sediments, regulating water flows and protecting coastlines from erosion by absorbing wave energy and mitigating the impact of storm surges. These wetlands sequester carbon in soils and biomass, and provide crucial habitats and nursery grounds for fish and other aquatic species. They are critical socio-ecological systems that underpin livelihoods, food security, climate resilience and cultural continuity.¹⁰¹



Photo: © Envato Elements

Regional Spotlight on Land and Water Resources

The Caribbean Region

Geology, Soils and Rainfall

The Greater Antilles are continental fragments believed to be remnants of land uplifted in the Pacific more than 200 million years ago.¹⁰² These fragments later collided with those from South America, creating distinctive bedrock and landforms. By contrast, the Lesser Antilles are geologically much younger and represent the active remnants of an ancient volcanic chain.¹⁰³

The soils in Caribbean SIDS are primarily shaped by geomorphological processes and climate. The tropical maritime climate promotes leaching and the transformation of mineral substances, often resulting in highly acidic soils.¹⁰⁴ Additionally, ancient marine sediments and shallow groundwater reserves in poorly drained areas with alluvial deposits lead to the formation of marshy (Gleysols) and saline (Solonchaks) soils. The Caribbean region comprises both volcanic islands, which tend to be mountainous, and low-lying, flat islands that are largely composed of limestone and are often surrounded by coral reefs. The landscapes of the Greater Antilles, which are located between the Caribbean Sea and the Atlantic Ocean, range from the low-lying Bahamian archipelago (64 m), which is characterised by coral, aeolian sands and limestone, to Jamaica, which has peaks exceeding 2,000 m.¹⁰⁵ The continental SIDS of Guyana and Suriname have more varied geological origins and climatic conditions, which contribute to a broader diversity of soil types.¹⁰⁶

The volcanic islands of the Lesser Antilles produce significant orographic effects, resulting in extremely wet windward slopes that receive over 7,000 mm of rainfall per year. In contrast, the leeward sides are much drier, with an annual rainfall of around 1,000–1,200 mm. Lower-lying calcareous islands receive a more modest 900–1,200 mm per year, although this rainfall is often unreliable and highly variable. Most Caribbean islands experience a unimodal rainfall regime with clearly defined wet and dry seasons. Belize follows a similar pattern, but receives substantially more rainfall overall, ranging from 1,750 to 3,750 mm per year. Guyana is the exception in the region, exhibiting a bimodal rainfall pattern with two wet seasons each year and total annual rainfall of 2,000–2,500 mm.¹⁰⁷

Vegetation

The flora in Caribbean SIDS is highly diverse, ranging from dry forests in the lowlands to montane evergreen forests in more humid regions. Suriname and Guyana have some of the highest levels of forest cover in the world (Table 4). In warm, humid regions, tropical or subtropical moist broadleaf forests developed on deep, highly weathered soils. Often referred to as rainforests or jungles, these forests support exceptionally high biodiversity. Tropical and subtropical dry broadleaf forests, many of which are found in mountainous regions, are home to around 79% of Central America's population, reflecting a historical tendency to settle in drier rather than wetter areas. These dry forests provide important resources such as fodder, ornamental plants and fruit that are valuable to local communities. However, due to extensive land degradation, some areas that were once covered by these forests have been converted into savannahs and grasslands. Additionally, tropical and subtropical coniferous forests, characterised by dense stands and thick undergrowth, are present in parts of the region. In drier zones, succulents and thorny shrubs are prevalent, particularly in rain shadows formed by mountains or in more arid island environments. Xeric shrublands and cacti are widespread in favourable environments in Cuba and the Lesser Antilles. Some of the lowest-lying areas are characterised by swamps and marshlands, including extensive mangrove systems.¹⁰⁸ The Neotropical Caribbean region is a global hotspot for mangroves,¹⁰⁹ which support marine and coastal tourism, provide vital coastal protection, and supply a variety of goods and services for local communities and commercial enterprises.¹¹⁰

Biodiversity

The Caribbean Islands are a recognised biodiversity hotspot, supporting a remarkable range of terrestrial ecosystems and exceptionally high levels of endemism. Of the region's approximately 11,000 plant species, 72% are endemic, while 100% of amphibians (189 species), 95% of reptiles (520 species), 26% of birds (564 species), and 74% of mammals (69 species, the majority of which are bats) are unique to the region. Endemic plants and vertebrates represent 2.6% and 3.5% of global plant and vertebrate species, respectively.¹¹¹ Only around 11.3% of the region's original natural habitat remains intact, and the Caribbean has the highest number of threatened species globally, with 703 species classified as such.¹¹²

Freshwater Ecosystems

Large lowland rivers, lakes, montane rivers and streams, wetlands, and underground karst networks provide important habitats for aquatic biodiversity and play a vital role in supplying clean water, food, and other essential ecosystem services to local communities.¹¹³

The Caribbean region contains several Ramsar sites, which are designated wetlands of international importance. These sites are located in Antigua and Barbuda (1), the Bahamas (1), Barbados (1), Belize (2), Cuba (6), the Dominican Republic (6), Grenada (1), Jamaica (4), Saint Lucia (2), Suriname (1), and Trinidad and Tobago (3).¹¹⁴

TABLE 4 The lithology, soils, climate, vegetation, biodiversity and freshwater resources of Caribbean SIDS

	Lithology	Dominant Soil Types	Climate ^{115 116}	Vegetation	Biodiversity ¹¹⁷ <i>*Country Ranking: Nr. of Endemic Species</i>	Freshwater
GREATER ANTILLES AND THE BAHAMAS						
Bahamas ^{118 119 120}	Archipelago, limestone	Sandy, thin soils, some loamy, organic and lateritic soils	Tropical Savanna, avg. 1,030 mm/a	Pine Forest (north), ¹²¹ mixed coppice and scrub lands (south), mangroves ¹²²	Caribbean Island Hotspot, ^{123 124} 50 KBAs, 68 th *	Freshwater lenses, inland ponds, and wetlands
Cuba	Central island and several minor archipelagos, complex and diverse geology ¹²⁵	Varied soils	Tropical savannah avg. rainfall 1335 mm/a	Mostly dry broadleaf forest, ¹²⁶ pine forest, ¹²⁷ xeric shrublands, ¹²⁸ moist forest ¹²⁹	Caribbean Island Hotspot, ^{130 131} 42 KBAs, 163 rd *	Aquifers, short rivers, lagoons, reservoirs, wetlands ¹³²
Dominican Republic	80% mountainous, mostly volcanic and sedimentary ¹³³	Diverse, from alluvial plains to rocky, clayey, and volcanic soils ¹³⁴	27 different climatic zones (semi-arid to tropical), ¹³⁵ 760 - 2500 mm/a ¹³⁶	Moist ¹³⁷ , dry ¹³⁸ and pine ¹³⁹ forests, mangroves	Caribbean Island Hotspot, ^{140 141} 34 KBAs, 116 th *	Rivers and lakes, wetlands, ¹⁴² limestone aquifers ¹⁴³
Haiti ^{144 145}	75% mountainous, mostly volcanic rock or limestone	Shallow and sandy soils	Tropical to semi-arid, bi-modal rainfall 300 – 3000 mm/a	Humid forests, dry forests, and mountain forests, mangroves	Caribbean Island Hotspot, ¹⁴⁶ 39 KBAs, 35 th *	Rivers, lakes, deltas, estuaries, lagoons, inland wetlands
Jamaica	Hill lands and plains, limestone and volcanic ¹⁴⁷	300 local soil types: shallow to moderately deep or deep, red to brown, alluvial and calcareous ¹⁴⁸	Tropical, avg. rainfall 2,051 mm/a	Moist ¹⁴⁹ and dry ¹⁵⁰ forest, mangroves	Caribbean Island Hotspot, ^{151 152} 35 KBAs, 163 rd *	Rivers, springs, limestone (50%), alluvium (6%) and coastal (0.35%) aquifers and aquicludes, wetlands ¹⁵³
LESSER ANTILLES						
Antigua and Barbuda	Volcanic and limestone, with central clay plains (Antigua) and limestone (Barbuda) ¹⁵⁴	Clay looms (volcanic), heavy clay, well-drained soils (plains), calcareous (limestone) ¹⁵⁵	Tropical maritime, avg. rainfall 1,030 mm/a ¹⁵⁶	Caribbean shrublands, Lesser Antillean dry forest, Leeward Islands moist forest ¹⁵⁷	Caribbean Island Hotspot, ^{158 159} 11 KBAs, 123 rd *	Intermittent rivers, reservoirs, desalination plants, freshwater lenses, wetlands ¹⁶⁰
Barbados	Limestone and sedimentary deposits of the Scotland Series ¹⁶¹	Siliceous and coral based sand ¹⁶²	Tropical maritime: from sub-humid / humid to semi-arid 100 – 2000 mm/a ¹⁶³	Caribbean shrublands	Caribbean Island Hotspot, ^{164 165} 15 KBAs, 137 th *	Dry rivers for surface drainage, aquifer serviced by natural underground streams ¹⁶⁶
Dominica ^{167 168}	Volcanic, very rugged and steep	Fertile but unconsolidated and friable ¹⁶⁹	Humid tropical marine, strong steady trade winds, 3500 – 8000 mm/a ¹⁷⁰	Sub-montane rainforest, littoral and Elfin woodland, semi-deciduous forest, mature rainforest, montane forest, scrub woodland and savannah	Caribbean Island Hotspot, ¹⁷¹ 6 KBAs, 52 nd *	Abundant rivers, streams, and lakes ¹⁷²

Grenada ¹⁷³	Volcanic / limestone	Very deep, moderately well drained soils that formed in thick loess ¹⁷⁴	Hot, tropical climate, avg. rainfall 2,350 mm/a	58% forests (dry scrub woodland, rainforest and montane thicket), mangroves	Caribbean Island Hotspot, ^{175 176} 9 KBAs, 79 th *	Small streams, larger lakes, crater lakes, ponds, geothermal springs, coastal aquifers ¹⁷⁷
Saint Kitts and Nevis ¹⁷⁸	Volcanic	Mostly sandy loam in St. Kitts, clayey in Nevis ¹⁷⁹	Tropical marine, avg. rainfall 1,427 mm/a	Rainforest (highlands), dry land grasses, low shrubs, cacti and yucca (lowlands)	Caribbean Island Hotspot, ^{180 181} 4 KBAs, 137 th *	Small, perennial streams, reservoirs, brackish lake, coastal aquifers ¹⁸²
Saint Lucia	Volcanic ¹⁸³	Very fertile volcanic soils, but topographic constraints ¹⁸⁴	Tropical, avg. rainfall 2,301 mm/a	Cloud montane rainforest, Elfin shrubland, deciduous seasonal forest, littoral evergreen forest / shrub, littoral scrub ¹⁸⁵	Caribbean Island Hotspot, ^{186 187} 6 KBAs, 87 th *	Rivers, wetlands, springs, reservoirs ¹⁸⁸
St. Vincent and the Grenadines ¹⁸⁹	Volcanic	Young, coarse, free-draining sandy soils, fertile, well-drained soils above 600 ft., fertile alluvial deposits on valley floors	Tropical, avg. rainfall 1,104 mm/a, from 3,800 mm (interior) to 460 mm in the Grenadines	Rainforest (primary and secondary), cloud forest, dry scrub, littoral woodland and swamp / mangroves	Caribbean Island Hotspot, ¹⁹⁰ 17 KBAs, 87 th *	Rivers and streams (St. Vincent), rainwater harvesting and desalination (the Grenadines) ¹⁹¹
Trinidad and Tobago	Continental (Trinidad) and volcanic (Tobago) ¹⁹²	Highly diverse, most soils are highly erodible fine sands and heavy clays ¹⁹³	Tropical, avg. rainfall 2,200 mm/a	Rainforest, littoral woodland, deciduous seasonal woodland, swamp forests ¹⁹⁴	Caribbean Island Hotspot, ¹⁹⁵ 7 KBAs, 77 th *	Rivers, aquifers, reservoirs ¹⁹⁶
CONTINENTAL LATIN AMERICA						
Belize ¹⁹⁷	Continental	Diverse: alkaline, shallow limestone (north), acidic, nutrient-poor (coastal plains), clayey (upland) ¹⁹⁸	Tropical, avg. rainfall 1,705 mm/a	Primary and secondary rainforests, savannas, mangroves, and wetlands ¹⁹⁹	6 KBAs, 139 th *	Large continental rivers and aquifers ²⁰⁰
Guyana ^{201 202}	Continental	Fertile clay (coastal plains), heavily leached sand/clay (interior) ²⁰³	Tropical, avg. rainfall 2,387 mm/a	Rainforest, montane forest, swamp and marsh, dry evergreen, seasonal forest, mangrove forest ²⁰⁴ 2 nd globally in terms of forest cover (94%)	1 KBAs, 47 th *	Large continental rivers and aquifers, 2 nd highest freshwater availability per capita globally ²⁰⁵
Suriname ²⁰⁶	Continental	Fertile clay (coastal plains), weathered, nutrient-poor (interior) ²⁰⁷	Tropical, avg. rainfall 2,331 mm/a	Rainforests, marsh, swamp and mangrove forest, savannas, inselberg ecosystems, ²⁰⁸ 1 st globally in terms of forest cover (97%) ²⁰⁹	13 KBAs, 80 th *	Large, continental rivers and aquifers, ²¹⁰ 3 rd highest freshwater availability per capita globally ²¹¹

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

Geology, Soils and Rainfall

The AIS SIDS have diverse geological origins (Table 5), reflecting their considerable geographic spread. Many of them, including the Comoros Islands, Mauritius and São Tomé and Príncipe, have volcanic origins. This has resulted in varied landscapes and soils, which are often derived from volcanic rocks and coral limestones which determine soil fertility and land use potential. In contrast, the Maldives consist of low-lying coral atolls with very thin, nutrient-poor soils. The Seychelles are unique in being the world's only mid-oceanic granitic islands,²¹² while Singapore is characterised by three major geological formations and notably diverse geology.²¹³ The climates of the AIS SIDS span the tropical and subtropical zones, with variations in rainfall patterns influenced by monsoon systems. Many have a maritime tropical or humid tropical climate, while Cabo Verde is classified as arid to semi-arid.²¹⁴ São Tomé and Príncipe experiences a range of climates, from extremely humid conditions with over 7,000 mm of annual rainfall to semi-arid zones with only 600–1,000 mm per year.²¹⁵

Vegetation

The flora in AIS SIDS ranges from tropical moist forests on larger or higher islands to shrublands, coastal mangroves, and dune and coral island plant communities on smaller, low-lying islands (Table 5). The granitic islands of the Seychelles, for example, support moist broadleaf forests with unique endemic species such as the coco de mer and the jellyfish tree, the latter of which is considered one of the rarest trees in the world.²¹⁶ This reflects the islands' long isolation and distinctive biogeography. In contrast, many coral atolls, such as those in the Maldives, are dominated by hardy pioneer species, palms and shrubs adapted to living in sandy,

saline and nutrient-poor soils. 'Reef islands' often have specialised coastal vegetation, including mangroves, which provide important shoreline protection.²¹⁷

Biodiversity

AIS SIDS are exceptionally rich in biodiversity, with many falling within four of the world's recognised biodiversity hotspots. Cabo Verde is home to around 7,000 terrestrial and marine species²¹⁸ and is part of the Mediterranean Basin biodiversity hotspot, which is the third most species-rich hotspot in the world.²¹⁹ The Comoros Islands, Mauritius and the Seychelles lie within the Madagascar and Indian Ocean Islands hotspot. Some of the Seychelles islands separated from the supercontinent Gondwana more than 160 million years ago, allowing species to evolve in long-term isolation. The Seychelles are home to one of the world's rarest bats: the Seychelles sheath-tailed bat (*Coleura seychellensis*), of which there are only an estimated 30–100 individuals left in the world.²²⁰ Singapore is part of the Sundaland hotspot and has lost most of its tropical primary forest; however, protected secondary forest reserves still support high levels of biodiversity.^{221 222}

Freshwater Ecosystems

Freshwater resources in AIS SIDS are highly variable. While some countries have an abundance of rivers, streams and estuaries, others depend primarily on groundwater stored in fractured or alluvial aquifers, basalt formations, perched aquifers or freshwater lenses. Several AIS SIDS also contain inland and coastal swamps and marshes, and the region is home to a number of Ramsar sites, including those in Cabo Verde, Guinea-Bissau, Comoros, Mauritius, Seychelles, and São Tomé and Príncipe.²²³

TABLE 5 The lithology, soils, climate, vegetation, biodiversity and freshwater resources of AIS SIDS

	Geology	Soil Types	Climate ^{224 225}	Vegetation	Biodiversity ²²⁶ *Country Ranking: Nr. of Endemic Species	Freshwater
ATLANTIC OCEAN						
Cabo Verde	Archipelago, volcanic ²²⁷	Volcanic, shallow, medium-coarse texture, low in organic matter ²²⁸	Arid to semi-arid, avg. rainfall 228 mm/a	Savanna or steppe vegetation (lower parts) of the islands, arid shrubland (higher altitudes) ²²⁹	Mediterranean Basin Hotspot, ²³⁰ 33 KBAs, 87 th *	Freshwater lenses ²³²
Guinea-Bissau ²³³	Continental and deltaic sedimentary archipelago ²³⁴	Poor and lateritic ²³⁵	Humid Tropical, ITF, avg. rainfall 1,400 – 2,500 mm/a ²³⁶	Mangroves, palm forests, dry forests, woodland savannas	9 KBAs, 163 rd *	Abundant rivers and transboundary aquifer ²³⁷
São Tomé and Príncipe ²³⁸	Volcanic islands ²³⁹	Highly weathered, e.g. Ferralsols and Lixisols	From super humid (>7000 mm) to semi-arid (600 – 1000 mm)	Mangroves, montane and mist forests, deciduous forests / woodlands, agroforests, anthropogenic savannas	Guinean Forests of West Africa Hotspot, ^{240 241} 4 KBAs, 41 st *	Rivers, lagoons, estuaries, waterfalls, lowland and montane swamps
INDIAN OCEAN						
Comoros ^{242 243 244}	Archipelago, volcanic ²⁴⁵	Diverse: sandy loam, brown, red, ferrallitic, volcanic and hydromorphic soils	Maritime tropical climate, avg. rainfall 1000 – 5000 mm/a	Semi-deciduous forests, montane evergreen moist forests	Madagascar and the Indian Ocean Islands Hotspot, ²⁴⁶ 21 KBAs, 48 th *	Rivers and streams, basalt and perched aquifers ²⁴⁷
Maldives ²⁴⁸	Atoll, archipelago ²⁴⁹	Coarse, shallow over coral limestone base layer	Tropical monsoon, ²⁵⁰ avg. rainfall 1,972 mm/a	Shrub vegetation (coast), denser and larger trees (inland), mangroves	1 KBAs, 163 rd *	Wetlands, shallow ponds, freshwater lens
Mauritius	Volcanic	Mostly tropical red earth soils, reddish prairie and brown forest soils ²⁵¹	Mild tropical maritime ITCZ, ²⁵² avg. rainfall 2,041 mm/a	Wet or dry evergreen forest and scrub, palm savanna ²⁵³	Madagascar and the Indian Ocean Islands Hotspot, ²⁵⁴ 25 KBAs, 43 rd *	Rivers, impermeable, fractured and alluvial aquifers ²⁵⁶
Seychelles ²⁵⁷	Only mid-oceanic granitic islands in the world, other islands volcanic rocks and young raised coral reefs	Ferrallitic and calcareous sandy soils ²⁵⁸	Humid tropical, avg. rainfall 2,300 – 5,000 mm/a	Palms, pandans, and hardwoods, remnants of cloud forests	Madagascar and the Indian Ocean Islands Hotspot, ²⁵⁹ 62 KBAs, 43 rd *, World's rarest bat ²⁶⁰	River valleys and marshes
SOUTH CHINA SEA						
Singapore ^{261 262}	3 Formations: sedimentary rock (dolomite, lime-, mud-, sandstone, and shale); igneous rock / granite; and semi-harden alluvial deposits	Residual soils based on the three main formations	Tropical, avg. rainfall 2,497 mm/a	Lowland dipterocarp rain forest, freshwater swamp forest, mangroves, considerable greening in urban areas	Sundaland Hotspot, ^{263 264} 3 KBAs, 123 rd *, 50% of birds in the Indian Ocean islands are endemic to Singapore ²⁶⁵	Surface water, very limited groundwater ²⁶⁶

The Pacific Region

Geology, Soils and Rainfall

The soils of Pacific SIDS range from fertile volcanic and alluvial soils to shallow, nutrient-poor limestone and atoll soils. Melanesia can be broadly grouped into three environmental areas. The islands and lowlands of Vanuatu, the Solomon Islands and Papua New Guinea have a tropical equatorial climate, with minimal seasonal temperature variation, high annual rainfall (1,500–4,000 mm) and some areas receiving over 8,000 mm. The highlands of Papua New Guinea (above 1,000 m) have cooler temperatures that vary with altitude. Southern Vanuatu experiences greater seasonal temperature variation and a subtropical climate with an average annual rainfall of 1,000–3,000 mm.²⁶⁷ Micronesian and Polynesian SIDS predominantly have tropical climates, but with high spatial variability (Table 6). For instance, Kiribati receives approximately 3,000 mm of rainfall per year in the north, whereas in the south, this figure is around 500 mm.²⁶⁸

Vegetation

The highly diverse biophysical conditions of Pacific SIDS have resulted in naturally variable ecosystems, including open woodlands, grass savannas, tropical montane rainforests, mangroves, and coastal littoral forests.²⁶⁹ The region contains approximately 40 million hectares of forest, 99% of which are found in Melanesian SIDS, where approximately 78% of land area is forested.²⁷⁰ In contrast, Micronesian SIDS are largely covered by tropical atoll forest and scrub, with notable exceptions being Palau and the Federated States of Micronesia, which have the 6th and 3rd highest forest cover globally. The Federated States of Micronesia support a variety of ecosystems, including lowland and montane rainforests, cloud forests, tropical dry forests and mangrove systems.²⁷¹ Similarly, Polynesian countries host a combination of rainforests, mangroves, and tropical atoll forest and scrub (Table 6).

Biodiversity

The Pacific region is exceptionally rich in biodiversity and contains several globally recognised biodiversity hotspots. Fiji and the Polynesian SIDS are part of the Polynesia–Micronesia Hotspot, spanning more than 4,500 islands and supporting extremely high levels of biodiversity and endemism. This hotspot is also notable for its diverse cultures, many of which have extensive traditional ecological knowledge and long-standing environmental stewardship practices.²⁷² The East Melanesian Islands Hotspot, which includes Vanuatu, the Solomon Islands, and Papua New Guinea, is one of the most geographically complex regions in the world.²⁷³ Papua New Guinea alone hosts an extraordinary diversity of species, including an estimated 25,000–30,000 plant species and over 150,000 animal species, more than 30% of which are endemic to the country. This places Papua New Guinea ninth globally in terms of endemic species richness.²⁷⁴ The Solomon Islands are similarly significant, containing around 40% of the world's mangrove species.²⁷⁵ Timor-Leste is part of the Wallacea Biodiversity Hotspot, a region characterised by high endemism due to its unique biogeographic position between the Asian and Australasian continental plates.²⁷⁶

Freshwater Ecosystems

The Pacific SIDS are home to a variety of unique freshwater ecosystems, including lakes, streams, wetlands, salt marshes and mudflats.²⁷⁷ Wetlands play an important role in the cultural traditions of Pacific communities. For instance, women harvest food and create art, such as dyed barkcloth (*tapa*), from resources found in coastal wetlands.²⁷⁸ Several countries in the region have designated Ramsar sites, including Samoa (3), Papua New Guinea (2), the Marshall Islands (2), Fiji (2), Vanuatu (1) and Kiribati (1).²⁷⁹ Small, low-lying atolls and limestone islands such as those in Tuvalu, Kiribati and the Marshall Islands rely on thin freshwater lenses,²⁸⁰ while other countries possess large rivers and substantial aquifer systems.

TABLE 6 The lithology, soils, climate, vegetation, biodiversity and freshwater resources of Pacific SIDS

	Geology ²⁸¹	Soil Types	Climate ^{282 283}	Biomes	Biodiversity ²⁸⁴ *Country Ranking: Nr. of Endemic Species	Freshwater
MELANESIA AND TIMOR-LESTE						
Fiji	Composite and volcanic archipelago	Very diverse, from highly fertile alluvial and colluvial to heavily acidic siliceous soils ²⁸⁵	Tropical, avg. rainfall 2,592 mm/a	Lowland rainforests, montane and cloud forests, tropical dry and mangrove forest ²⁸⁶	Polynesia-Micronesia Hotspot, ^{287 288} 51 KBAs, 42 nd *	Perennial rivers, reservoirs, and aquifers, freshwater lenses on outer islands ²⁸⁹
Papua New Guinea	Part of a continental island, with surrounding composite and volcanic islands	Diverse, mostly young and fertile soils ²⁹⁰	Tropical lowlands and oceanic highlands, avg. rainfall 3,142 mm/a	Diverse, with mangroves, sub-alpine grasslands, savannah grasslands, lowland and montane rainforests, and swamp forests ²⁹¹	East Melanesian Islands Hotspot, ²⁹² 129 KBAs, 9 th *, 25,000–30,000 plant and 150,000+ animal species, >30% endemic ²⁹³	Large rivers and aquifers, small lakes and reservoirs ²⁹⁴
Solomon Islands	Composite and volcanic, some atolls	Strongly weathered and leached volcanic soils (highlands), and fertile alluvial deposits ²⁹⁵	Tropical, avg. rainfall 3,028 mm/a	Lowland and montane tropical rainforest, mangroves, 5 th globally in terms of forest cover (90%) ²⁹⁶	East Melanesian Islands Hotspot, ²⁹⁷ 37 KBAs, 26 th *, contains 40% of the world's mangrove species ²⁹⁸	Perennial rivers and large aquifers on larger volcanic islands, freshwater lenses on atolls. ²⁹⁹
Timor-Leste	Part of a composite island with complex and varied geology	Varied, but generally low fertility soils ³⁰⁰	Tropical lowlands, oceanic highlands, avg. rainfall 1,500 mm/a	Savannah, tropical dry lowland forest, moist forest, montane forest, swamp and mangroves ³⁰¹	Wallacea Biodiversity Hotspot, ^{302 303} 33 KBAs, 137 th *	Short, fast-flowing rivers, aquifers, one lake ³⁰⁴
Vanuatu	Composite and volcanic islands, some low-lying coral islands	Primarily fertile volcanic andosols, ferralitic and fersiallitic soils ³⁰⁵	Tropical, avg. rainfall 2,000 mm/a	Lowland rainforest and montane cloud forest, seasonal forest, scrub and grassland, coastal forest, including mangroves, and secondary forest	East Melanesian Islands Hotspot, ³⁰⁶ 307 308 29 KBAs, 60 th *	Rivers and aquifers on larger volcanic islands, and freshwater lenses on low-lying coral islands ³⁰⁹
MICRONESIA						
Federated States of Micronesia	Mostly volcanic islands	Diverse mix of volcanic, limestone and alluvial soils ³¹⁰	Tropical, avg. rainfall of 5,000 mm/a in Pohnpei to 3,000 mm/a in Yap ³¹¹	Lowland and montane rainforests, cloud forest, tropical dry forest, mangroves, ^{312 313} 3 rd globally in terms of forest cover (92%) ³¹³	Polynesia-Micronesia Hotspot, ^{314 315} 58 KBAs, 50 th *	Rivers, and intermittent streams, aquifers, freshwater lenses on outer islands ³¹⁶
Kiribati ³¹⁷	Atolls and one raised limestone island	Shallow, nutrient-poor, alkaline limestone soils	Tropical, avg. rainfall 3,000 mm/a (north), 500 mm/a (south) ³¹⁸	Coconut dominated agroforests with some useful indigenous trees and shrubs	Polynesia-Micronesia Hotspot, ^{319 320} 28 KBAs, 123 rd *	Freshwater lenses ³²¹
Marshall Islands ³²²	Reef atolls, and some small coral islands	Shallow, nutrient-poor, and alkaline limestone soils	Tropical, avg. rainfall 1,800 mm/a (north), 4,300 mm/a (south) ³²³	Coconut dominated, agroforestry	Polynesia-Micronesia Hotspot, ^{324 325} 15 KBAs, 163 rd *	Freshwater lenses ³²⁶

Nauru ³²⁷	High limestone island	Phosphate mining has removed almost all productive topsoil, narrow coastal soils ³²⁸	Tropical, avg. rainfall ~2,000 mm/a ³²⁹	Littoral vegetation, limestone vegetation, agroforestry (coastal areas), secondary scrub (inland)	Polynesia-Micronesia Hotspot, ³³⁰ 1 KBAs, 137 th *	No rivers, single freshwater lagoon, freshwater lens
Palau	Archipelago of limestone and composite volcanic islands	Diverse mix of volcanic, limestone, and alluvial soils ³³¹	Tropical, avg. rainfall 3,160 mm/a ³³²	Rainforests, savannah and limestone forests, mangroves, 6 th globally in terms of forest cover (90%) ³³³	Polynesia-Micronesia Hotspot, ^{334 335} 16 KBAs, 60 th *	Rivers and reservoirs, coastal aquifers ³³⁶
POLYNESIA						
Cook Islands ³³⁷	Archipelago of atolls (northern group) and composite volcanic islands (southern group)	Diverse mix of volcanic basalt and limestone-based soils ³³⁸	Tropical, avg. rainfall 2,206 mm/a ³³⁹	Lowland and montane forests, cloud forests, limestone forests, wetlands	Polynesia-Micronesia Hotspot, ³⁴⁰ 10 KBAs, 83 rd *	Streams and rainwater (southern group), rainwater and freshwater lenses (northern group) ³⁴¹
Niue ³⁴²	High limestone island	Shallow, nutrient-poor, and highly weathered soils, with unusually high natural radioactivity ³⁴³	Tropical, avg. rainfall ~2,000 mm/a ³⁴⁴	Littoral shrubland, littoral forest, coastal forest, mature forest and secondary rainforest	Polynesia-Micronesia Hotspot, ³⁴⁵ 1 KBAs, 163 rd *	Freshwater lens
Samoa	Volcanic islands	Mostly volcanic basalt ³⁴⁶	Tropical, some oceanic highlands, avg. rainfall 2,880 mm/a	Montane, lowland and cloud rainforest, ³⁴⁷ mangroves ³⁴⁸	Polynesia-Micronesia Hotspot, ^{349 350} 8 KBAs, 68 th *	Perennial and ephemeral rivers and springs, aquifers, crater lakes and reservoirs ³⁵¹
Tonga	Archipelago of mixed origin, volcanic (western chain), limestone (eastern chain)	Primarily deep, fertile volcanic ash ³⁵²	Tropical, avg. rainfall 2,200 mm/a (north), 1,700 mm/a (south) ³⁵³	Mangrove and coastal swamps; coastal and littoral, tropical lowland and upland rainforest ³⁵⁴	Polynesia-Micronesia Hotspot, ^{355 356} 11 KBAs, 116 th *	Freshwater lenses, 'Eua, Niuafo'oua, Niuatoputapu and Tofua have small springs and ephemeral streams ³⁵⁷
Tuvalu ³⁵⁸	Atolls	Shallow, nutrient deficient, and highly alkaline sandy soils	Tropical, avg. rainfall 3,500 mm/a ³⁵⁹	Coconut dominated, agroforestry and scrub, mangroves	Polynesia-Micronesia Hotspot, ^{360 361} 0 KBAs, 163 rd *	Freshwater lenses

Land at the Heart of Cultures, Livelihoods and Island Economies

The Link between Land, Freshwater and Marine Ecosystems

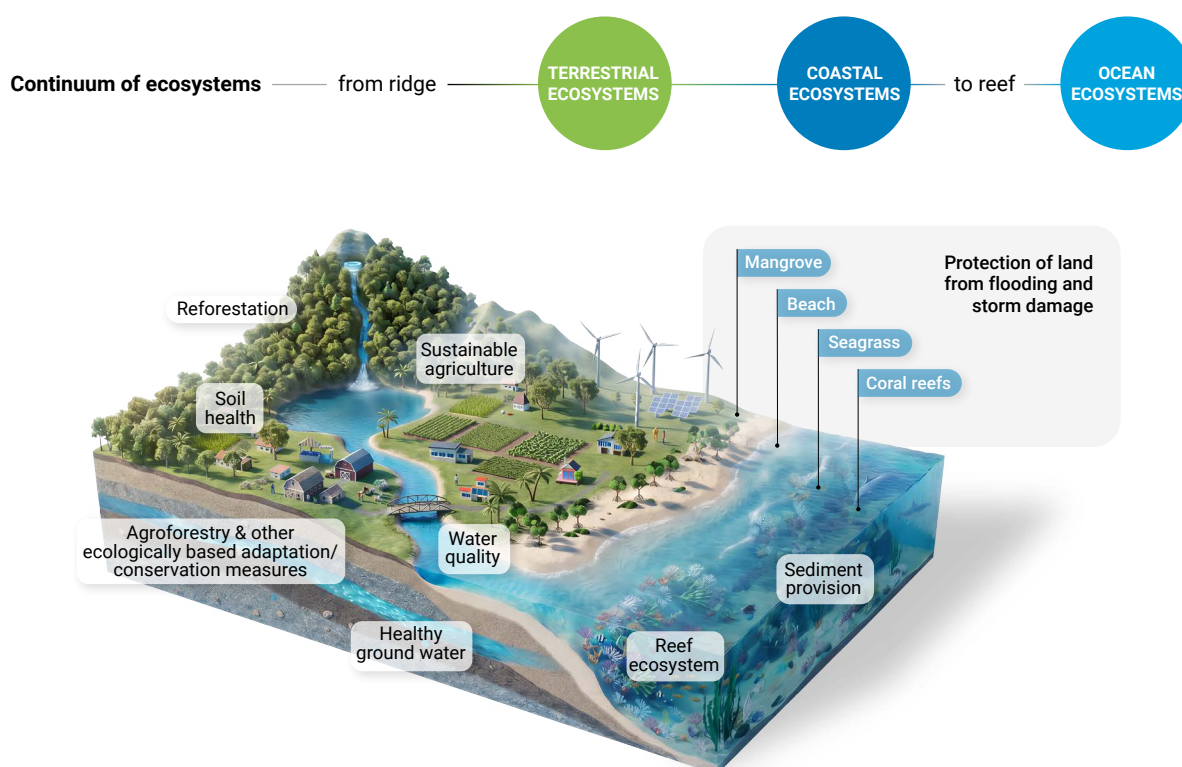
The limited landmass of SIDS creates strong connections between terrestrial and marine ecosystems.³⁶² Ecological connectivity enables the transfer of water, energy, nutrients and organisms across landscapes and seascapes. It supports the free movement and genetic exchange of species, allows ecosystems to adapt to migratory and climate-driven changes, and fosters the communication and collaboration that empowers communities to take restorative action.³⁶³ In SIDS, where land and sea are closely linked, maintaining and restoring this connectivity is vital for sustaining livelihoods, safeguarding biodiversity, and supporting ecosystem services (Figure 9).

A primary pathway of interaction between land and sea is through hydrological channels, including submarine groundwater discharge and surface runoff. The condition of the land and how it is managed has important implications on the amount and quality of freshwater that reaches the ocean and reefs. Land can function either as a source or a sink for inorganic and organic pollutants. When land is healthy and

sustainably managed, rainfall is effectively absorbed, soils are stabilised, sediment flows are reduced, nutrients are retained, and heavy metals and other pollutants are fixed and mineralised. Vegetation plays a particularly important role as it intercepts, absorbs and evapotranspires rainwater. Forest litter slows overland flow by creating natural dams and enhancing absorption, while healthy roots and burrowing species support soil porosity and infiltration. Mangroves also play a crucial role in trapping sediments before they reach coastal waters. Healthy vegetation therefore contributes to improved coastal water quality and greater abundance of marine species. Land further provides habitat for species that move between terrestrial and marine environments. Greater habitat and species diversity often translates into higher aquatic biodiversity.^{364 365}

The management of marine resources can also affect land resources. For example, healthy wetlands and coral reefs help to protect limited land areas from flooding and storm damage.³⁶⁶ The strong connections between terrestrial and marine environments necessitate an integrated approach to natural resource management that recognises the high levels of ecological connectivity within island ecosystems. In the South Pacific, for example, the revival of customary ridge-to-reef approaches to natural resource management reflects this land-to-sea linkage.³⁶⁷

FIGURE 9 Ridge-to-Reef approaches need to manage and enhance ecological connectivity between different landscape components (Adapted from Mycoo et al. 2022)³⁶⁸



The Importance of Natural Resources for Livelihoods and Island Economies

Land and natural resources are the backbone of island economies, influencing the productivity and resilience of key sectors such as agriculture, fisheries, tourism, forestry and renewable energy. In SIDS, where land is scarce and ecosystems are closely linked, economic activities depend directly on the health and productivity of soils, freshwater, forests, coastal systems and marine environments. These natural assets underpin livelihoods, generate income, and support national development, illustrating the inseparable link between resilient island economies and healthy land and ecosystems.

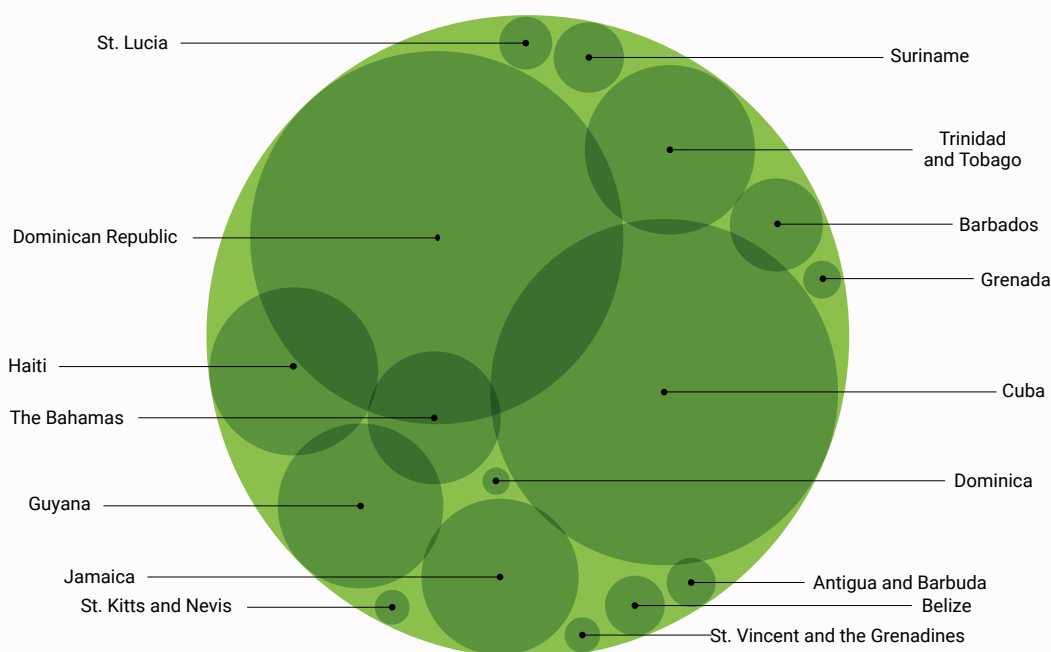
In terms of GDP, the AIS region has the highest GDP (~USD 580 billion) when Singapore is included, followed by the Caribbean (~USD 370 billion) and the Pacific (~USD 47 billion). Singapore's GDP alone (~USD 550 billion in 2024) exceeds that of all other SIDS combined.³⁶⁹ When Singapore is excluded, the Caribbean region becomes the

SIDS region with the highest GDP (Figure 10). As shown in Tables 7 to 9, the economies of most SIDS rely heavily on the services sector. Collectively, tourism accounted for 28% of SIDS's GDP in 2018 – double the global average – contributing more than half of GDP in Antigua and Barbuda, Barbuda, the Seychelles and the Maldives.³⁷⁰ Agriculture, forestry and fishing represent a significant share of GDP in Kiribati (21%), Guinea-Bissau (27%), Comoros (37%) and the Solomon Islands (37%).³⁷¹

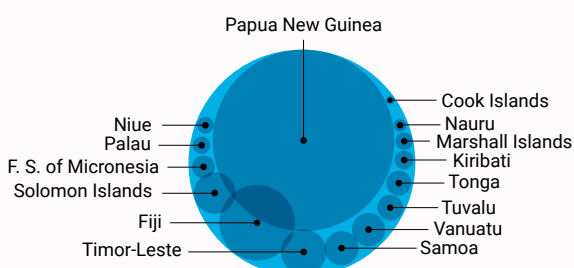
Agriculture is an important sector for ensuring food security in SIDS. Although urban areas have grown considerably, large segments of the population still live in rural areas and depend on fisheries and subsistence agriculture, particularly in the Pacific region.³⁷² In several SIDS, a substantial proportion of the population is employed in agriculture, including in Haiti (45.5%), Guinea-Bissau (50.3%), the Comoros (34.6%), the Solomon Islands (37.3%), Timor-Leste (39.2%) and Vanuatu (42.3%).³⁷³ Fisheries are also critical for food security in SIDS, providing around 50% of total animal protein intake.³⁷⁴

FIGURE 10 Distribution of GDP by region and country, excluding Singapore (see Annex 3)

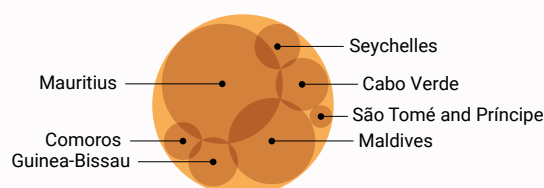
Caribbean 369.19 billion GDP



Pacific 46.60 billion GDP



AIS 31.38 billion GDP



Regional Spotlight on Island Economies

The Caribbean Region

The economies of most Caribbean SIDS are heavily dependent on the services sector, particularly tourism,³⁷⁵ while Suriname and Guyana have a comparatively high industrial contribution to GDP. While agriculture does not represent a significant proportion of GDP in many Caribbean SIDS, it remains an important sector in several countries, accounting for a large part of their limited land areas – including in Haiti (66%), Cuba (58%), the Dominican Republic (50%) and Jamaica (40%).³⁷⁶ Haiti continues to have a large proportion of its population employed in agriculture, and agricultural commodities, such as tobacco, fruit,

rum, tafia, sugar and wheat, remain major export items (Table 7). Recent reforms to European Union agricultural policies have contributed to a shift towards more diversified agricultural production and away from the export of raw materials, alongside a gradual decline in agriculture's overall contribution to the region's economies.³⁷⁷ Livestock production is a secondary activity in most Caribbean SIDS, with the notable exception of Belize, where it is the main form of farming. Consequently, livestock products account for a large share of food imports across the Caribbean.³⁷⁸

TABLE 7 Overview of the GDP, main economic sectors and export goods of Caribbean SIDS

For some countries, no data were available within global datasets. In these cases, alternative references were consulted, which may differ in timescale and methodology. In general, the retail, real estate, accommodation, financial services, and construction sectors were classified under the 'services' category.

		Services	Industry	Agriculture		
Caribbean	GDP (2024) ³⁷⁹	Main Sectors (Contribution to GDP, 2022) ^{380 381 382}	Employment (2022) ³⁸³	Export Goods ³⁸⁴		
GREATER ANTILLES AND THE BAHAMAS						
The Bahamas	15.83 billion			1. Petroleum oils 2. New stamps, stamp-impressed paper, banknotes 3. Dredgers 4. Frozen rock lobster, other sea crawfish 5. Expandable polystyrene, primary forms		(2023)
Cuba	107.35 billion			1. Nickel oxide sinters etc. 2. Rum and tafia 3. Cigars, cheroots and cigarillos 4. Zinc, not alloyed 5. Raw cane sugar		(2022)
Dominican Republic	124.28 billion			1. Gold 2. Medical instruments and appliances 3. Cigars, cheroots and cigarillos 4. Automatic circuit breakers 5. Jewellery		(2023)
Haiti	25.22 billion			1. Textiles and apparel 2. Fruit and other agricultural products 3. Essential oils ³⁸⁵		(2024)
Jamaica	22.01 billion			1. Petroleum oils 2. Aluminium oxide 3. Liquefied natural gas 4. Fruit 5. Aluminium ores and concentrates		(2023)

LESSER ANTILLES					
Antigua and Barbuda	2.21 billion			386	1. Petroleum oils 2. Articles of wire, iron or steel 3. Rock lobster and other sea crawfish 4. Whiskeys (2023)
Barbados	7.5 billion				1. Petroleum oils 2. Rum and tafia 3. Other medicaments 4. Margarine 5. Sweet biscuits; waffles and wafers (2023)
Dominica	688.88 million		No data		1. Parts of boring or sinking machinery 2. Bananas 3. Paints and varnishes 4. Soap and organic surface-active products (2023)
Grenada	1.37 billion			387	1. Wheat or meslin flour 2. Preparations for animal feed 3. Mace 4. Paints 5. Carboys/bottles/flasks (2023)
Saint Kitts and Nevis	1.12 billion			388	1. Planes, helicopters, and/or spacecraft 2. Other measuring instruments 3. Electrical control boards 4. Electrical transformers 5. Hard liquor (2024) 389
Saint Lucia	2.55 billion				1. Beer made from malt 2. Bananas 3. Jewellery 4. Cartons, boxes and cases of corrugated paper 5. Pebbles, gravel, shingle and flint (2020)
St. Vincent and the Grenadines	1.16 billion				1. Wheat or meslin flour 2. Other preparations for animal feed 3. Aquatic invertebrates 4. Pile-drivers and pile-extractors 5. Beer made from malt (2023)
Trinidad and Tobago	25.63 billion				1. Methanol (methyl alcohol) 2. Anhydrous ammonia 3. Petroleum oils 4. Liquefied natural gas 5. Ferrous products (2023)
CONTINENTAL LATIN AMERICA					
Belize	3.2 billion				1. Raw cane sugar 2. Bananas 3. Petroleum oils 4. Brans, sharps and other residues of maize 5. Cigarettes (2023)
Guyana	24.66 billion				1. Petroleum oils 2. Cargo containers 3. Gold 4. Cruise ships, excursion boats etc. 5. Parts of boring or sinking machinery (2023)
Suriname	4.42 billion				1. Gold 2. Wood 3. Parts of boring or sinking machinery 4. Cigarettes 5. Machines and mechanical appliances (2023)

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

The services sector in the AIS region remains central to the economies of Singapore and tourism-focused islands such as the Maldives, Mauritius and the Seychelles. Agricultural exports also play an important role. In Guinea-Bissau, for instance, agriculture contributes substantially to GDP, with exports dominated by land-based commodities such as nuts

and timber. Meanwhile, São Tomé and Príncipe's main exports are cocoa, palm oil, fruit, vegetables, and coconuts. In Comoros, where agriculture likewise contributes significantly to GDP and employment, key exports include cloves, essential oils, and vanilla. The fisheries sector is also a significant source of export revenue for many AIS SIDS (Table 8).

TABLE 8 Overview of the GDP, main economic sectors and export goods of AIS SIDS

For some countries, no data were available within global datasets. In these cases, alternative references were consulted, which may differ in timescale and methodology. In general, the retail, real estate, accommodation, financial services, and construction sectors were classified under the 'services' category.

AIS	GDP (2024) ³⁹⁰	Main Sectors (Contribution to GDP) 391 392 393	Employment ³⁹⁴	Export Goods ³⁹⁵
ATLANTIC OCEAN				
Cabo Verde	2.73 billion			1. Petroleum oils 2. Cargo containers 3. Prepared or preserved mackerel 4. Prepared or preserved tuna, skipjack and bonito 5. Prepared or preserved fish (2023)
Guinea-Bissau	2.22 billion			1. Coconuts, brazil nuts, and cashews 2. Animal meal and pellets 3. Non-fillet frozen fish 4. Cocoa beans 5. Other oily seeds (2024) 396
São Tomé and Príncipe	822.15 million			1. Cocoa beans 2. Crude palm oil 3. Capsicum or pimenta 4. Chocolate 5. Crude coconut (copra) oil (2023)
INDIAN OCEAN				
Comoros	1.44 billion			1. Cloves 2. Tug boats 3. Essential oils 4. Scrap vessels 5. Vanilla (2024) 397
Maldives	7.06 billion			1. Frozen skipjack or stripe-bellied bonito 2. Prepared or preserved tuna, skipjack and bonito 3. Fresh or chilled fish fillets 4. Frozen yellowfin tunas 5. Fresh or chilled yellowfin tunas (2023)
Mauritius	14.94 billion			1. Prepared or preserved tuna, skipjack and bonito 2. Cane or beet sugar 3. Raw cane sugar 4. Men's or boys' trousers 5. Other live animals (2023)
Seychelles	2.17 billion			1. Prepared or preserved tuna, skipjack and bonito 2. Petroleum oils 3. Ferrous waste and scraps 4. Frozen skipjack or stripe-bellied bonito 5. Fish flour, meals and pellets (2023) 398
SOUTH CHINA SEA				
Singapore	547.39 billion			1. Monolithic integrated circuits, digital 2. Petroleum oils 3. Machines and mechanical appliances 4. Transmission apparatus 5. Semi-manufactured gold (2023)

The Pacific Region

In the Pacific SIDS, agriculture, forestry, and fisheries remain important industries, contributing an average of 17% to GDP and accounting for a substantial share of employment (Table 9). Agriculture is also crucial for the independence and self-reliance of island communities.^{399 400} While the Cook Islands, Samoa, Palau, Fiji, and Vanuatu depend heavily on tourism, countries such as Timor-Leste and Papua New Guinea primarily rely on their mineral reserves for income.⁴⁰¹ Approximately 60% of the population in Pacific SIDS

are employed in agriculture, which accounts for a significant proportion of exports in Vanuatu, Tonga, and Samoa (over 60%), as well as in the Solomon Islands, Papua New Guinea, and Fiji (over 30%).⁴⁰² Many Pacific SIDS also have a long history of plantation agriculture and are major producers of cash crops such as palm oil, rubber, sugar, coffee, cocoa, coconuts, and copra. These crops often contribute substantially to export revenues and local market activity, supporting household incomes, nutrition, and food security.⁴⁰³

TABLE 9 Overview of the GDP, main economic sectors and export goods of Pacific SIDS

For some countries, no data were available within global datasets. In these cases, alternative references were consulted, which may differ in timescale and methodology. In general, the retail, real estate, accommodation, financial services, and construction sectors were classified under the 'services' category.

		Services	Industry	Agriculture		
Pacific	GDP (2024) ⁴⁰⁴	Main Sectors (Contribution to GDP) 405 406 407			Employment ⁴⁰⁸	Export Goods ⁴⁰⁹
MELANESIA AND TIMOR-LESTE						
Fiji	5.97 billion					1. Petroleum oils 2. Mineral waters and aerated waters 3. Raw cane sugar 4. Gold 5. Wheat or meslin flour (2023)
Papua New Guinea	31.80 billion					1. Petroleum gas 2. Gold 3. Copper ore 4. Crude petroleum 5. Palm oil (2024) 410
Solomon Islands	1.58 billion					1. Rough wood 2. Processed fish 3. Gold 4. Precious metal ore 5. Nickel ore (2024) 411
Timor-Leste	1.87 billion					1. Crude petroleum 2. Petroleum gas 3. Coffee 4. Vanilla 5. Scrap iron⁴¹² (2022)
Vanuatu	1.12 billion					1. Non-fillet frozen fish 2. Special purpose ships 3. Perfume plants 4. Molluscs 5. Cocoa beans (2024) 413
MICRONESIA						
Federated States of Micronesia ⁴¹⁴	471.43 million					1. Live animals, animal products (99%) 2. Vegetable products 3. Prepared foodstuffs, beverages, spirits and tobacco 4. Textiles and textile articles 5. Wood, cork and articles thereof⁴¹⁵ (2023)
Kiribati	307.86 million					1. Crude coconut (copra) oil 2. Frozen fish fillets 3. Copra 4. Frozen albacore or longfinned tunas 5. Photographic plates 416 (2021)

Marshall Islands ⁴¹⁷	290.11 million		1. Passenger and cargo ships 2. Recreational boats 3. Refined petroleum 4. Non-fillet frozen fish 5. Special purpose ships ⁴¹⁸	(2024)
Nauru	162.59 million		1. Non-fillet frozen fish 2. Calcium phosphates 3. Wheat 4. Centrifuges 5. Integrates Circuits ⁴²⁰	(2024)
Palau ⁴²¹	276.73 million		1. Fresh or chilled yellowfin tunas 2. Fresh or chilled tunas 3. Helicopters 4. Other live fish 5. Self-propelled excavating machinery	(2018)
POLYNESIA				
Cook Islands ⁴²²	103.9 million ⁴²³		1. Recreational boats 2. Non-fillet frozen fish 3. Fish fillets 4. Telephones 5. Knit women's suits	(2024) ⁴²⁴
Niue ⁴²⁵	26.04 million ⁴²⁶		1. Abrasive powder 2. Non-woven textiles 3. Silver 4. Collector's items 5. Paintings ⁴²⁷	(2024)
Samoa	1.18 billion		1. Petroleum oils 2. Frozen sardines, brisling or sprats 3. Coconut copra oil 4. Boards, panels, etc. 5. Other fruit	(2023)
Tonga	591.14 million		1. Refined petroleum 2. Cassava 3. Non-fillet frozen fish 4. Documents of title (bonds etc.) and unused stamps 5. Perfume plants	(2024) ⁴²⁸
Tuvalu	62.28 million		1. Non-fillet frozen fish 2. Tug boats 3. Other iron products 4. Integrated circuits 5. Fish fillets	(2024) ⁴³⁰

Cultural Heritage, Traditional Knowledge and Land Management

Cultural heritage and traditional knowledge play a central role in guiding land management practices in SIDS, reflecting generations of lived experience and deep connections to place. Communities have developed unique Indigenous and local knowledge systems, along with strategies for living in and adapting to dynamic and highly variable environments, enabling them to steward land, water, and coastal resources sustainably. In many SIDS, land is deeply embedded in cultural norms and traditional governance, shaping identities, livelihoods and social networks.⁴³¹

Culture plays a key role in individual and community decision-making processes. SIDS encompass some of the most culturally diverse areas in the world, illustrating the close relationship between culture and the environment. The cultures of SIDS have been shaped by complex migratory movements – both voluntary and forced – influencing how communities interact with their natural environment and with one another.⁴³² Cultural practices and Indigenous knowledge systems comprise beliefs, skills and traditions that have been developed over generations through interaction with nature and often integrate spiritual, social and ecological dimensions.⁴³³



Photo: © Envato Elements

Regional Spotlight on Culture and Land Management

The Caribbean Region

The Caribbean region is broadly divided into French-, English-, Spanish- and Dutch-speaking areas. Many of these communities share a history of forced migration and slavery, as well as coexistence with ethnic groups originating from South Asia, East Asia, and Africa within plantation societies. Following the end of colonial rule, developing a strong local cultural identity rooted in African heritage became a vital tool for emancipation, giving rise to distinctive cultural expressions and practices.⁴³⁴ Indigenous knowledge systems often reflect a blend

of pre-Columbian traditions, Afro-Caribbean practices, Maroon resilience strategies, local agroecological methods and community governance that have evolved over generations.⁴³⁵ These cultural practices and traditional governance structures contribute significantly to community resilience. For example, following Hurricane Maria in 2017, Dominica's recovery was supported by the social capital of island networks, facilitating the restoration of assets and improving access to livelihood opportunities.⁴³⁶

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

AIS SIDS have experienced very different historical and cultural trajectories. They were all colonised by European powers: São Tomé and Príncipe and Cabo Verde by Portugal; Comoros by France; and Mauritius and Seychelles initially by France and later by Great Britain. While the Comoros Islands were inhabited by Indigenous peoples prior to colonisation, São Tomé and Príncipe, Cabo Verde, Mauritius and the Seychelles were previously uninhabited. The transatlantic slave trade and the establishment of plantation economies brought

various populations to these islands. Comoros retained its predominantly Muslim Indigenous culture, whereas Cabo Verde, São Tomé and Príncipe, and the Seychelles developed mixed societies formed by creolisation processes that forged shared identities. Mauritius is considered one of the most ethnically heterogeneous countries in the world for its size, with communities of British, Creole, French and Indian heritage contributing to its cultural landscape.⁴³⁷

The Pacific Region

Around 80% of the population of the Pacific SIDS are Indigenous, with the exception of Fiji, which also has a large population of Indian descent. Traditional land tenure and governance systems continue to influence the landscapes and social structures of many Pacific islands. Although the region is commonly divided into three geo-cultural areas — Micronesia, Melanesia and Polynesia — significant interaction, settlement and voyaging has historically occurred across these boundaries. A deep knowledge of the ocean and navigation enabled Pacific Islanders to explore and settle vast and remote areas.⁴³⁸ Decision-making and collective action are strongly influenced by Pacific Island worldviews and cultural frameworks.

The Fijian concept of *Vai Nui*, for example, emphasises the interconnectedness of Pacific peoples, contributing to a strong sense of collective agency. Similarly, the principles of *Fa'asamoa* — the Samoan way of life — inform decision-making processes within the *aiga* (extended family), forming a complex web of local, national and international kinship networks.⁴³⁹ Land is a vital resource for Pacific SIDS, central to survival, cultural identity and social cohesion. In many Pacific languages, land is directly associated with 'being, belonging, and life'.⁴⁴⁰ The Kuk Early Agricultural Site in Papua New Guinea is one of the few archaeological sites worldwide with records documenting the long-term evolution of agriculture. Significant technological innovations and a major transformation in agricultural practices occurred during a period of continuous wetland reclamation from 7,000 to 10,000 years ago.⁴⁴¹

Confluence of Pressures and Challenges

Small Island Developing States (SIDS) face an increasingly complex set of pressures and challenges that directly threaten their resilience, livelihoods and long-term development. Accelerating land and ecosystem degradation, rising competition for scarce land and water resources, biodiversity loss and pollution are all undermining the productivity of landscapes and their ecological integrity. These pressures are particularly acute for agricultural land, where declining soil health, freshwater scarcity and coastal salinisation are putting additional strain on food production systems and undermining food security in regions that already rely heavily on imports. These challenges are becoming increasingly difficult to address as drought, climate change and rising sea levels reconfigure landscapes and weaken the natural systems that sustain communities. Understanding the nature and scale of these pressures and drivers is essential for designing effective, context-specific responses. This chapter outlines SIDS status and trends across four major environmental crises: desertification, land degradation and drought (DLDD), climate change, biodiversity loss and pollution.



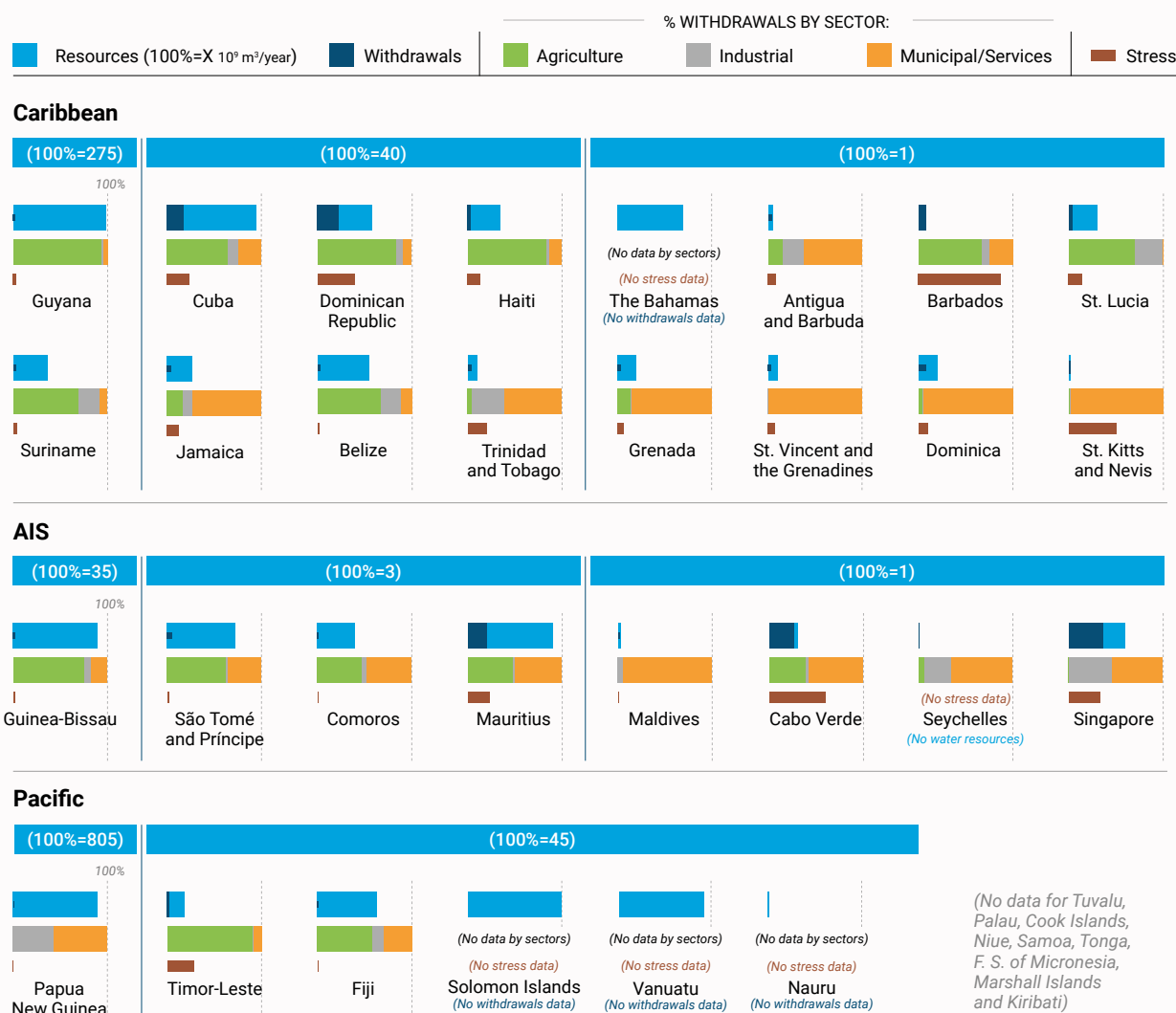
Desertification, Land Degradation and Drought

Increasing Demand for Land and Water Resources

SIDS face unique pressures on their land and water resources arising from their small landmasses, geology and morphology, as well as the impacts of climate change and unsustainable human activities. At the same time, population growth, socioeconomic development and multiple competing land uses are putting immense strain on these limited resources, threatening to exceed the land's carrying capacity. As land and freshwater are closely bound in highly interconnected island ecosystems, land degradation and drought can trigger tipping points that rapidly diminish natural resources and ultimately render SIDS uninhabitable.⁴⁴²

In addition to land scarcity, SIDS are among the countries most affected by water scarcity (Figure 11). Over 70% of SIDS face a risk of water shortages, a figure which rises to 91% in low-lying SIDS.⁴⁴³ Most SIDS have limited groundwater resources and rely on a combination of groundwater abstraction, rainwater harvesting, surface water and, in some cases, desalination.⁴⁴⁴ Their strong dependence on rainfall makes them highly vulnerable to changes in precipitation patterns, which can lead to severe droughts.⁴⁴⁵

FIGURE 11 Water resources, withdrawals and water stress across the three SIDS regions (see Annex 4)

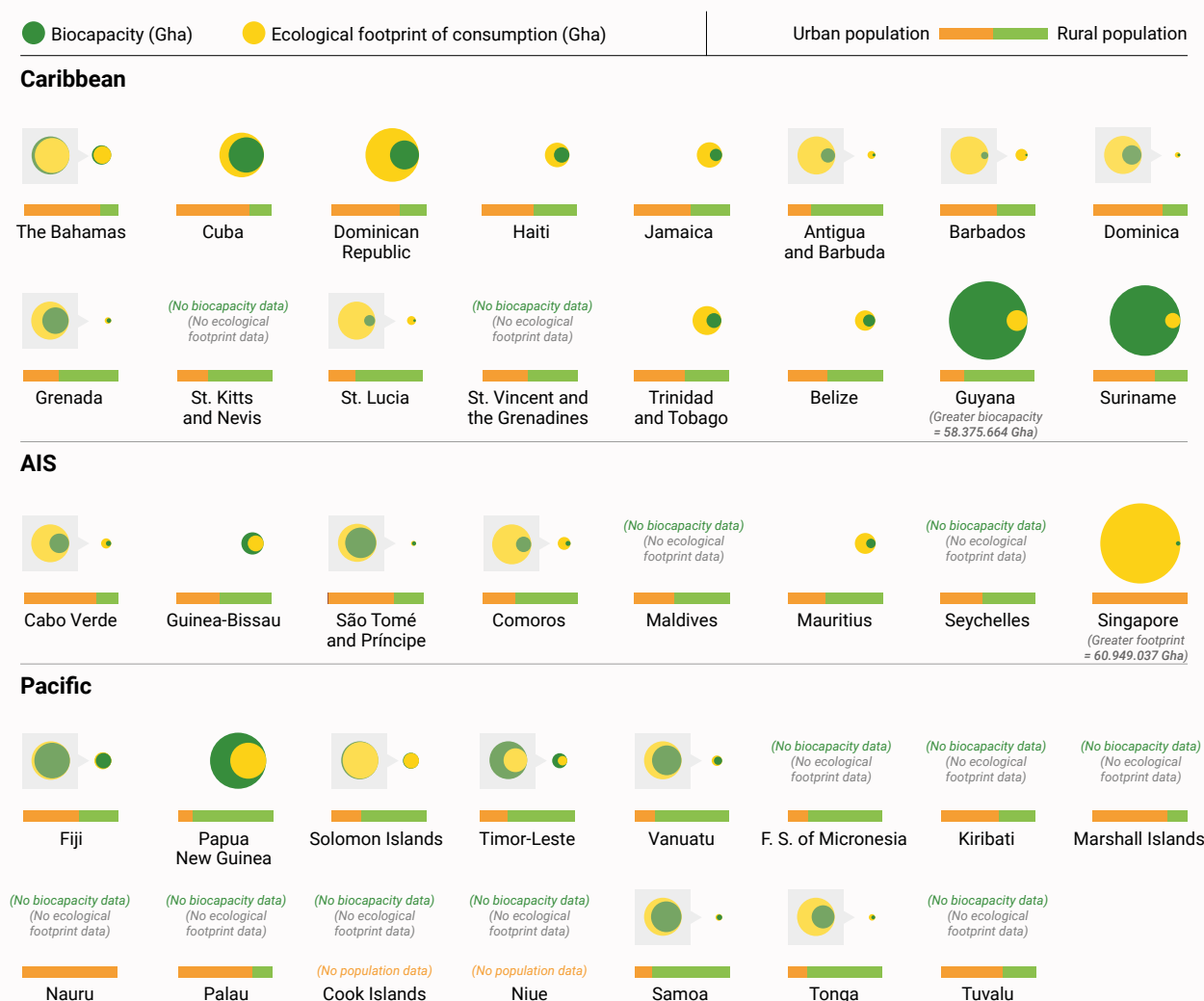


Urbanisation is converting natural land and encroaching on sensitive watersheds at an increasing rate. Around 52.3%, 53.6% and 46% of the population in the Caribbean, AIS and the Pacific regions, respectively, currently live in urban areas, and these figures are projected to rise by 2050. Twelve SIDS, particularly in the AIS and Melanesian regions, are experiencing rapid urbanisation (at a rate of greater than 2% per year). This is driven by education and employment opportunities, the expansion of the public sector, and centralisation and growth in the private sector, all of which draw people towards towns and cities. While only 15% of Papua New Guinea's population lives in urban areas, urbanisation rates approach 100% in Nauru and Singapore, as well as several other SIDS.⁴⁴⁶

Although urbanisation can lead to higher living standards, improved service delivery, economic

diversification and greater labour pooling,⁴⁴⁷ it also tends to concentrate environmental pressures and can deplete human capital in rural areas and the outer islands (Figure 12). Unplanned development often leads to land degradation and biodiversity loss, as rapid urban expansion can result in the growth of informal settlements or poorly planned infrastructure that removes vegetation and accelerates soil erosion.⁴⁴⁸ Clearing natural areas for housing and commerce in the upper parts of watersheds can alter peak flows, leading to flooding in lower areas or reducing base stream flows.⁴⁵⁰ Impermeable surfaces exacerbate the urban heat island effect, limit groundwater recharge and increase the likelihood of flash floods. Together, these processes create feedback loops that intensify heat stress and raise water demand. They also degrade freshwater resources through polluted runoff and increase heat-related health risks and mortality.⁴⁵¹

FIGURE 12 Share of people living in urban and rural areas, the biocapacity of natural systems and the ecological footprint of consumption (see Annex 5)



While **tourism** can have a positive impact on the economies and communities of SIDS, a high influx of tourists and the associated development can also put significant pressure on the environment, contributing to land degradation and wider ecosystem impacts. In some SIDS, the number of tourists visiting each year exceeds the number of residents (Figure 13), substantially increasing demand for land and water resources.⁴⁵² The construction of tourism-related infrastructure along coastlines often puts considerable pressure on mangroves and wetlands, which play a vital role in protecting the land from wave and storm erosion. In Antigua and Barbuda, for instance, around 70% of coral reefs have been threatened by coastal developments.⁴⁵³ The tourism industry also requires a lot of water and can make shortages worse, particularly because peak tourism seasons often coincide with the dry season in many SIDS.⁴⁵⁴

Mining puts further pressure on land and water resources. Many SIDS have abundant mineral reserves that remain largely untapped, and mining could provide an important source of revenue, foreign investment and employment. However, mining activities are increasingly generating significant negative environmental impacts. In Suriname and Guyana, for example, gold extraction often involves the use of highly toxic substances such as mercury and cyanide, while decades of phosphate mining in Nauru have resulted in the loss of most of the productive topsoil. Mining can contaminate soils, drive deforestation, remove or disturb topsoil, and lead to substantial biodiversity loss and land degradation. SIDS that are particularly at risk include Cuba, Haiti, the Dominican Republic, Guyana, Suriname and Jamaica in the Caribbean region, as well as Nauru in the Pacific. In addition, seabed and sand mining pose serious risks to many SIDS by compromising the health, integrity and resilience of coastal and marine ecosystems.^{455 456}

FIGURE 13 The total population compared to international tourist arrivals in SIDS (see Annex 6)



Land Degradation from Phosphate Mining in Nauru ^{457 458 459}

Nauru provides a stark illustration of how unsustainable land use can undermine the ecological integrity, food security and economic resilience of SIDS. Decades of intensive phosphate mining stripped around 70–80% of the island's land area of vegetation, topsoil and phosphate rock, leaving much of the interior environmentally degraded and largely uninhabitable. This extensive land degradation has disrupted the island's hydrology, decimated traditional food production systems, and weakened the soil and ecosystem functions that previously supported Nauruans' livelihoods and cultural identity. Despite generating substantial revenues during the 20th century, phosphate extraction delivered rather limited long-term benefits for the population, while significant environmental costs persist today. Following the exhaustion of phosphate reserves in the early 2000s, Nauru has experienced acute economic vulnerability, dependence on food imports and limited development opportunities. The country's experience highlights the importance of integrated management approaches, diversified livelihood strategies, and long-term planning that align economic, land, climate, and biodiversity objectives.

European colonisation introduced large-scale **agriculture** to many SIDS, establishing slave-based plantation economies and leading to extensive deforestation and land use change. This legacy continues to affect the land's and soils' capacity to retain

water and regulate water flows.⁴⁶⁰ Today, unsustainable agricultural practices also contribute to the leaching of chemicals and nutrients, which pollutes waterways, aquifers and coastal ecosystems.⁴⁶¹ Meanwhile, the decline of native biodiversity — the foundation of

traditional agroecosystems — threatens food and livelihood security.⁴⁶² The loss of agrobiodiversity is driven by the cultivation of a limited number of staple crops, the simplification of ecosystems, and the loss of habitats due to deforestation, mechanised harvesting

and the use of inorganic fertilisers and pesticides, as well as pests and diseases. Failing to utilise the vast genetic resources found in SIDS represents a significant missed opportunity to strengthen nutrition and food security.⁴⁶³

Food Security and Human Health in SIDS

Although agriculture remains an important sector for island economies and livelihoods, people in SIDS experience significantly higher levels of food insecurity, undernourishment and hunger than the global average. In fact, their situation more closely resembles that of the Least Developed Countries. It is estimated that 16.3 million people face severe food insecurity, with 11.5 million being undernourished.^{464 465} The struggle to provide sufficient and nutritious food is driven by multiple factors, including environmental degradation, climate change, changing dietary habits, and a heavy reliance on imported food.⁴⁶⁶

Despite the collapse of traditional export commodity markets, many SIDS have maintained an emphasis on export-oriented agricultural production and policy frameworks, partly due to the legacy of former colonial agricultural systems. This has hindered the development of diverse domestic smallholder farming systems.⁴⁶⁷ Small-scale, local food production is further constrained by insufficient access to technology and low levels of investment. Existing small farms are often family-run and embedded within local cultures and territorial networks when operating in regional markets. These family farms play an important role in protecting the surrounding ecosystems. However, this role is increasingly undermined by the decline of subsistence agriculture and rural out-migration, which are being driven by climate change and societal shifts away from agricultural labour and towards urbanisation.⁴⁶⁸

Replacing traditional, locally grown foods with calorie-dense, processed, imported foods has contributed to high rates of obesity (22.6%), overweight children (8%),⁴⁶⁹ and non-communicable diseases such as strokes, hypertension and diabetes.⁴⁷⁰ Due to their heavy reliance on food imports, SIDS are also highly dependent on maritime transport systems to ensure food security.⁴⁷¹

FIGURE 14 Share of the total land area under conservation⁴⁷²

Caribbean

34,6%	15,6%	26,2%	8,6%	19,9%	16,5%	1,1%	21,4%
The Bahamas	Cuba	Dominican Republic	Haiti	Jamaica	Antigua and Barbuda	Barbados	Dominica
8,8%	16,9%	18,2%	22,6%	30,6%	37,3%	8,4%	14,8%
Grenada	St. Kitts and Nevis	St. Lucia	St. Vincent and the Grenadines	Trinidad and Tobago	Belize	Guyana	Suriname

AIS

17,6%	26,2%	31,7%	33,7%	3%	5%	68,1%	4,6%
Cabo Verde	Guinea-Bissau	São Tomé and Príncipe	Comoros	Maldives	Mauritius	Seychelles	Singapore

Pacific

3,9%	3,7%	2,4%	16,1%	4,2%	0%	22,9%	16,6%
Fiji	Papua New Guinea	Solomon Islands	Timor-Leste	Vanuatu	F. S. of Micronesia	Kiribati	Marshall Islands
0%	31,4%	1,02%	22,13%	7,8%	13,3%	20,2%	
Nauru	Palau	Cook Islands	Niue	Samoa	Tonga	Tuvalu	

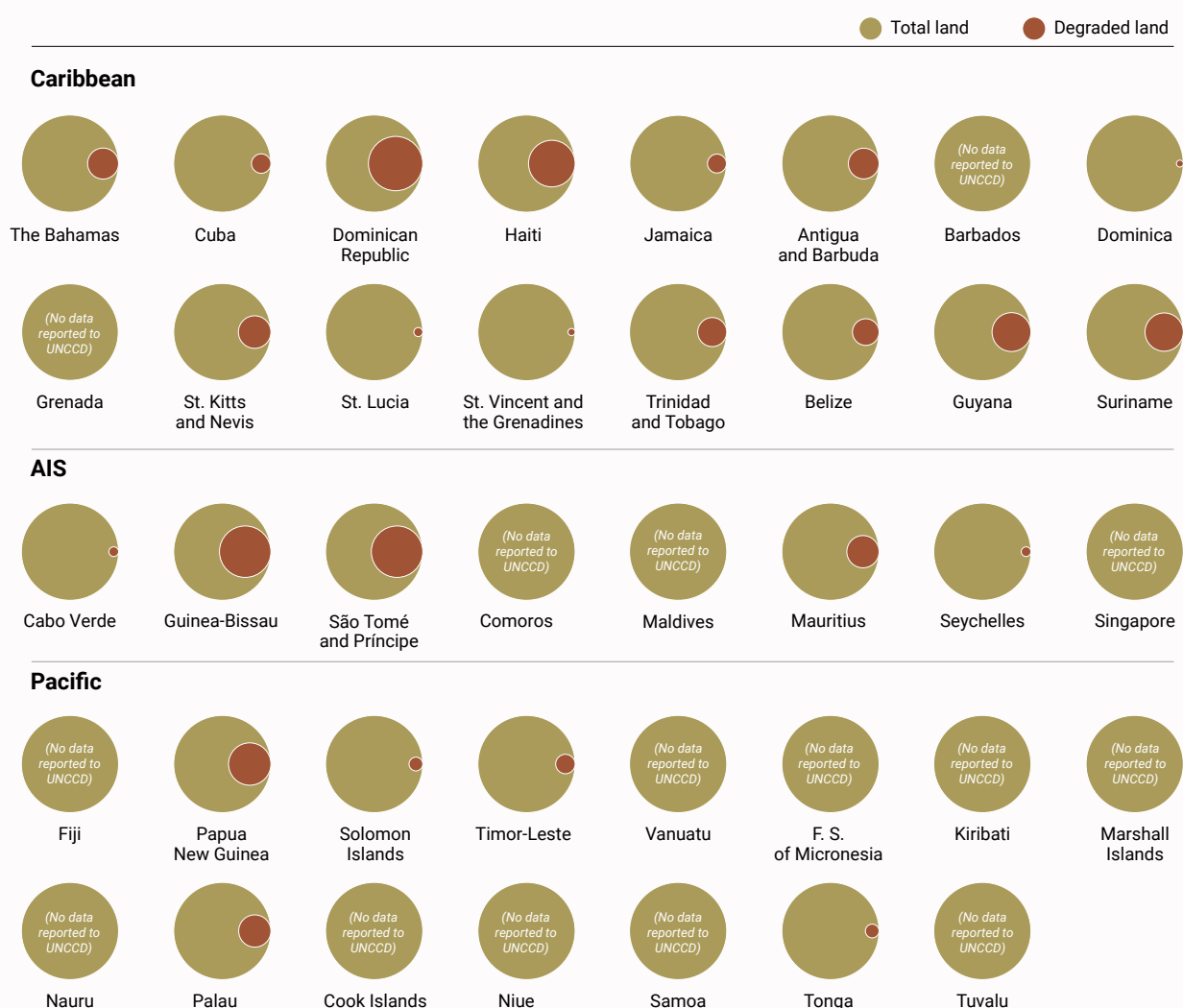
The **water sector** in SIDS is often characterised by deteriorating infrastructure, which leads to major inefficiencies in water delivery and significant losses.⁴⁷³ In Trinidad and Tobago, for instance, approximately 48% of water is lost due to leaks and unauthorised connections.⁴⁷⁴ In many Caribbean SIDS, water losses stem from outdated and poorly maintained infrastructure dating back to colonial times, much of which was originally built to irrigate large sugarcane plantations.⁴⁷⁵ Access to water and sanitation services remains limited: only around 40% of people in SIDS have access to sanitation services and approximately 56% have access to clean drinking water. This highlights substantial gaps in infrastructure and wastewater treatment capacity,^{476 477} which can have serious environmental implications and exacerbate water stress. In the Maldives, for example, saltwater intrusion and sewage contamination have made groundwater unusable on most islands, requiring regular emergency water deliveries to outer islands from the capital.⁴⁷⁸ The lack of potable water in Caribbean SIDS could render some reef islands uninhabitable by the 2030s.⁴⁷⁹

In addition to sectors requiring land for socio-economic development, those aimed at enhancing environmental outcomes and promoting **nature conservation** (Figure 14) also depend on SIDS's limited land and water resources. Protected areas play a vital role in safeguarding the distinctive biodiversity of SIDS and bolstering their resilience to climate change. They also often form the basis of ecotourism, which is one of the most important sectors in many island economies.⁴⁸⁰



FIGURE 15 Degraded land compared to the total land area of SIDS

The data is based on reports submitted to the UNCCD and, where reports were not available, on estimated values derived from global datasets (see Supplement).



Accelerating Trends in Land and Ecosystem Degradation

In addition to the pressure placed on the limited land and water resources of SIDS by multiple, competing land uses, land and ecosystem degradation (Figure 15) and drought are increasingly affecting the health and productivity of the land. The processes of land degradation in SIDS have deep roots in the social, economic and institutional legacies of colonial extractive industries, which have driven soil erosion, fertility loss, biodiversity decline and water pollution to varying degrees and at different times.^{481 482} In many cases, these extractive economic models have persisted, with powerful logging, mining and agricultural interests continuing to drive land degradation in several SIDS.⁴⁸³ These pressures are therefore the result of long-standing structural challenges, as well as contemporary social, economic and environmental conditions. They are closely interconnected with, and often exacerbated by, climate change, biodiversity loss and pollution.⁴⁸⁴

In 2019, an estimated 18.8 million hectares – or 16.5% of the total land area of all SIDS – were reported as degraded, similar to the global average. The Dominican Republic (31.25%), São Tomé and Príncipe (28.50%) and Guinea-Bissau (27.94%) reported relatively high proportions of degraded land. At the same time, 51 million hectares, or 43.2% of the total land area of SIDS, were affected by drought, of which 3% experienced severe drought and 6% extreme drought.⁴⁸⁵ In the Caribbean region alone, land degradation is estimated to cost states USD 4.8 billion annually, with significant impacts on livelihoods especially for the most vulnerable groups.⁴⁸⁶

Key drivers of land degradation in SIDS⁴⁸⁷

- land conversion for urbanisation, such as the expansion of tourism infrastructure and the growth of informal settlements;
- deforestation for domestic uses, including the production of charcoal, firewood, construction materials and traditional medicines;
- land clearing for agriculture, with slash-and-burn practices still being widely used in many areas, as well as overgrazing and wildfires; and
- unsustainable small-scale mining and quarrying.

See Supplement for a more detailed description for each SIDS.

Erosion and landslides are major concerns for many SIDS and are strongly influenced by urbanisation, unsustainable land use, logging and mining. On erosion-prone slopes, clearing vegetation destabilises soils, resulting in gullying and landslides. In forested landscapes in Samoa and Fiji, erosion rates as high as 50 tonnes per hectare per year have been recorded. Storms and other extreme weather events can wash away limited soil resources, often leaving behind unproductive, salinised soils.⁴⁸⁸ Unregulated or excessive livestock grazing on fragile land further accelerates soil erosion. In some cases, limited land availability, weak enforcement of land use planning, poverty and urbanisation rates that exceed the government's capacity to provide basic services have led to unplanned residential and industrial expansion in areas prone to landslides and flooding, amplifying the negative impacts.⁴⁸⁹

On smaller islands and atolls, beaches and near-shore marine sediments account for a disproportionately large share of the total land area. These ecosystems support mangrove forests, coastal littoral forests, coastal plains, estuaries, coral reefs and seagrass beds. Coastal development and population growth have intensified the extraction of biomass from, and conversion of, wetlands, coastal littoral forests and mangrove ecosystems. The removal of vegetation and the subsequent erosion, coupled with the effects of climate change – such as rising sea levels, extreme weather events and groundwater salinisation – are contributing to a 'coastal squeeze'.⁴⁹⁰ It is estimated that around one metre of coastal land is lost globally each year, with losses likely to be more severe in areas facing substantial sea level rise and extreme events, such as SIDS. Caribbean SIDS are projected to lose up to 3,900 km² of land to erosion and rising sea levels by 2050, with the economic value of this lost land estimated to be between USD 406-624 billion.⁴⁹¹ The combined loss of coastal habitats, including mangroves and coastal littoral forests, significantly reduces valuable ecosystem services, such as carbon sequestration, biodiversity, coastal protection, sediment and pollutant filtering, and has a profound impact on local livelihoods.⁴⁹²

Intensive agricultural practices have been identified as a major cause of soil fertility loss and land degradation. These include a heavy reliance on chemical fertilisers and pesticides, shortened or eliminated fallow periods and cultivation on marginal hillsides, all of which lead to soil compaction and erosion, and the depletion of productive topsoil. Over time, such practices reduce soil organic matter and essential nutrients, whilst increasing soil acidification, and thus undermining long-term agricultural productivity.⁴⁹³

In Fiji, for example, studies suggest that the small size of landholdings — with over 60% of farms being smaller than 3 hectares — leads to intensive cultivation based on monocultures and shortened fallow periods in order to maximise output. Competition for farmland also forces subsistence farmers to cultivate steep slopes, since flatter land is often used for grazing or cash crop production. On atolls, replacing natural vegetation with coconut plantations reduces soil carbon, which plays a critical role in moisture retention in these fragile ecosystems.⁴⁹⁴

Although plantation economies have declined in many SIDS, the cultivation of export-oriented crops, such as banana, sugar, cocoa, coffee, and coconut continues, contributing to land degradation and undermining soil health and long-term resilience.⁴⁹⁵ In both the Caribbean and the Indian Ocean, several SIDS have experienced farmland abandonment as a result of declining soil productivity and reduced agricultural profitability.^{496 497}

Deforestation is a major cause of land degradation and the subsequent loss of ecosystem services. Annex 8 provides an overview of the status of forest resources and deforestation rates in SIDS, as well as the main drivers of forest loss. Tropical montane cloud forests (TMCFs), which are among the most threatened terrestrial ecosystems in the world and are present across all three SIDS regions, are declining rapidly due to invasive alien species, rising temperatures, conversion for grazing and agriculture, overharvesting, mining and infrastructure development. TMCFs play a vital role in the water cycle, acting like a 'sponge' that intercepts cloud moisture and channels it into freshwater systems, which is crucial for the water supply. TMCFs also host significant endemic biodiversity, sequester carbon, and play an important role in nutrient cycling.⁴⁹⁸

Deforestation in Comoros

The Comoros Islands are a biodiversity hotspot, yet they suffer from one of the highest rates of deforestation in the world, at 9.3% per year.⁴⁹⁹ Poverty, undernourishment and unemployment remain widespread, with around 72% of the population depending directly on forest resources for their livelihood.⁵⁰⁰ Rapid population growth is increasing the demand for agricultural land. These pressures have resulted in continued clearance of old-growth forests for agriculture, exacerbated by weak institutional capacity at all levels, limited systems of community resource governance, and the urgent need for income and subsistence.⁵⁰¹ Mature trees are typically first harvested for charcoal or construction timber. Then, larger areas are permanently cleared to establish new farming plots on marginal hillsides, often with shortened or no fallow periods. This leads to severe soil erosion and depletes soil fertility, which in turn incentivises further deforestation on even steeper slopes.⁵⁰² Consequently, Comoros has lost 28% of its forest cover over the past 20 years.⁵⁰³ This situation highlights the need for land management systems that can meaningfully support community livelihoods while protecting the natural resources on which they depend. With support from international partners, the Government of Comoros is developing ambitious plans and projects to address these interconnected challenges and work towards this goal.



Regional Spotlight on the Historical Drivers of Land Degradation

The Caribbean Region

As early as the late 15th and early 16th centuries, extensive plantations for export crops such as sugarcane, coffee and tobacco were established in the Caribbean. This displaced indigenous farming systems and led to the clearing of vast areas of natural habitat.⁵⁰⁴ In Barbados, for instance, wetland areas were drained, and by the 17th century, most of the island's once dense forests had been converted into sugar plantations.⁵⁰⁵ Subsequent land reallocation schemes across the Caribbean failed to empower freed slaves and the working classes,⁵⁰⁶ leaving large segments of the population poor and landless.⁵⁰⁷

From the 1950s onwards, bananas replaced sugar as the main export crop on many islands. While this drove economic growth and supported independence movements, it also introduced harmful pesticides that contaminated waterways and damaged terrestrial and marine ecosystems.⁵⁰⁸ The legacy of extractive plantation economies continues to influence perceptions of land and water use to this day.⁵⁰⁹ Barbados's country report to the UNCCD, for instance, notes that the colonial-era belief that 'all bush is bad' persists, prompting landowners to clear shrubland even when it does not increase agricultural productivity.⁵¹⁰

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

SIDS in the AIS region experienced similar colonial land conversions for cash crop plantations. The Maldives was an exception, as it remained a protectorate rather than a colony. As in the Caribbean, fertile agricultural land in Comoros and Guinea-Bissau was seized from Indigenous populations, leading to the decline of the traditional grain, root and tuber food systems, and contributing to systemic inequality and poverty that persists to this day.⁵¹¹ Political instability since independence has kept both countries economically fragile. In Comoros, the government has historically been driven to privatise and auction natural resources to foreign interests in hopes of spurring national economic development.⁵¹²

The previously uninhabited islands of São Tomé and Príncipe, Cabo Verde, Mauritius, and the Seychelles experienced rapid biodiversity loss and widespread clearing of primary forests during the early stages of colonisation. Prior to colonisation, Cabo Verde was covered by dry forests and scrub, which were almost entirely cleared for agriculture or overgrazed. Today, only small, isolated fragments of native vegetation remain.⁵¹³ In an attempt to counter severe soil erosion, extensive afforestation efforts were undertaken, resulting in 21.1% of the country now being covered by non-native planted forests.⁵¹⁴ Similarly, much of the coastal primary rainforest of São Tomé and Príncipe had been cleared by 1540 to make way for sugar plantations. When the sugar industry declined, secondary forests began to regenerate, however, these were also cleared in the 18th and 19th centuries for coffee and cacao plantations.⁵¹⁵



Photo: © Adobe Stock

The Pacific Region

Although the Pacific was colonised later than other regions, the same extractive economic model was established on many islands. Traditional mixed root and fruit systems were replaced by sugarcane, coconut and other export-oriented industries.⁵¹⁶ The legacy of this model is still evident in soil degradation that persists today, as it often takes decades for ecological processes to stabilise and recover.⁵¹⁷ Competition for arable land has also increased due to urbanisation, tourism, and the continued conversion of forest land for agricultural use, as well as increasing soil erosion on mechanised farms.⁵¹⁸ In several countries, mining operations have heavily disrupted soils – for example, in Papua New Guinea and Nauru.⁵¹⁹

Despite land dispossession and subjugation, customary land tenure systems were not completely dismantled in most cases, and traditional land management practices and governance structures survived or blended with Western legal systems to a greater extent than in other regions. However, Pacific islands gained independence with insufficient infrastructure, weak post-colonial governance institutions and rapid demographic growth.⁵²⁰ This has led to increased resource extraction for subsistence needs or by foreign corporations, which have taken advantage of limited regulatory capacity. In larger Melanesian SIDS, such as Papua New Guinea, Fiji and the Solomon Islands, the abundance of natural resources – including minerals and timber – has attracted foreign governments and companies, heightening national tensions in some cases. Notable examples include the Panguna copper mine on Bougainville, which was opened by an Australian subsidiary and caused extensive environmental damage with little compensation to local communities. This became a principal trigger of the ten-year Bougainville Civil War against the Papua New Guinean government.⁵²¹

Foreign fleets also continue to exploit the Pacific's rich marine resources through unsustainable and often illegal fishing practices, depleting fish stocks and further threatening the food security of island communities that depend on fishing.⁵²²

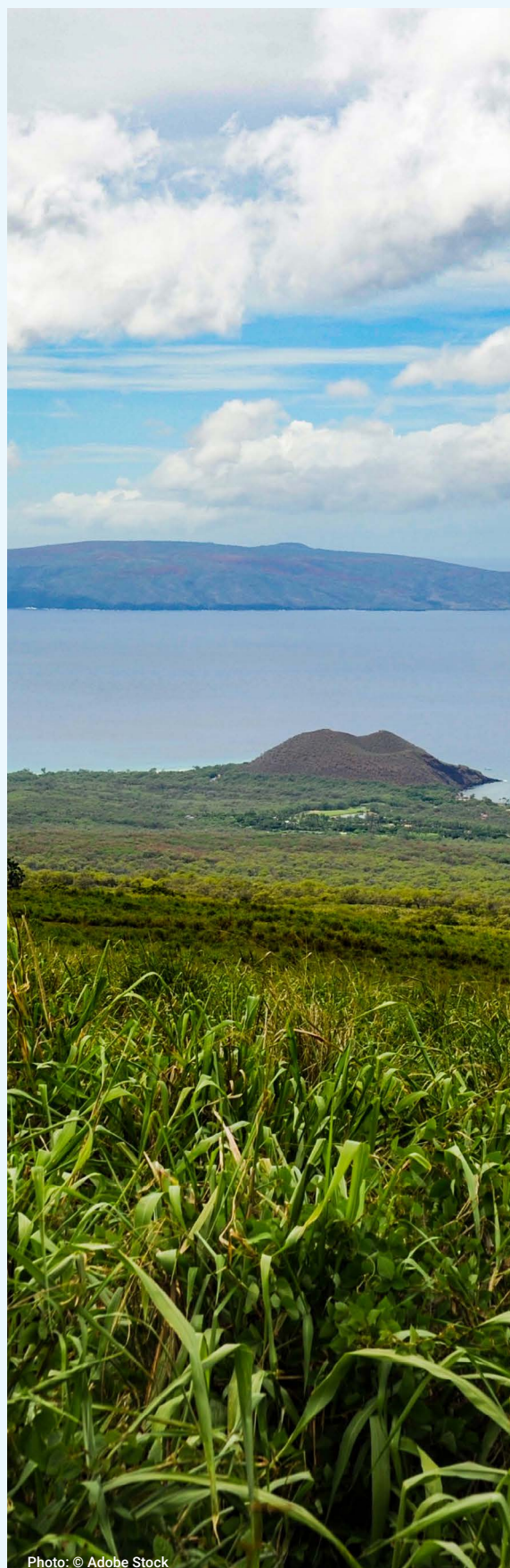


Photo: © Adobe Stock

Drought Risk and Water Stress

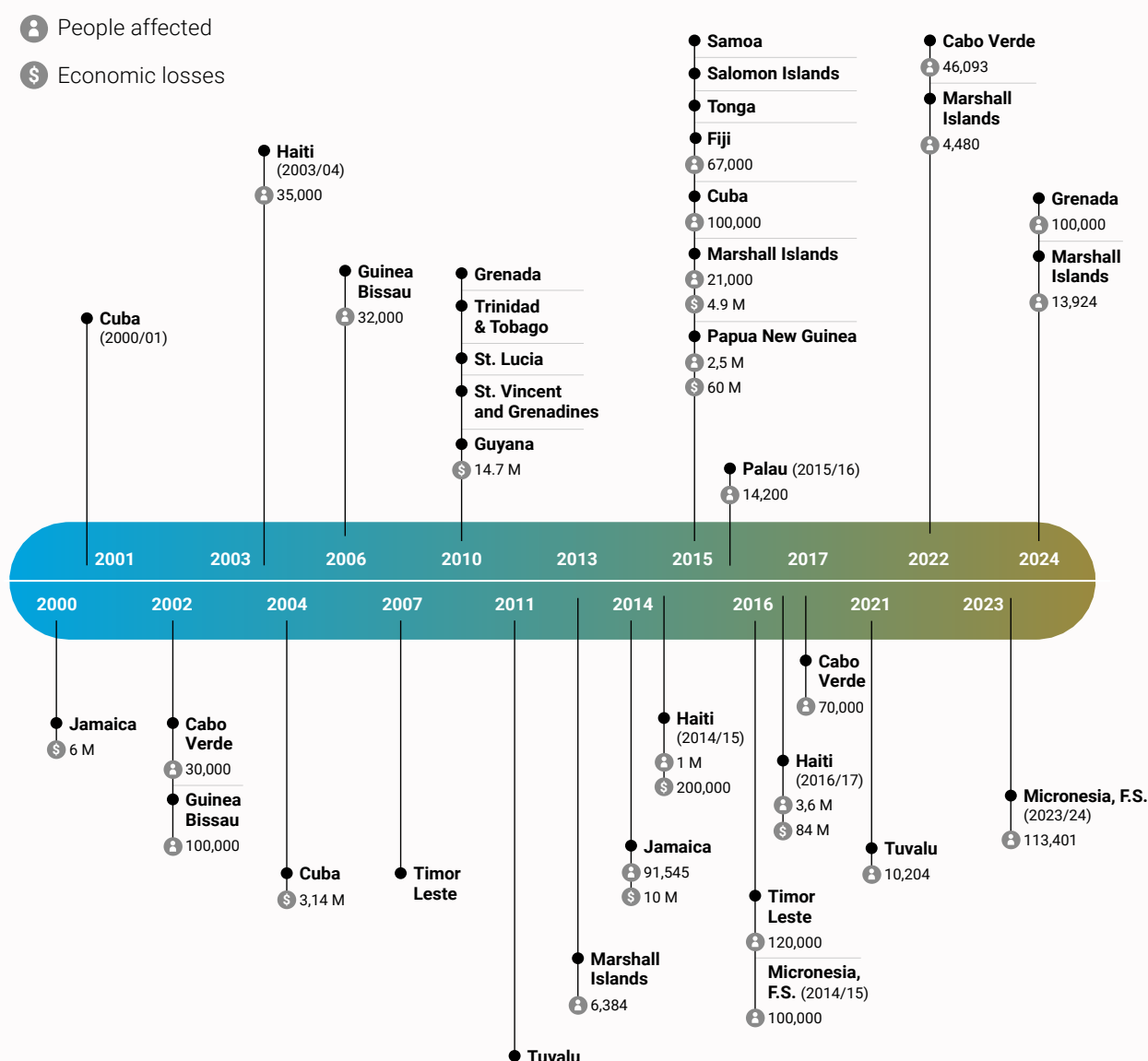
Drought is an increasing concern. Between the periods 1961–1970 and 2014–2023, the total area affected by extreme drought rose by 30% across all SIDS.⁵²³ The smaller, more isolated and poorer islands are usually the most vulnerable, including the Marshall Islands, Haiti, Kiribati, Tuvalu, the Dominican Republic, Cape Verde and the Comoros Islands. The Pacific region is considered the most vulnerable to drought, followed by the Caribbean and AIS regions.⁵²⁴

In SIDS, limited natural water storage, shallow and climate-sensitive freshwater lenses, and heavy reliance on rainfall-dependent systems mean that drought conditions can quickly lead to water stress, including disruptions to drinking-water supplies, which has a knock-on effect on food security, health and livelihoods.^{525 526}

Reduced rainfall limits water availability and diminishes soil moisture and agricultural productivity, contributing directly to food insecurity and malnutrition. These effects highlight the need for a paradigm shift with coordinated governance frameworks that align policies across sectors and scales, moving beyond fragmented responses towards proactive integrated drought-risk management.^{527 528}

Severe droughts have had considerable physical and socioeconomic impacts in the past (Figure 16). In Cuba, for example, periods of severe drought have coincided with high levels of land disturbance.⁵²⁹ Cabo Verde frequently experiences prolonged droughts, exacerbated by limited vegetation cover to protect soils, alongside intense rainfall concentrated within the three-month wet season. These conditions often trigger landslides and the collapse of houses, particularly in areas characterised by unplanned development.⁵³⁰

FIGURE 16 Drought events in SIDS based on the EM-DAT Database⁵³¹



As a result of climate change, droughts are expected to become more intense and frequent, further reducing the availability of freshwater in some of the world's most vulnerable aquatic ecosystems. More severe and frequent droughts can lead to increased food and water insecurity, as well as substantial economic losses.⁵³² In the Pacific SIDS, drought accounts for an estimated 20% of the overall risk landscape, with drought-related agricultural losses reaching USD 217 million in 2019 – representing 20% of total annual losses.⁵³³

In SIDS, drought rarely occurs in isolation, but is increasingly experienced alongside other interacting stressors, such as heatwaves, land degradation and rising sea levels. These factors exacerbate each other, amplify the impact of drought, and complicate risk management. Rising temperatures, shifting rainfall patterns, and, in some cases, soil salinisation are altering the suitability ranges for crops and native vegetation. This has led to declines in species diversity and reductions in non-timber forest products, on which many vulnerable communities depend.⁵³⁴

Droughts and associated freshwater shortages heighten the risk of groundwater salinisation and can significantly reduce freshwater recharge.⁵³⁵ In the Caribbean and Pacific regions, which depend heavily on rainwater harvesting for domestic water supply, droughts severely compromise water availability. In Vanuatu, for example, prolonged drought has forced communities to rely on small amounts of contaminated water left at the bottom of tanks.^{536 537} Rainfall is also critical for subsistence farmers. In Jamaica, for instance, 80% of farmers rely on rainfed agriculture.⁵³⁸ Across SIDS, many farmers lack supplementary irrigation, meaning droughts can seriously impact on food security and community livelihoods.⁵³⁹

Drought can have a significant negative impact on human health and contribute to the spread of infectious diseases. In Barbados, two major drought events (2009/10 and 2014), combined with inadequate water storage, led to outbreaks of gastroenteritis, placing substantial pressure on the health sector. Drought conditions have also contributed to the proliferation of the *Aedes aegypti* mosquito in Barbados and Dominica – the primary vector for Zika, dengue and chikungunya – thereby increasing the risk of vector-borne diseases during dry periods.^{540 541} SIDS are also increasingly affected by airborne pollutants originating far beyond their borders. During droughts in the Sahara, elevated dust levels have been observed in the eastern Caribbean and Cabo Verde, while dust from Asia is transported across both the Atlantic and Pacific Oceans.⁵⁴²

These long-range dust events have been linked to adverse health impacts, including an increased incidence of asthma in the Caribbean and pulmonary disease in Cabo Verde.⁵⁴³

Drought Increases Wildfire Risk in Guyana^{544 545}

Guyana experienced devastating wildfires in 2024. According to the country's Environmental Protection Agency, climate change has lengthened dry seasons and intensified droughts, resulting in extremely dry soils and vegetation. Low rainfall and shifts in humidity can quickly create wildfire conditions, particularly when wind speeds are high. According to NOAA, March 2024 and the January to March 2024 period recorded the highest average global surface temperatures since records began in 1850. Although wildfires are uncommon in tropical rainforests due to consistently high humidity, these climatic shifts left Guyana particularly vulnerable, resulting in wildfires that burned approximately 13,000 km² of land – approximately 6% of the country's total area. Between January and May 2024, over 90,000 fires were recorded, peaking in March. The wildfires severely impacted Indigenous communities, degraded air quality for two years, and affected mangroves, forests, agricultural fields and protected areas. Savanna landscapes experienced particularly intense burning. The South Rupununi Conservation Society (SRCS), a local NGO, noted that traditional burning practices, land use changes, and shifts in vegetation types also contributed to the complex dynamics influencing wildfire risk. Based on research and monitoring conducted through their conservation programmes, key biodiversity refuges, habitats and breeding sites were destroyed, and species recovery has been slow and highly dependent on more favourable climatic conditions.

The impacts of drought are inherently cross-sectoral, reflecting the close interdependencies between land, water and socio-economic systems. Therefore, addressing drought requires an integrated approach that recognises the interlinkages between land, water, food, health and energy systems, and explicitly considers drought as part of a broader, interconnected risk landscape in order to design effective, preventive, land-based drought risk management strategies in SIDS.

A key element of this approach is closing critical data and information gaps, particularly by strengthening hydro-meteorological monitoring, drought early warning systems and climate services. Investing in improved observational networks can significantly improve water management decisions and farm-level planning. This helps to translate climate information into practical action, reducing the human, economic and ecological costs of drought in SIDS.⁵⁴⁶

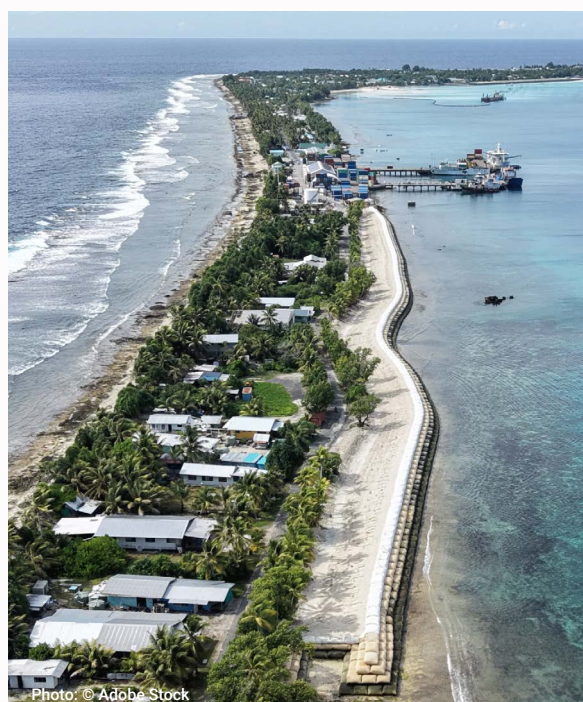
Formulating National Drought Plans in SIDS⁵⁴⁷

In response to the growing risk of drought, the UNCCD has supported countries in shifting from a reactive to a proactive approach to drought risk management. This includes the development of national drought plans, which provide practical examples of preparedness activities, resilience building, and integrated land- and water-based approaches. The national drought plans developed by the Dominican Republic, Grenada and Guyana under the UNCCD Drought Initiative exemplify this desire to shift towards proactive, risk-based management tailored to national contexts. In all three countries, drought is treated as a long-term land-water governance challenge rather than a short-term emergency. There is a strong emphasis on early warning systems, vulnerability assessments and predefined response triggers. The plans integrate hydro-meteorological monitoring with sector-specific actions for water, agriculture, health and disaster risk management, while embedding land-based measures such as watershed protection, sustainable land use planning and soil conservation as core components of long-term resilience. These approaches demonstrate how coordinated institutions, clear planning frameworks and preventative interventions can reduce the impact of drought and provide transferable lessons for SIDS facing similar constraints and risks.

Climate Change and Sea Level Rise

SIDS have long faced heightened risks from storms, cyclones, floods and droughts — risks that are now being intensified by climate change.⁵⁴⁸ Even if global temperature increases are limited to 1.5 °C, SIDS are projected to incur climate-related losses of over USD 200 billion by 2050. Overshooting the 1.5 °C target would more than double these economic damages to an estimated USD 476 billion by 2050, severely constraining and potentially reversing development gains.⁵⁴⁹ SIDS experience the highest disaster costs as a percentage of GDP of any region in the world. This is particularly evident in the Caribbean, where nine of the ten most economically damaging single disasters occurred between 2000 and 2019.⁵⁵⁰

The vulnerability of SIDS to climate change is well documented.^{551 552 553} While pre-colonial settlements were often located inland, the populations and critical infrastructure of most SIDS (e.g., airports, roads, urban centres) are now concentrated in low-lying coastal areas.⁵⁵⁴ Approximately 1.1 million people — around 2% of the SIDS population — currently live on land less than one metre above sea level.⁵⁵⁵ Climate-related disasters in SIDS accelerate existing land degradation trends by disrupting natural habitats, triggering severe soil erosion, and damaging natural, agricultural, and urban landscapes.⁵⁵⁶ Under a 2 °C warming scenario, storms and floods are projected to cause cumulative climate change-attributable losses and damages totalling USD 56 billion by 2050.⁵⁵⁷



Recovery from Hurricane Maria in Dominica

Hurricane Maria was one of the most destructive storms in recent history, and climate change is estimated to have made it nearly five times more likely.⁵⁵⁸ In Dominica, the hurricane damaged over 90% of homes, destroyed virtually the entire agricultural sector and stripped large areas of their primary forest cover. This has led to severe land degradation and losses and damages amounting to USD 1.3 billion — equivalent to 226% of the country's GDP in 2016. In response, Dominica has developed a comprehensive strategy to become the 'first climate-resilient nation', involving the establishment of the Climate Resilience Execution Agency and its Climate Resilience and Recovery Plan for the period 2020–2030. The plan includes investments in climate-smart land use planning, slope stabilisation and storm-resilient agricultural practices.⁵⁵⁹ However, the plan faces an annual financing gap equivalent to 8% of GDP, requiring an increase in donor grants of around USD 63 million per year — approximately three to four times higher than recent levels.⁵⁶⁰

Sea level rise, saltwater intrusion and more frequent droughts will put further strain on the already limited water resources of SIDS, which have some of the world's most threatened freshwater systems.⁵⁶¹ An increase in temperature of just 1°C (from 1.7°C to 2.7°C) could lead to a 60% rise in the number of people

in SIDS facing severe water stress between 2043 and 2071.⁵⁶² In Guinea-Bissau, for example, coastal salinisation has already damaged rice production, a vital staple crop, forcing a shift towards cultivation in higher inland areas. In Mauritius, the aquifer that supplies over half of the country's domestic water is experiencing significant saltwater intrusion.⁵⁶³ In the Maldives, sea level rise is projected to reduce the volume of the freshwater lens by 11–36%. While many SIDS are expected to experience severe reductions in their freshwater supplies, some islands in the northern Indian Ocean and the western Pacific may see an increase in rainfall in the future (Figure 17).⁵⁶⁴

Insular species often respond to climate change by contracting or shifting their ranges, which can significantly alter local ecological dynamics by increasing competition, triggering pathogen outbreaks and altering migratory routes. The ecological impacts of climate change on island ecosystems are particularly difficult to predict because these ecosystems tend to contain a high proportion of keystone species, many of which are endemic. Changes affecting these 'ecosystem engineers' can lead to unforeseeable consequences, such as disruptions to seed dispersal. In the Pacific Islands, for example, extreme temperatures have already caused the death of species such as flying foxes (*Pteropus*).⁵⁶⁵

Rising temperatures will also have serious implications for human health and labour productivity. It is estimated that 4.4 billion potential labour hours were lost in 2023 alone. Between 2018 and 2022, the elderly in SIDS experienced nearly twice as many days of dangerously high temperatures as in the period 1998–2002.

FIGURE 17 Predicted trends in climate metrics, 2040-2060⁵⁶⁶

Region	Air Temperature	Precipitation	Tropical Storms	Sea level rise (trend 1993-2014)
Caribbean	Hotter, especially in the east.	Slightly wetter, more extreme seasonality in east, drier elsewhere.	Fewer, but intense storms.	Slightly greater than global mean (2.5-3 mm/year).
Atlantic	Hotter.	Inconclusive.	More intense.	No data.
Indian Ocean	Inconclusive.	Drier during wet seasons (south-west).	More frequent storms in the north-west, fewer in the east.	Greater than average (4-6mm/year).
Pacific	Hotter.	Wetter in the west, drier with more extreme seasonality elsewhere.	Less frequent storms in the south and northeast, more and stronger storms in the centre.	Western tropical region greater than average (5-11mm/year).

Altered temperature, rainfall and humidity patterns have increased the potential for dengue fever transmission by 33% compared to the 1950s. Furthermore, it is estimated that 2.6 million people (4.8% of the population in 30 SIDS for which data is available) experienced moderate or severe food insecurity due to an increased frequency of heatwaves and droughts compared to the average between 1981 and 2010.⁵⁶⁷

Biodiversity Loss and Invasive Species

The size of SIDS' land areas and their geographic isolation mean that endemic terrestrial species have a limited ability to shift their ranges in response to pressures such as habitat loss and fragmentation, competition from invasive species, pollution and the extraction of natural resources for domestic use.⁵⁶⁸ Past and ongoing pressures have already caused dramatic declines in island biodiversity; islands account for 75% of all recorded extinctions⁵⁶⁹ and 41% of species that are currently at risk of extinction.⁵⁷⁰ These losses can trigger cascading effects, weakening the terrestrial and marine ecosystems that support island livelihoods, economies and cultures while eroding globally unique genetic diversity and irreplaceable natural heritage.^{571 572}

Despite making up less than 1% of the world's land area, SIDS host nearly 30% of global coral reefs,⁵⁷³ 11% of all mangrove forests,⁵⁷⁴ and extensive seagrass beds and wetlands.⁵⁷⁵ These coastal habitats are critical for sustaining both global and local marine biodiversity, on which many SIDS depend. However, pressures from land use – combined with climate change, overfishing and plastic pollution – are driving the widespread degradation of these ecosystems.⁵⁷⁶

Invasive species are considered the primary driver of extinctions in island ecosystems⁵⁷⁷ and are expected to become more prevalent due to climate change and other pressures such as overexploitation, urbanisation, agricultural intensification, tourism and global trade.⁵⁷⁸ Exotic plants continue to displace native vegetation at alarming rates, while non-native mammals (e.g., rats, wild pigs) exacerbate habitat loss, degradation and fragmentation.⁵⁷⁹ Around 75% of species globally that are threatened by invasive alien species or disease are found on islands, where the impact is far more severe than on continental systems. In fact, 95% of extinctions attributed to invasive species have occurred on islands. Pacific SIDS host a significantly higher number of alien species, while the AIS and Caribbean regions are experiencing faster rates of accumulation.⁵⁸⁰ In many low-lying islands, invasive species have completely

displaced native biota as land use change creates favourable conditions for their introduction and spread.⁵⁸¹

In agricultural landscapes, invasive plants diminish the area of land available for grazing or cultivation, thereby reducing productivity.⁵⁸² This affects human health, food security and export earnings from tourism, fisheries and agriculture. In Seychelles, alien mammalian predators are estimated to cause around USD 21 million in damage each year,⁵⁸³ while the oriental fruit fly has threatened the NZD 3 million fruit-export industry of the Cook Islands. Across the Pacific Islands, fruit flies, termites, ants and plant pathogens have caused significant economic losses, threatening export industries, reducing subsistence incomes and impacting human health.⁵⁸⁴

Waste Management and Pollution

Pollution is another major threat to terrestrial ecosystems in SIDS. Assessments have identified a variety of harmful substances, including microplastics, pathogens, persistent organic pollutants (POPs), hydrocarbons and heavy metals, in SIDS ecosystems. Additional pollutants, such as organic compounds, particulate matter, nitrous and sulphur oxides, and ozone, are present in the atmosphere. While some pollution originates locally, much of it results from global increases and long-range transport.⁵⁸⁵

SIDS are highly vulnerable to, and significantly affected by, global plastic pollution. Although they produce very little plastic, it is embedded in every stage of production, consumption and trade.⁵⁸⁶ Plastic waste often overwhelms waste management facilities and sewage systems, putting additional strain on other infrastructure. Pacific SIDS, for example, are grappling with a severe legacy waste crisis, with plastic pollution and hazardous materials accumulating in terrestrial and marine environments well beyond their management capacity, despite the fact that much of this waste originates outside the region and arrives via transboundary ocean currents and global supply chains.⁵⁸⁷ Microplastics are a particular concern as they attract and concentrate hydrophobic compounds (such as POPs) from surrounding seawater. These compounds can then bioaccumulate and biomagnify through the food chain, potentially impacting human health.^{588 589}

Inadequate waste management systems and very limited land availability present a major challenge for waste management in SIDS. It is estimated that between 0.75 and 2.8 kg of solid waste is generated per person each

day. This includes organic waste, which accounts for around 50% of all waste, as well as paper, plastic, glass, textiles and metals. Electronic waste is also a growing concern. Most SIDS primarily rely on landfills for waste disposal,⁵⁹⁰ while some solid waste is burned or dumped in surrounding mangroves or coastal waters. High tourist numbers exacerbate these issues by significantly increasing the volume of waste produced.⁵⁹¹

Waste Management in the Maldives ⁵⁹²

Rapid economic growth in the Maldives, driven by the tourism sector, has led to an over 200% increase in municipal solid waste since 1999, with 240,000 tonnes generated in 2019 alone, considerably higher than in several neighbouring Asian countries on the continent. In the capital Malé, which generates 63% of the country's waste (48% of which is organic), the municipality pays private contractors to collect and dispose of waste in landfills, with limited segregation. Around 10% of the country's plastic waste is exported to India annually for recycling. On outer islands, waste collection and recycling are rare; inorganic and hazardous medical waste is buried or burned, posing a significant risk to human and environmental health. Many islands have reported vegetation die-off, damaged root systems and coastal erosion as a result of open burning and inadequate waste management practices. As part of its carbon-neutral initiative, the Government of the Maldives is exploring solutions to address its municipal solid waste challenges, including developing waste-to-energy systems.

Another major challenge is the lack of adequate sanitation and sewage systems. Only around one third of SIDS have access to sewage systems, with the remaining two thirds relying on systems that do not safely manage human waste. In Haiti, for instance, only around 20% of the population has access to improved sanitation facilities, which are frequently shared and poorly maintained. In many SIDS, sewage is discharged directly into the ocean without treatment, and only around 59% of wastewater receives secondary treatment. Statistics on improved sanitation and access to drinking water often hide interruptions or shortages in supply during dry periods.⁵⁹³ Vulnerable groups, particularly women, are disproportionately affected by limited access to sanitation and clean drinking water, as they often have to walk long distances to fetch water, exposing them to the risk of assault and other forms of gender-based violence.⁵⁹⁴

Groundwater pollution caused by wastewater and contaminated agricultural runoff can intensify water stress and reduce resilience to drought. The increasing and indiscriminate use of pesticides can have devastating effects on small island environments, especially given their steep topography and the close interlinkages between their terrestrial, freshwater and marine ecosystems. Many pesticides are POPs, which remain in ecosystems for long periods, travel over vast distances and accumulate in the food chain, threatening biodiversity and human health. The agricultural sector can also be severely impacted if honeybees and other pollinators are harmed.⁵⁹⁵



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Structural Barriers to Sustainable Land and Water Management



Small Island Developing States (SIDS) face an urgent paradox: they possess extraordinary natural resources that must be conserved and restored, yet they are simultaneously exposed to mounting environmental and socio-economic pressures that accelerate land degradation and the depletion of their natural capital. These pressures are also the main obstacle to the wider adoption of sustainable land and water management practices, which are needed to advance sustainable development in SIDS. This chapter examines some of the structural and technical barriers that SIDS face when addressing the challenges outlined in the previous chapter.

Land Governance and Tenure Security

Tenure and land governance systems in SIDS are complex and closely linked to local cultural customs, national policies, the impacts of climate change, and biodiversity conservation priorities. While some SIDS demonstrate stronger-than-average governance indicators and uphold high levels of free expression and accountability,^{596 597 598} others struggle with weak governance institutions, informal tenure arrangements, land conflicts and tensions, and recurrent resettlements, which are often prompted by frequent natural disasters. These factors can pose major barriers to the implementation of sustainable

land and water management practices and effective nature conservation.⁵⁹⁹

In some cases, hierarchical governance structures, which are often remnants of colonial administrations, have proved ineffective in addressing contemporary environmental and food security challenges. Centralised systems and top-down decision-making can hinder the implementation of sustainable natural resource management, agricultural innovation, and much-needed collaboration between national and local stakeholders, often dispersed across multiple islands. This fragmentation restricts collective action.⁶⁰⁰ In several SIDS, ongoing conflict or political fragility further limits opportunities for responsible and inclusive land governance. Examples include Comoros, Guinea-Bissau and São Tomé and Príncipe in the AIS region, Haiti in the Caribbean region, and the Marshall Islands, Kiribati, Papua New Guinea, the Federated States of Micronesia, Tuvalu, Timor-Leste and the Solomon Islands in the Pacific region.⁶⁰¹

Insecure land tenure often forces landowners to adopt short-term planning strategies, which discourages investment in sustainable land management and restoration, and instead incentivises environmentally damaging practices.⁶⁰² The legacy of colonial plantation economies has entrenched extreme inequalities in land ownership and control.⁶⁰³

Furthermore, many SIDS lack the financial, technical and administrative capacity to recognise, document and enforce legitimate land rights, or to support sustainable management practices. These limitations

reflect broader structural challenges, including brain drain, fragile economies, reliance on costly imports, and the significant financial burden of borrowing and disaster recovery.^{604 605}



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Regional Spotlight on Land Tenure

The Caribbean Region

In the Caribbean region, tenure insecurity remains high due to the prevalence of informal arrangements, such as unrecognised communal tenure and squatting.⁶⁰⁶ In Saint Lucia, for instance, local legislation does not fully recognise family land tenure, resulting in inaccurate land administration records. Legal procedures and penalties only apply to formally registered owners, leaving management practices on informally held land largely unregulated.⁶⁰⁷ In Belize, land leases can be revoked if holders fail to 'develop' the property, which incentivises periodic clearing even when it does not improve yields.⁶⁰⁸ Common tenure-related issues across Saint Lucia, Jamaica, Grenada, Dominica and Trinidad and Tobago include absentee landownership, landlessness and squatting, unequal land access and restrictive or short-term leases.⁶⁰⁹

Due to their heavy reliance on luxury international tourism, vulnerability to disasters, substantial debt, and limited land availability, many governments and communities are under pressure to sell land for private tourism or luxury real estate development.⁶¹⁰ These pressures often intensify in the aftermath of disasters, when (i) private companies can exploit the need for liquidity, (ii) community advocacy is weakened by displacement, or (iii) political instability creates conditions conducive to land grabbing. Following Hurricane Irma in 2017, for instance, the government of Antigua and Barbuda declared Barbuda uninhabitable and evacuated almost the entire population. It then used the reconstruction process to accelerate luxury tourism and private real estate developments.⁶¹¹

The Atlantic, Indian Ocean, and South China Sea (AIS) Region

Singapore has an advanced land administration framework, largely based on freehold and leasehold arrangements.⁶¹² Similarly, Mauritius maintains secure and well-established land titles and rights, supported by a modern 'Land Administration, Valuation and Information Management System'.⁶¹³ The Maldives guarantees equitable rights to housing and land resources; however, challenges remain in allocating plots of land, especially on outer islands, which remain unused due to migration towards islands with tourism resorts offering greater employment opportunities.⁶¹⁴

Other countries in the AIS region have faced greater challenges in reconciling land tenure systems and establishing effective land governance frameworks following independence. In Guinea-Bissau, for example, traditional authorities administered land resources at the local level under colonial rule, even though all land formally belonged to Portugal. Following independence, community committees (*Comités de Tabanca*) were established to assist with land administration, but were unsuccessful due to their limited legitimacy among rural populations. Following a civil war, persistent political instability further hindered the development of land administration systems. Currently, all land in Guinea-Bissau is publicly owned, which precludes private land rights and requires public institutions to primarily administer land through concessions.⁶¹⁵

After independence, all land in São Tomé and Príncipe was nationalised and a planned economy based on state-owned agricultural enterprises was established, aiming to generate sufficient revenue to develop other sectors. However, a lack of incentives, low investment, corruption and mismanagement led to the system's failure, resulting in a subsequent transition to private agriculture. A major agrarian reform redistributed more than two thirds of plantation land to smallholders under usufruct rights. Nevertheless, volatility in the agricultural sector and limited productivity have driven significant rural-to-urban migration, placing heavy pressure on urban land demand and resulting in tenure insecurity for low-income urban residents. Today, urban land is predominantly privately owned, while rural land is mostly held under usufruct rights through concessions, although private ownership is also recognised.⁶¹⁶

Land administration records in AIS SIDS countries are often limited or fragmented, which complicates governance efforts. For example, Cabo Verde previously received support to reconcile the multiple land records systems held by different institutions, which had caused confusion over land boundaries, ownership and unauthorised or informal land sales.⁶¹⁷ In Comoros, the occupation of colonial estates producing vanilla and perfume crops during the revolutionary

crisis of 1975–1976 led to the destruction of all land records in large bonfires. It was only in 1996, with the support of bilateral and multilateral organisations, that new land governance systems were established, based on a model of land 'reformation' designed to stabilise smallholder agriculture. The resulting land

governance system, which is based on Islamic law (the Shafi'i school), combines increasing levels of private land ownership with customary systems. Due to strong ideological and religious principles, obligations towards the community remain embedded even in privately held land.⁶¹⁸

The Pacific Region

During the period of colonial administration, the majority of land in the South Pacific was managed by chiefs and their relatives. Consequently, the majority of land remains under indigenous stewardship and is governed through customary systems today. Fiji, the Cook Islands, the Marshall Islands, Kiribati, Niue, Nauru, the Solomon Islands, Samoa, Tuvalu, Tonga, Papua New Guinea and Vanuatu all have long-standing customary land tenure systems (Table 10). These systems are based on the idea that the wider community is responsible for protecting healthy land for current and future generations. There is a strong cultural belief that land must be preserved to ensure intergenerational equity.⁶¹⁹

TABLE 10 Land by system of tenure in Pacific SIDS (2008)⁶²⁰

	Public ^a	Freehold ^b	Customary
Cook Islands	Some	Little	95%
Timor Leste^c	Some	Some	Most
Fiji	4%	8%	88%
Federated States of Micronesia	35%	<1%	65%
Kiribati	50%	<5%	>45%
Marshall Islands	<1%	0%	>99%
Nauru	<10%	0%	>90%
Niue	1.5%	0%	98.5%
Palau	Most	Some	Some
Papua New Guinea	2.5%	0.5%	97%
Samoa	15%	4%	81%
Solomon Islands	8%	5%	87%
Tonga	100%	0%	0%
Tuvalu	5%	<0.1%	95%
Vanuatu	2%	0%	98%

a Includes crown land and land owned by provincial and local governments.
b Includes land that is not strictly freehold, but similar in characteristics, such as the 'perpetual estates' found in the Solomon Islands.
c At the time the original table was compiled, Timor Leste did not have a separate legal category of 'customary land', even though most of its rural land remains under customary forms of authority.

However, these customary tenure systems are often inadequately reflected in post-independence legal frameworks, and their underlying principles are frequently challenged by Western notions of property rights, particularly with regard to participation in market-based economies.⁶²¹ Environmental degradation and the high frequency of natural disasters present major challenges for land governance and administration in Pacific SIDS. These issues are further exacerbated by rapid urbanisation, the growth of informal settlements, land disputes and social tensions.⁶²²

Land is often leased for short periods, which incentivises tenants to prioritise immediate economic returns over long-term sustainable management. Meanwhile, population growth, rural–urban migration and a shortage of affordable land for housing and commerce have led to the growth of informal settlements on state and customary lands, particularly in Melanesian SIDS. These settlements often lack clear tenure arrangements, resulting in disputes, inadequate basic infrastructure and unmanaged waste disposal.⁶²³ In the Federated States of Micronesia, land ownership is based on a matrilineal system that gives women a central role in decision-making. The loss of productive land due to drought, land degradation or climate change-driven sea level rise not only compromises economic wellbeing, but also cultural identity — particularly for Chuukese women, for whom land is closely linked to lineage, belonging and social status.⁶²⁴

Absentee landlordism poses a significant threat to land tenure in Pacific SIDS. Many migrants retain rights to customary land despite living overseas. They can influence land use decisions from afar, block proposed developments and undermine the tenure security of those who remain on the land. This contributes to social tensions and reduced rural productivity.⁶²⁵ In the Cook Islands, for instance, children inherit equal shares of land, despite around 90% of Cook Islanders living abroad. This leads to the fragmentation of land parcels, which limits the ability of resident families

to make productive use of the land. In Samoa, chiefs may reassign family farmland when members move overseas; however, this practice is becoming increasingly difficult to manage due to the scale of emigration. In Tonga, the government attempted to cancel the leases of absentee landlords, but this decision was overturned by the courts. In Kiribati, the traditional rule that allows land to be reallocated to close relatives if someone has been absent for more than seven years is rarely enforced nowadays.⁶²⁶

Foreign Logging Companies in the Solomon Islands

The government of the Solomon Islands lacks the financial, technical and human resources to implement, monitor and enforce conservation regulations, or to prevent corruption and corporate tax evasion. Consequently, foreign logging companies have exploited customary land tenure arrangements, often bypassing communal decision-making processes by negotiating logging contracts with individuals instead of consulting the tribes or clans that collectively hold land rights under customary systems. This has enabled many timber companies to violate environmental regulations, marginalise local communities, and avoid paying taxes.⁶²⁷ Unsustainable forestry practices have caused extensive soil erosion and severe flooding, destroying forests that local communities depend on for food, water and timber. The combined effects of environmental degradation, weak governance and exploitative commercial practices pose a significant threat to livelihoods and ecological stability in the Solomon Islands.⁶²⁸ The Ministry of Forestry and Research is therefore advancing comprehensive reforms to the forestry sector. These include the development of a Downstream Processing and Value Adding Policy and a National Carbon Trading Policy. The aim is to shift away from raw log exports, strengthen sustainable forest management, and create new economic incentives for forest conservation and climate resilience.^{629 630}

Customary Land Tenure in the Cook Islands^{631 632 633}

The land tenure system in the Cook Islands is deeply rooted in customary practice and is central to cultural identity, family structure and the responsible stewardship of natural resources. Across most of the islands, land matters are administered through the courts. However, in Mitiaro, Mangaia and Pukapuka, customary approaches still predominate, with land rights being inherited or allocated within extended families according to lineage and tradition. Land ownership is therefore strongly tied to genealogy, and proof of lineage is essential. Land rights remain collectively held, and even Cook Islanders living abroad retain strong affiliations with their ancestral lands through these genealogical connections.

The Cook Islands currently have a population of between 10,000 and 12,000 people, while a significantly larger population lives in New Zealand and Australia. Many of these people are of second or third-generation New Zealand or Australian descent, but they maintain close cultural and familial links to their islands of origin. Prolonged outward migration has resulted in depopulation across many islands, loss of human capital and fragmented decision-making. Large areas of land remain idle or underutilised due to the absence of resident landowners. Nevertheless, despite the geographical distance, the strong sense of belonging to the land offers hope for the future management and use of land, guided by customary authority and collective responsibility.



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Traditional Knowledge and Social Capital

The indigenous peoples of SIDS possess unique cultural knowledge and philosophies regarding the sustainable management of land and water resources, which are based on the principles of coexistence and long-term stewardship. This knowledge has evolved over generations and is finely adapted to the specific natural environments and circumstances of each island. However, the erosion of traditional knowledge and practices is a major concern, as generalised land and water management approaches are often unsuitable, and sometimes completely inappropriate, for the ecological, cultural and socio-economic contexts of SIDS.^{634 635}

Loss of Traditional Knowledge Impacting Resilience in Fiji ⁶³⁶

In many Pacific Island cultures, oral traditions play a central role, offering valuable insights into environmental phenomena that occurred in pre-literate times. Traditional knowledge was historically embedded in inclusive decision making, community unity, open communication, and a strong sense of empowerment and agency in shaping collective futures — all of which greatly enhanced community resilience. Traditional knowledge in Fiji has eroded significantly over the past 150 years of European settlement. What remains is often only remembered by older generations in more remote or marginalised areas. The introduction of Christianity in the second half of the 19th century had a profound effect on indigenous communities, many of which lost land to settlers or suffered from introduced diseases. More recently, oral traditions, which were once passed on through rich storytelling practices, have weakened as communities have become less self-sufficient and more reliant on digital communication, with a greater focus on income generation. Older rural generations tend to value oral traditions highly, seeing them as practical and well-adapted to village life. However, many younger people now have limited exposure to traditional ecological knowledge.

Another factor contributing to the erosion of traditional knowledge is the weakening of family values and societal structures in SIDS. This has led to a loss of social cohesion. This decline is evident in many areas of public life, including rising crime and violence, changing gender relations, limited opportunities for young people

and increased migration. These pressures are often exacerbated by globalisation and external shocks, such as economic and financial crises, which exacerbate inequality and undermine social protection mechanisms. In some cases, the erosion of traditional support systems creates space for informal structures to fill the void, including antisocial networks or gangs. Alternatively, it can drive further emigration, which in turn weakens community safety nets and the intergenerational and neighbourly ties that once sustained social resilience.⁶³⁷

Social Capital and Agricultural Innovation in the Caribbean ⁶³⁸

In many Caribbean SIDS, the agricultural sector is transitioning from large-scale, export-oriented cash crop production to domestic markets and locally owned farming systems. This shift is strongly supported by the Caribbean Community (CARICOM), which aims to strengthen the agricultural sector in order to enhance food security and promote sustainable rural development, for example through the Jagdeo Initiative. Agricultural innovation has been identified as essential for improving the resilience of smallholder farming systems. However, a study assessing the innovation potential of smallholder farmers in the Caribbean found low levels of technology adoption and innovation, ranging from 18% in St. Kitts and Nevis to 51% in Guyana, with a regional average of 38%. An even smaller proportion of farmers actively seek technical assistance. Of those who do, the majority rely on research institutes (20%) and friends (16%). Decentralised social networks — and the knowledge passed down through generations — play an important role in shaping management decisions and agricultural practices, thereby contributing to innovation potential and resilience. Strengthening social networks and promoting social learning were identified as key enablers of improved food production systems.

Migration and Employment

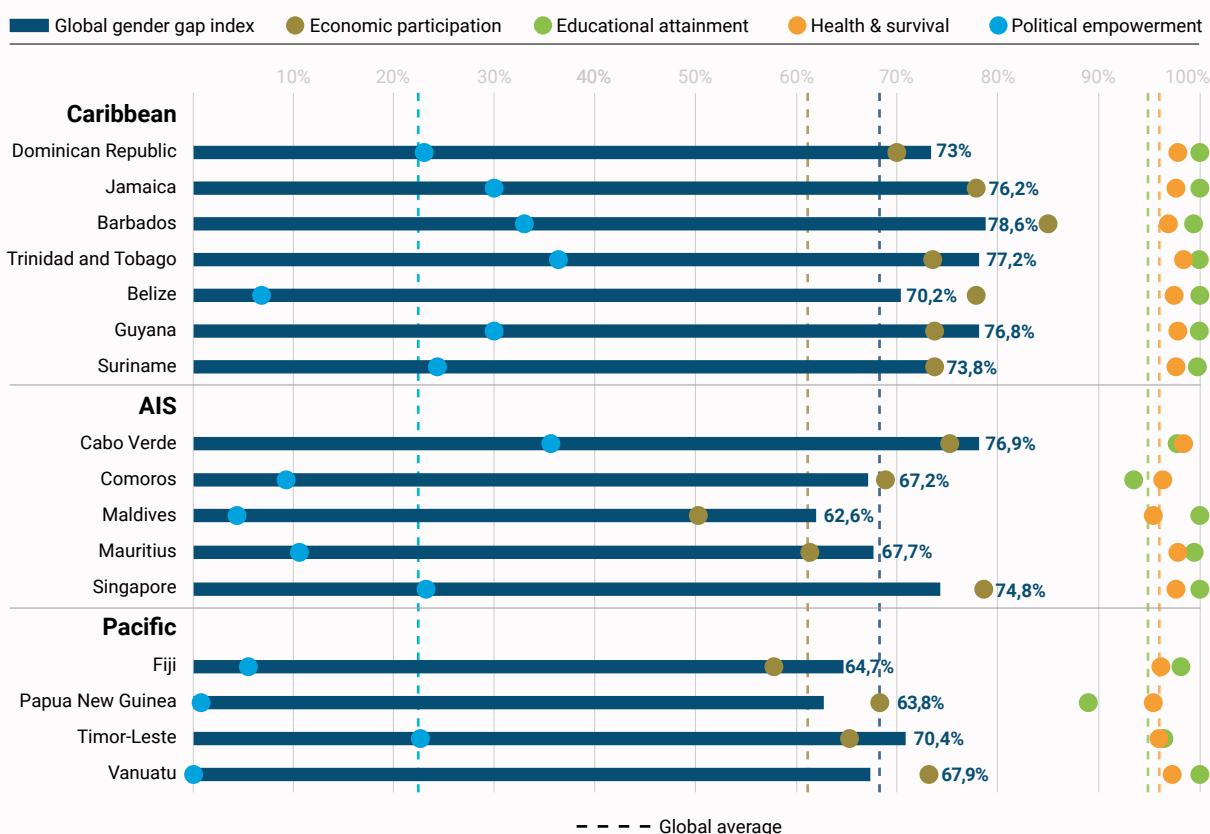
The small population sizes of SIDS often result in limited institutional capacity in both the public and private sectors.⁶³⁹ A sufficiently skilled and trained workforce in fields such as science, technology, economics and governance is key to sustainable development,⁶⁴⁰ yet many SIDS lack the resources to strengthen human capacity. While SIDS government officials and natural resource managers recognise the need to build resilience,

tremendous pressure exists to prioritise more urgent concerns regarding economic development, social stability, public education and healthcare.⁶⁴¹ These constraints are exacerbated by unique challenges requiring specialised skills, as well as high levels of emigration among skilled workers. On average, SIDS lose around 50% of their talent and skills.⁶⁴²

Small economies and limited job opportunities drive many people to seek employment abroad, contributing to a severe brain drain. Samoa, Jamaica, the Federated States of Micronesia, Haiti, Guyana, Cabo Verde, Grenada, and Fiji are among the 20 countries with the highest scores on the Human Flight and Brain Drain (HFBD) Index, which measures the economic impacts of lost human capital.⁶⁴³ Emigration rates for both low-skilled workers (15.6%) and university graduates (50.8%) are significantly higher than those of other high-income or developing countries. Due to shortages of skilled labour, some SIDS rely heavily on expatriate workers – even when domestic unemployment rates are high.⁶⁴⁴ The outflow of young, educated, and skilled professionals from already small populations has led to demographically imbalanced economies that struggle to provide decent employment opportunities and adequate social services.⁶⁴⁵ This weakens the ability of local communities and institutions to retain the expertise and resources necessary for effective sustainable land and water management.⁶⁴⁶



FIGURE 18 Overview of the Global Gender Gap Index (see Annex 10)



Growing SIDS Diaspora

In addition to brain drain, SIDS must respond to forced population displacement caused by climate change and land degradation while maintaining demographic balance, cultural continuity and strong connections with their diaspora.⁶⁴⁷ Often, the diaspora population of SIDS is larger than its resident population: Grenada, for instance, has around 100,000 residents, while approximately 230,000 Grenadians live abroad.⁶⁴⁸

Structural challenges within SIDS economies, including limited formal employment opportunities and persistent outward migration, result in high levels of employment in the informal sector. This accounted for 56.2% of total employment in 2022.⁶⁴⁹ Although traditional gender roles have shifted (Figure 18), with women increasingly accessing education, entering the workforce and owning land, their employment opportunities remain less diverse than those of men. Women are overrepresented in tourism and the informal sector, both of which are highly vulnerable to natural disasters, global pandemics and climate change. Following crises, women and girls are often disproportionately impacted: they are more likely to lose access to social protection and income, take on additional unpaid care responsibilities, and face an increased risk of gender-based violence.^{650 651}

Declining economic opportunities also affect men, many of whom struggle to find stable employment. This can contribute to a 'crisis of masculinity', characterised by feelings of hopelessness, as well as rising levels of violence and crime, including domestic violence. These dynamics reflect deep socio-economic stresses that intersect with environmental pressures, shaping the resilience and well-being of communities across SIDS.⁶⁵² Youth unemployment rates of up to 50% are also a significant challenge in SIDS, highlighting the growing disparity between educational systems and available job opportunities. High youth unemployment can lead to increased crime and violence, drug abuse and teenage pregnancies.⁶⁵³

Finance, Debt and Market Dependency

In SIDS, sustainable land management and restoration initiatives are constrained by chronic financial resource shortages, which are rooted in structural economic vulnerabilities and compounded by external pressures. Limited domestic markets and high production costs restrict opportunities for generating internal revenue, while heavy reliance on imports increases exposure to global price fluctuations and supply chain disruptions. These dynamics increase vulnerability to external shocks and often contribute to cycles of debt distress, which further restrict fiscal space for

environmental investment. Many SIDS rely heavily on official development assistance (ODA) and climate finance, which frequently fail to align with their specific needs and contexts. Taken together, these constraints create a financial landscape in which transformative land management and restoration efforts are difficult to initiate and sustain.

Limited Domestic Markets and High Import Dependency

The small and highly dispersed populations of SIDS limit the development of domestic markets and reduce opportunities to benefit from economies of scale.⁶⁵⁴ Limited competition among local producers leads to inefficiencies and increased costs. The remoteness and geomorphology of many SIDS, which often comprise multiple, scattered islands, also result in exceptionally high transportation costs, reducing their competitiveness in global markets. These factors significantly constrain income-generating activities, leading to heavy reliance on a few key sectors based on natural resources or service industries. This leaves limited scope for diversifying their economies.⁶⁵⁵ Around 42% of SIDS' export revenue comes from inbound tourism, making them highly vulnerable to external shocks such as economic crises, the COVID 19 pandemic, and natural disasters.⁶⁵⁶

Many SIDS have economies that are driven by imports, with large trade deficits that are financed through import credits, ODA, foreign direct investment and international reserves.⁶⁵⁷

Since the 1990s, food imports have increased by between 40% and 60%, and over half of Caribbean and Pacific SIDS now import more than 80% of their food. Key imports include meat, dairy products, wheat, maize and highly processed foods. Around 20% of export revenue is spent on food, compared to a global average of 5%. Some SIDS spend a higher proportion of their export revenue on food, including Dominica (103%), St. Kitts and Nevis (67%), Barbados (49%), and Jamaica (48%).⁶⁵⁸

As with food, many SIDS are heavily dependent on imported fossil fuels for transport and energy. In Pacific SIDS, for example, around 75% of imported oil is used by the transport sector.⁶⁵⁹ Approximately 90% of all energy consumed in SIDS comes from oil imports,⁶⁶⁰ which account for more than 30% of foreign exchange earnings each year.⁶⁶¹ On average, SIDS spend between 5% and 10% of their GDP on fossil fuels.⁶⁶² Their heavy dependence on oil makes SIDS four times more vulnerable to volatile energy prices than continental

regions, resulting in a disproportionately high inflation pass-through.^{663 664} Delivery inefficiencies and frequent supply disruptions further constrain development and affect livelihoods. These dynamics also drive up electricity costs, which are typically higher than in most other economies. Fossil fuels are often heavily subsidised, draining public resources that could otherwise be invested in the transition to renewable energy⁶⁶⁵ — a process that requires significant upfront capital.⁶⁶⁶

Access to Energy in SIDS

Overall, access to electricity reached approximately 91% in 2022. There were significant gains in the Pacific region, where access increased from 65% in 2009 to 85% in 2022. However, some countries still have much lower levels of access: Vanuatu (62%), Guinea-Bissau (40%) and Papua New Guinea (20%). National averages often mask stark internal disparities. In Haiti, for instance, 84% of people in urban areas have access to electricity, compared to just 3% in rural areas. Similar inequalities exist in terms of access to clean cooking fuel: while some SIDS have achieved universal coverage, others report extremely low rates. In Guinea Bissau, for example, only 1% of the population has access to clean cooking fuels, compared to 5% in Haiti and São Tomé and Príncipe. Most SIDS predominantly generate electricity using oil, and the share of renewable energy generation remains relatively low in most countries (Figure 19), with notable exceptions such as Haiti (77%), Guinea-Bissau (87%), Papua New Guinea (55%) and the Solomon Islands (50%) have a high share of renewable energy consumption.⁶⁶⁷

FIGURE 19 Access to electricity and the main sources of energy in SIDS (see Annex 11)

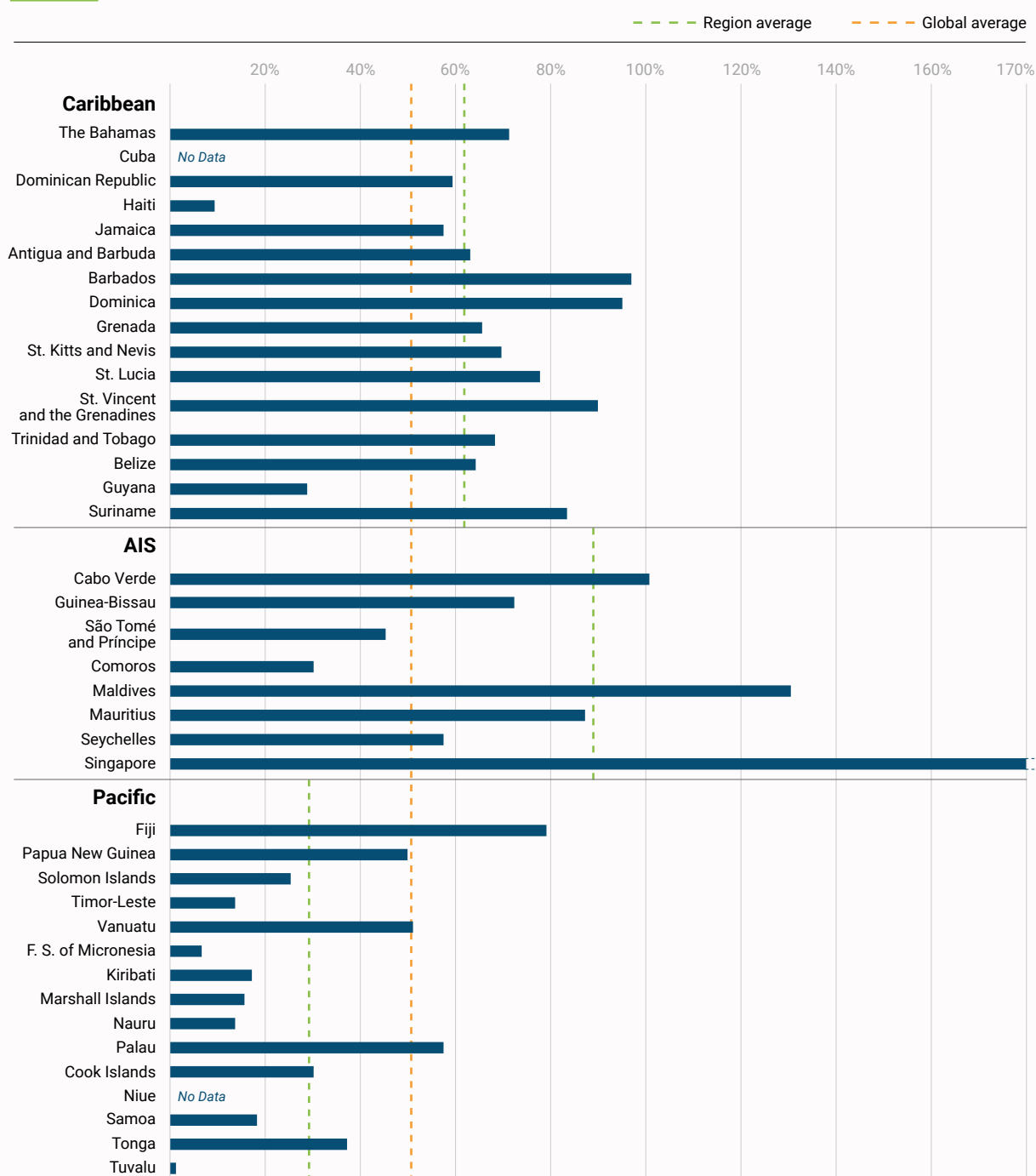


Vulnerability to External Shocks and Foreign Debt

The restricted economies of SIDS, their dependence on imports and the resulting vulnerability to environmental and economic shocks lock them into high and often unsustainable levels of debt.⁶⁶⁸ External debt levels range from 48% to 51% of gross national income (Figure 20). This debt is largely accumulated to finance emergency responses to natural disasters rather than due to financial mismanagement or weak economic policies. This challenge is compounded by the fact that 44% of public international finance provided to SIDS comes in the form of debt.⁶⁶⁹

On average, natural disasters cost SIDS 18% of their GDP, compared to a global average of just 3%.⁶⁷⁰ Many SIDS, particularly in the Caribbean and Pacific regions, face extremely high disaster recovery costs, forcing governments to allocate a large proportion of their revenue to debt repayment. Consequently, over 40% of SIDS are either approaching or already experiencing debt distress.⁶⁷¹ Collectively, SIDS have spent more on debt repayments than they have received in climate finance.⁶⁷²

FIGURE 20 Gross debt levels as percentage of GDP (see Annex 12)

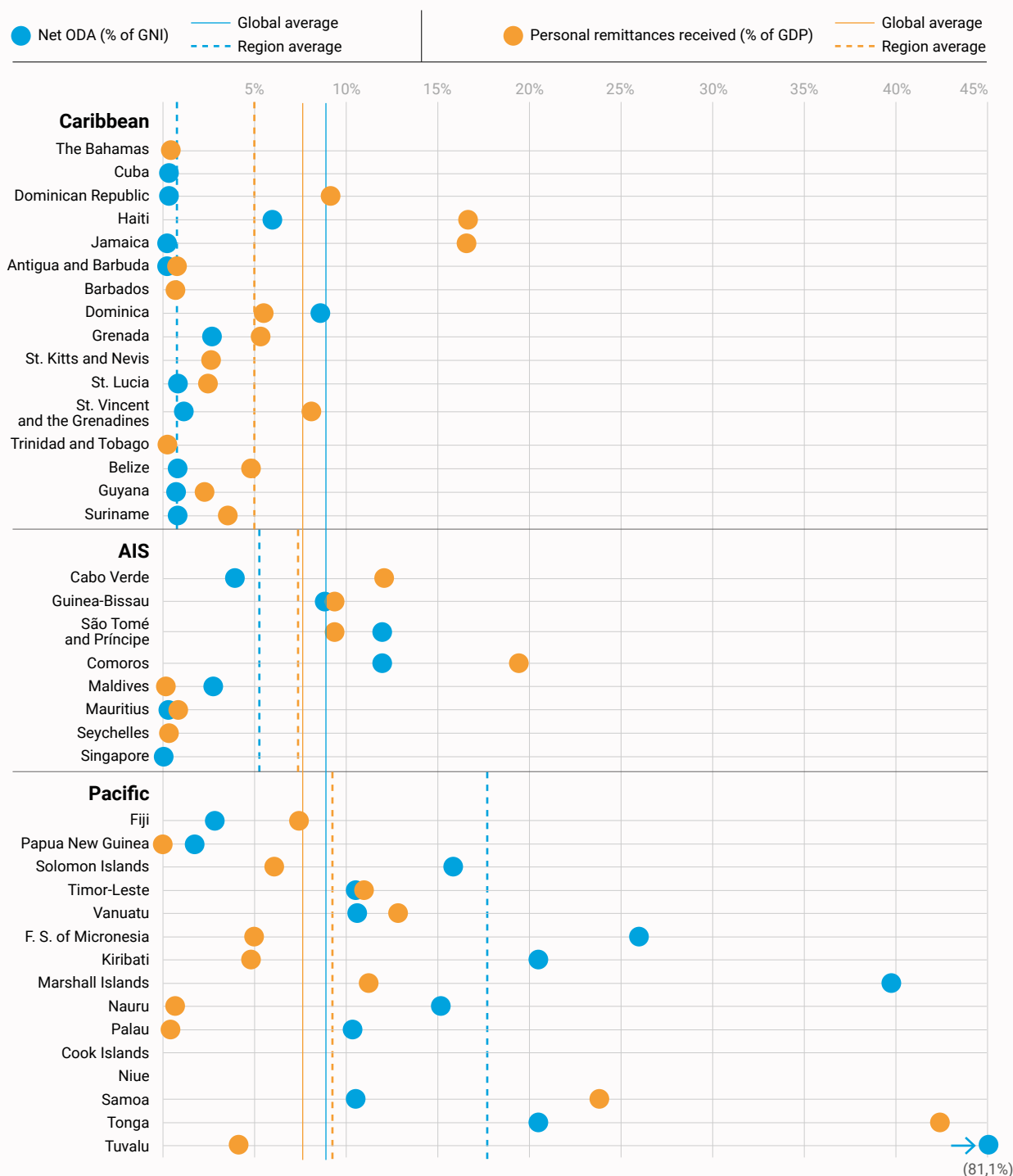


Efforts to reduce debt burdens through fiscal tightening, including austerity measures and spending cuts, have had significant negative impacts on SIDS societies,⁶⁷³ and have delayed investment in long-term development priorities and resilience.^{674 675}

Forty-four per cent of SIDS' external debt is held by multilateral organisations, including the IMF and development banks.⁶⁷⁶ Private creditors generally charge high interest rates due to the risks associated

with SIDS' economic fragility and vulnerability to natural disasters. Although multilateral development banks and bilateral lenders offer lower interest rates, concessional financing for SIDS has historically been limited, partly due to a lack of recognition of multidimensional vulnerability in eligibility criteria. The recently launched Multi-Dimensional Vulnerability Index aims to address this by providing a more accurate basis for allocating such financing.⁶⁷⁷

FIGURE 21 Overview of debt levels and external funding in the form of ODA and remittances (see Annex 12)



Debt Servicing and Land Degradation in Haiti

Haiti's post-colonial experience illustrates the reinforcing feedback loop between debt, weak governance and land degradation. In 1825, Haiti was forced to pay France an exorbitant indemnity, crippling its economy for generations. This debt was not fully repaid until 1947, largely through cash and timber exports.⁶⁷⁸ Consequently, by 1950, only a quarter of the country was covered by forests. Haiti's colonial-era debt severely undermined its public finances and governance capacity, fuelling political instability and hindering development. Limited access to alternative energy sources and livelihood opportunities led to further deforestation, as communities relied heavily on charcoal production and cleared forests to create farmland. By the late 1980s, forest cover had fallen to just 4%. With steep hillsides left exposed, erosion accelerated dramatically. The United Nations estimates that around 50% of Haiti's fertile topsoil has been washed away, leaving many areas unfit for farming.⁶⁷⁹ Today, less than 20% of the land currently under cultivation is suitable for agriculture.⁶⁸⁰ Despite the fact that a large proportion of Haitians work in agriculture, the country now imports nearly half of its food, increasing its vulnerability to disasters and external economic shocks.⁶⁸¹

Reliance on External Finance

Many SIDS are highly dependent on external funding in the form of Overseas Development Assistance (ODA) and remittances.⁶⁸² In many AIS and Pacific SIDS, ODA accounts for over 10% of Gross National Income (GNI), with notably higher proportions in Tuvalu (81%), the Marshall Islands (40%), the Federated States of Micronesia (26%) and Kiribati (20%) (see Annex 12). Remittances averaged USD 16.7 billion per year between 2019 and 2020, representing 54% of total external finance. However, high transfer costs, ranging between 6.5% and 10%, severely limit the potential for remittances to contribute meaningfully to sustainable development.⁶⁸³

Classifying many SIDS — particularly those in the Caribbean — as middle-income countries limits their access to concessional finance, exacerbating debt distress and hindering economic recovery and growth.⁶⁸⁴ This classification also excludes them from traditional

debt relief mechanisms. Two thirds of SIDS that are eligible for ODA are categorised as lower-middle or upper-middle income countries, and risk losing their eligibility altogether. As countries approach graduation thresholds and near the point of losing ODA eligibility, an increasing proportion of external funding is provided as loans rather than grants. Graduating from Least Developed Country (LDC) status also affects access to trade-related support, including preferential or special treatment in market access arrangements within the World Trade Organisation (WTO) and other regional agreements.^{685 686} Eligible SIDS also receive significantly more international adaptation finance than ineligible ones.⁶⁸⁷

Climate Finance and Funding Constraints in the Land Sector

Collectively, SIDS receive only around USD 2 billion in public adaptation finance per year — approximately 0.2% of total global climate finance. Two thirds of this funding is directed to just ten SIDS. However, between 2023 and 2035, it is estimated that SIDS will require at least USD 11.7 billion annually for adaptation purposes — nearly six times the current level of funding.⁶⁸⁸

Most of the financing for climate change adaptation has come from the Green Climate Fund (GCF), with SIDS receiving USD 1.56 billion (including multi-country projects not exclusive to SIDS).⁶⁸⁹ The GCF prioritises climate adaptation projects in SIDS and generally provides financing in the form of grants rather than loans to avoid creating additional debt burdens.⁶⁹⁰ SIDS have also received USD 586 million from the Global Environment Facility (GEF) for climate adaptation and mitigation, biodiversity conservation and sustainable livelihoods (excluding multi-country projects).⁶⁹¹ However, of the development finance provided to SIDS between 2016 and 2023, only around USD 487 million targeted desertification, land degradation and drought. This funding has been distributed unevenly, with five countries — Papua New Guinea, Haiti, the Dominican Republic, the Solomon Islands and Fiji — accounting for 65% of the total.⁶⁹²

Climate finance mechanisms often fail to address the unique circumstances and needs of SIDS. Small populations limit the institutional capacity required to collect the necessary data to develop a climate rationale based on historical and current evidence, as well as the capacity needed to manage and report on climate finance effectively.⁶⁹³ The complexity of accessing different multilateral climate funds, each with distinct requirements, exacerbates these challenges.⁶⁹⁴ Although the GCF has supported SIDS in accrediting regional and national entities, the costly and

burdensome accreditation process poses a particular challenge for smaller states with limited capacity. Consequently, only seven SIDS — Saint Lucia, Antigua and Barbuda, Belize, Jamaica, the Federated States of Micronesia, the Cook Islands and Fiji — currently have agencies that are accredited at a national level.⁶⁹⁵ At the same time, current financing metrics tend to favour larger-scale projects, where economies of scale can deliver greater absolute returns per unit of cost.⁶⁹⁶

Terminal evaluations of GEF projects in SIDS consistently score lower than the overall GEF portfolio on expected outcomes, implementation quality and execution quality.⁶⁹⁷ This is largely because national agency partnerships place additional administrative burdens on institutions that are already constrained by a lack of resources. Consequently, SIDS often rely on international agencies and 'fly in, fly out' consultants, which limits opportunities to develop long-term participatory approaches and sustained national capacity. Between 2007 and 2014, most GEF projects in SIDS were limited to a single four- to five-year phase, with many subsequent initiatives launched without any coherent follow-up.⁶⁹⁸ Anecdotal evidence also suggests that external technical staff in Pacific development agencies often leave after less than three years, meaning valuable knowledge and skills are easily lost.⁶⁹⁹

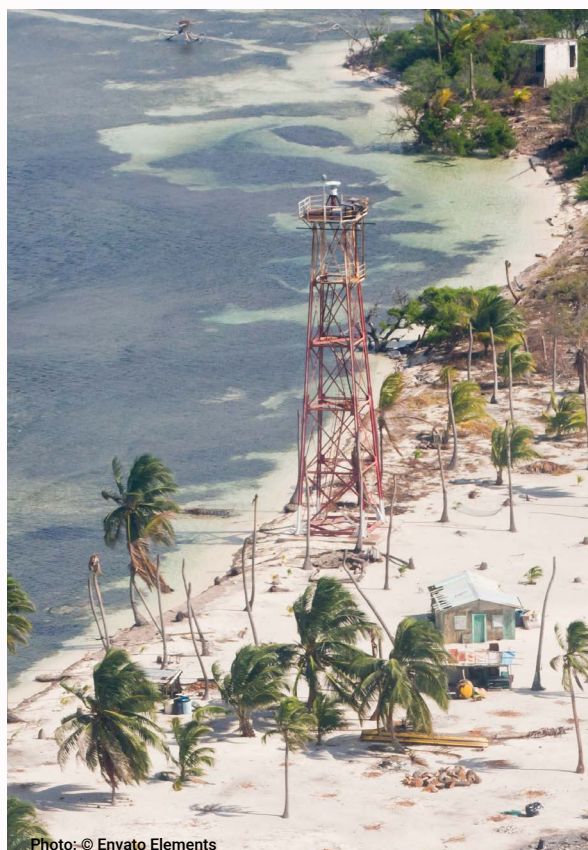


Photo: © Envato Elements

Together, these factors create a context in which projects are often short-lived and fragmented, involving repeated community engagement processes and offering limited opportunities for continuity. Land Degradation Neutrality (LDN) projects are most effective when they are based on in-depth contextual knowledge, sustained local participation or leadership, and robust, long-term monitoring and learning processes.⁷⁰⁰ Meaningful canopy closure and initial soil rehabilitation in tropical island ecosystems commonly require 10–25 years, while full recovery of soil carbon and ecosystem functions can take even longer.^{701 702}

The mismatch between short funding cycles and the long timescales of ecological recovery remains a fundamental barrier, undermining the effectiveness and durability of restoration efforts in SIDS.

Data Availability for Informed Decision-Making

High-resolution, timely datasets are essential for assessing land degradation, guiding land use planning and evaluating the impacts of climate change on communities and ecosystems. Such information enables decision-makers to develop more targeted, localised strategies, improving the effectiveness of land and water management practices and helping to prevent and reduce environmental degradation.⁷⁰³

SIDS lack disaggregated and fine-scale data on land degradation, primarily due to limited institutional capacity and insufficient digital infrastructure. Without the necessary data or tools for downscaling and disaggregation, the spatiotemporal resolution of global datasets is often too coarse to inform decision-making in SIDS. On small islands, land is managed at fine spatial scales, often smaller than a single Landsat tile. This can lead to misclassification and reduced reliability when setting LDN targets and monitoring SDG indicator 15.3.1 (proportion of land that is degraded).⁷⁰⁴

More broadly, SIDS face a shortage of basic development data. National statistical capacity and the availability of data for SDG indicators are lower in SIDS than in any other region. Data disaggregated by sex on exposure to land degradation and drought, as well as information on the gendered division of labour, are generally absent. In 2022, SIDS reported only 33% of gender-stratified SDG indicators, compared with 58–68% across other regional groupings.⁷⁰⁵ Therefore, strengthening data collection

and analysis is critical to designing and implementing policies and initiatives that effectively protect natural resources, livelihoods, human health and local adaptive capacity while advancing gender equality.

A variety of stakeholders and development partners have set up their own data collection initiatives for a range of different purposes. Consequently, data has become one of the most fragmented sectors in many SIDS. National statistical and data collection systems must be strengthened in order to harmonise methodologies, ensure that data serves national priorities, and utilise new digital tools and big data approaches to support evidence-based decision-making.⁷⁰⁶

Constraints to effective decision-making include limited capacity to integrate Earth observation data with national statistical systems, gaps in high-resolution and timely data, weak interoperability across datasets, and insufficient translation of data

insights into policy instruments. Addressing these challenges requires strengthening national data governance frameworks, improving the integration of Earth observation and ground-based data, expanding access to interoperable, user-friendly digital platforms and investing in sustained capacity-building to enable policymakers and practitioners to translate complex data into actionable planning and monitoring tools. For SIDS, progress will depend on coordinated regional approaches, partnerships with technology providers and academia, and demand-driven solutions tailored to local institutional realities.⁷⁰⁷

Recent SIDS-led assessments have highlighted that many of the challenges associated with data and digitalisation are primarily institutional and operational, rather than technological.⁷⁰⁸

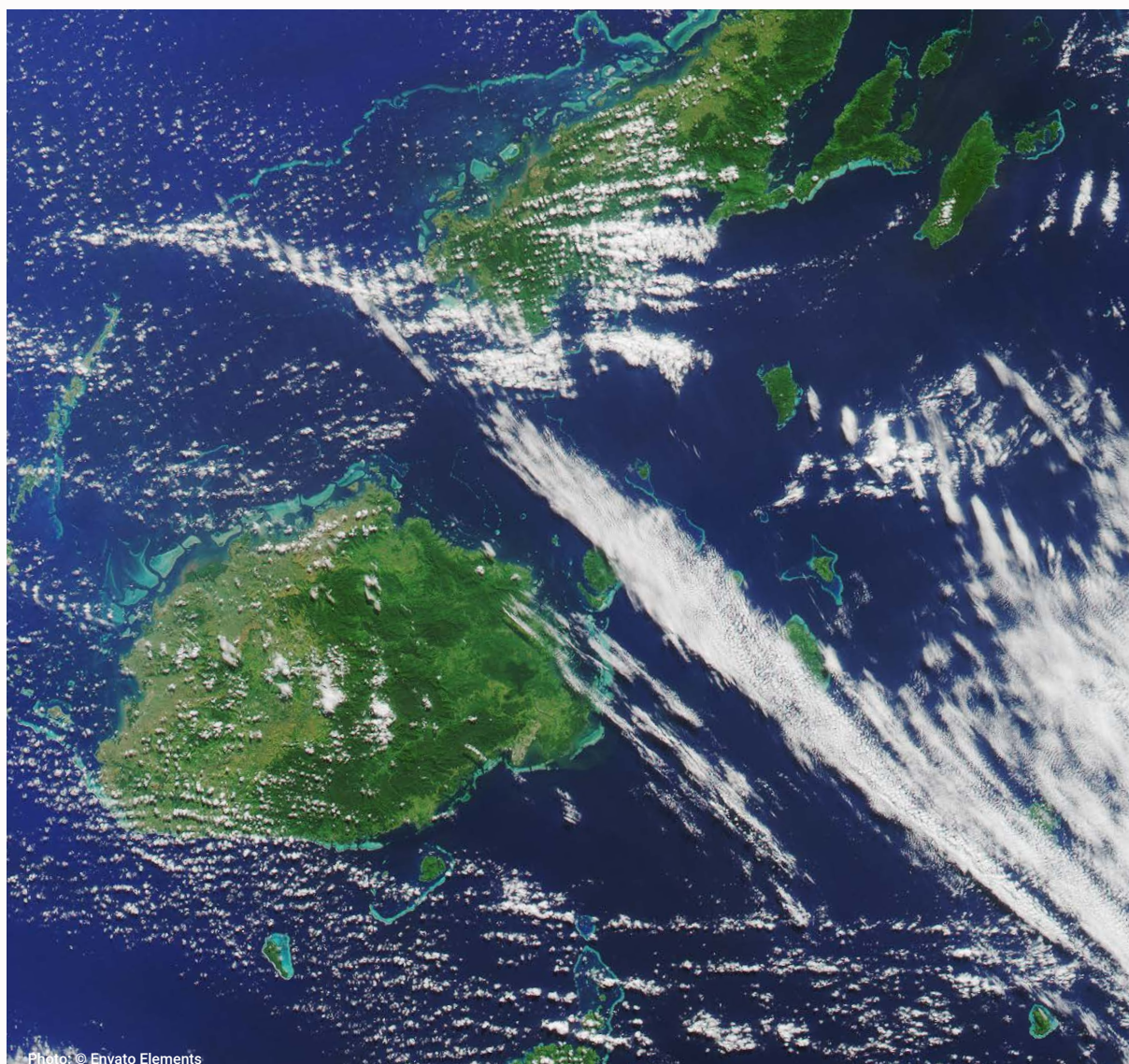


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Levers to Transform Land and Water Management



Small Island Developing States (SIDS) hold unique comparative advantages: they are custodians of globally significant natural assets and repositories of deep Indigenous knowledge. Their small land areas and tightly linked socio-ecological systems have the potential for rapid and integrated transformation. Thanks to their high levels of social capital, cohesive communities, and small, potentially agile administrations, SIDS are well placed to become global leaders in sustainable development.

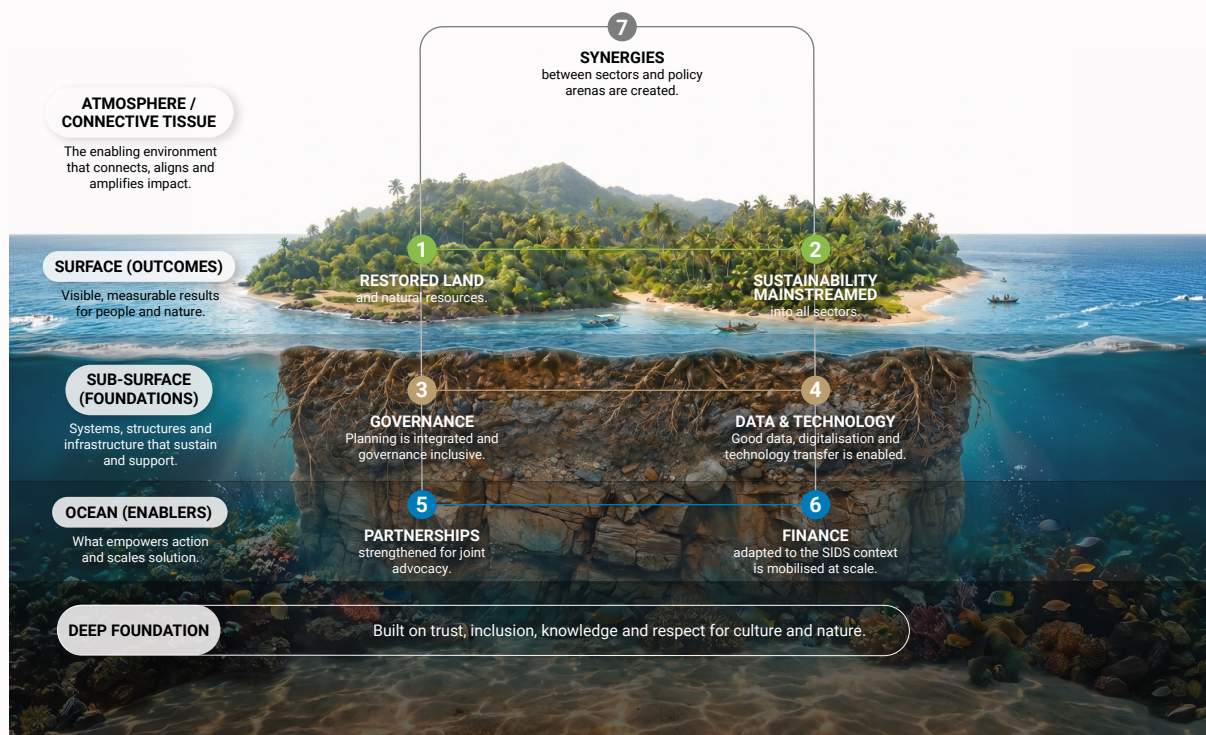
Healthy land and natural resources are essential for ensuring food security, water availability, climate resilience, biodiversity conservation, cultural identity and economic diversification. In recognition of the pivotal role of integrated land and water management practices in achieving sustainable development and building resilience to climate change and drought, the majority of SIDS have committed to attaining land degradation neutrality (LDN) by 2030. Twenty-six of the thirty-nine SIDS that are Parties to the UNCCD have engaged in the LDN target-setting process, with twenty-one committing to quantified, spatially explicit targets covering approximately 7.9 million hectares.⁷⁰⁹

This chapter outlines seven interlocking transformative levers — strategic points of influence that enable systemic change by altering the way decisions are made, resources are allocated and actions are implemented. In this report, 'transformative' does not imply a single disruptive shift, but rather innovative, integrated, context-specific ways of

working that are grounded in science, culture, and local realities, and that align short-term actions with long-term sustainability outcomes. Drawing on established entry points, these levers can range from incremental, locally-led improvements to large-scale landscape and ridge-to-reef approaches. Activation of multiple levers together helps move SIDS to go beyond isolated projects towards sustained programmatic pathways that restore land and water resources, strengthen climate resilience, and support inclusive, nature-positive development.

In practice, these transformative levers translate into a set of mutually reinforcing priorities that reshape the management of land, natural resources and sustainable development in SIDS. The first priority is to restore degraded land and ecosystems, while embedding sustainability principles across all sectors. Inclusive governance and integrated land use planning ensure participatory decision-making and community ownership. Technology transfer, enhanced access to data and digitalisation strengthen evidence-based decision-making, promote self-sufficiency and help to overcome geographic isolation. Partnerships and advocacy amplify the voices of SIDS on the global stage, enabling knowledge and resource pooling and supporting the mobilisation of finance to advance sustainable development across sectors. Finally, generating synergies across environmental domains and implementation agendas can help to break down sectoral silos, free up capacity and deliver exponential impacts.

FIGURE 22 Seven levers for transformative land and water management in SIDS



Restoring Land and Natural Resources

The limited landmass of SIDS and the strong ecological connectivity between the highlands and the coast make soil and water conservation key priorities. Following decades of land degradation and deforestation, reforestation and watershed restoration are now seen as essential for safeguarding the long-term functionality and integrity of island ecosystems.⁷¹⁰ As land, freshwater and marine ecosystems in SIDS are interconnected, restoring health to the land is an effective way to protect coral reefs and seagrass beds, ensure an adequate supply of freshwater, sustain fisheries and livelihoods, and strengthen the resilience of communities and ecosystems from ridge-to-reef.

Forests, along with trees on islands where there is limited or no forest cover, provide critical ecological functions and are vital for human livelihoods and wellbeing. It is often far easier and more effective to protect remaining forest fragments, traditional agroforestry systems and other tree-based landscapes than to attempt to restore large areas once they have been degraded or lost.⁷¹¹ In severely degraded landscapes, restoring native vegetation and trees in upland zones and along coastlines can stabilise soils, prevent erosion and enhance

biodiversity.⁷¹² Such interventions support community livelihoods, strengthen the resilience of ecological and agricultural systems, and improve local hydrology.⁷¹³ Protecting, restoring and expanding natural coastal barriers — including mangroves, coastal wetlands, dunes and other shoreline ecosystems — is essential for safeguarding the limited land areas of SIDS from flooding and erosion, while enhancing the resilience of these ecosystems to environmental disturbances.⁷¹⁴

The health and fertility of soils are closely linked to the composition of vegetation and species diversity in island landscapes. Greater biodiversity is generally associated with more stable communities, higher productivity, improved resource use efficiency and increased resistance to biological invasions.⁷¹⁵ Therefore, soil condition and nutrient status are important considerations in any ecological restoration initiative.⁷¹⁶

Traditional agroforestry systems have played a central role in the cultural heritage and food security of many SIDS, particularly in the Pacific region, where they cover 23.8% of agricultural land. These systems integrate trees into agricultural landscapes, providing essential food and income sources for local communities. Agroforestry can stabilise soils, enhance water infiltration, increase biodiversity within farming systems and strengthen the resilience of ecosystems and communities to droughts and floods. They also provide shade and protect crops from heat stress.^{717 718}

Lessons Learned from REDD+

Although most SIDS contribute very little to global emissions, and climate change mitigation is not a priority, several are implementing REDD+ schemes for the local adaptation benefits they can provide.

Vanuatu^{719 720}

Vanuatu is highly exposed and vulnerable to natural disasters. Healthy forest ecosystems act as natural buffers against sea-level rise and storms, help reverse land degradation and soil erosion, and safeguard critical watersheds. Agriculture is the main driver of permanent land cover change: around 80% of Ni-Vanuatu people are agriculturalists working on small family farms under diverse *kastom* and local land-lease arrangements. The traditional economy is rooted in meeting household subsistence needs, with food security maintained through community networks of obligation and exchange. Without the integration of trees into traditional agriculture, permanent land conversion would result in deforestation. The Loru Forest Carbon Project, implemented by Nakau and Live & Learn Vanuatu and initially funded by the EU, is Vanuatu's first carbon project. Located on 293 hectares of intact and degraded forest and abandoned farmland on the east coast of Espiritu Santo, the project emerged from a participatory process in which the Serakar Clan – customary landowners of Loru – chose to forego copra production and protect the forest to generate revenue from carbon credits for voluntary markets. The project established three zones:

- **Zone A** (tall forest): all cattle removed; vegetation clearing prohibited.
- **Zone B** (regenerating forest): invasive species removed to encourage natural regeneration; minimal extraction permitted except timber.
- **Zone C** (non-forest agricultural land): agroforestry established with fast-growing timber and nut trees; strategic thinning allowed; root crops planted by women to support subsistence and suppress weeds.

A cost–benefit analysis supported free, prior and informed consent (FPIC) discussions, helping the community understand the long-term benefits, revenue flows, and the viability of the business model without external finance. Carbon revenues from avoided deforestation funded the establishment of agroforestry plots, which required significant maintenance and upfront investment. High-value and fast-growing crops were interplanted to support future income while meeting short-term subsistence needs. The broader aim was to diversify community income, foster local business opportunities, and enable diversification into eco- or agri-tourism.

A major challenge was the absence of markets for agroforestry products, which created long-term reliance on carbon payments. Since 2016, carbon revenues have funded the management of the Loru Protected Area. The remaining 50% is used for school fees, water infrastructure and savings to buffer against market volatility. The small size of the project resulted in high technical and monitoring costs. A 2019 social impact survey reported that incomes had increased by 68% for men and 38% for women over five years, largely due to higher yields from ground crops. Some community members also gained employment through the project. Efforts are underway to close the gender income gap by providing women with training in nut processing. Water availability has improved markedly; previously, all households faced shortages, whereas carbon-funded water investments have reduced this figure to 65%. Households also benefited from more regular food supplies from gardens and agroforestry plots.

Guinea Bissau⁷²¹

Forests and mangroves play a key role in people's livelihoods in Guinea-Bissau. The country is home to 14% of West Africa's mangroves and stores around 116 million tonnes of carbon. However, this carbon stock has been degrading by 2–7% annually due to deforestation for traditional rice cultivation and the conversion of land for cashew nut plantations. Oyster harvesting damages mangrove roots, and fuelwood collection contributes to further degradation. With two thirds of the population living below the poverty line and the economy being highly dependent on agriculture, the pressure on mangrove ecosystems is intense.

The Community-Based Avoided Deforestation Project aimed to conserve forests and mangroves in Cantanhez Forest National Park – home to some of the last primary sub-humid forests in the region – and the Cacheu Mangrove Forest National Park, which contains 68% of the country's mangrove cover.

Covering 181,200 ha (145,698 ha of which are protected), the project directly affected over 50,000 residents. It combined conservation with socio-economic support by promoting sustainable agriculture and fishing. Carbon credits were generated through avoided deforestation and the conservation of existing forest resources. The project was implemented by the Institute of Biodiversity and Protected Areas and the BioGuinea Foundation, with support from the GEF, World Bank, French Global Environment Fund, MAVA Foundation, UNDP, and the European Union. The pilot began in 2011, was validated as a REDD+ initiative in 2015, and began selling carbon credits in 2017.

Activities included monitoring illegal activities, installing fencing to protect crops, and working closely with rice farmers to discourage slash-and-burn practices. Mangrove and coastal ecosystems were restored, and women received incentives to enhance oyster production. Community participation improved local environmental stewardship. From 2011 to 2016, deforestation rates dropped from 0.9% to 0.4%, reducing emissions by 335,603 tCO₂e. Carbon credits generated USD 4 million, supporting livelihoods through community gardens, irrigation infrastructure, and housing. Awareness raising efforts also positively influenced neighbouring communities not directly involved in the project.

However, the project faced significant challenges: political instability, including a coup, which disrupted conservation activities; reliance on international expertise which highlighted limited local capacity; and inconsistent funding which hindered continuous engagement. Furthermore, benefits were insufficient to significantly improve living standards, particularly as restrictions (e.g., rest periods to recover fish stocks) left fisherfolk without alternatives. Increased travel distances for fishing increased harvesting costs, and limited transport and cooling infrastructure restricted market access. These issues highlight the need to consider entire value chains and livelihood transitions in the design of carbon credit projects.

Guyana

Guyana is one of the world's most forested countries, with its forests largely managed by Indigenous peoples and local communities. These forests store around 21.8 billion tonnes of carbon, but are at increasing risk of deforestation. In 2022, Guyana became the first country to sell carbon credits under the REDD+ Environmental Excellence Standard (TREES), managed by Architecture for REDD+ Transactions (ART), in order to protect these resources. The country sold 33.47 million credits, which were generated between 2016 and 2020, marking the largest single carbon credit sale in market history.⁷²²

Indigenous peoples make up around 11% of the population. The 96 titled Indigenous communities control around 14% of Guyana's forest area. Around 50 additional communities are not titled, and others are seeking land title extensions. Some communities are attempting to reclaim traditional territories, and several claims have been pending in national courts for over 20 years. Although Guyana was an early adopter of REDD+, strong indigenous movements challenged top-down approaches, particularly during the Guyana-Norway REDD+ Investment Programme, revealing the limitations of externally driven natural resource management. Consequently, Guyana developed a national REDD+ strategy that addresses carbon rights and long-term benefit sharing, incorporating many indigenous demands into public policy. A rights-based approach and attention to land tenure and equitable benefit sharing are crucial for success. The greater involvement of Indigenous peoples and local communities — including in monitoring — strengthens local capacity, creates jobs and improves environmental stewardship.⁷²³

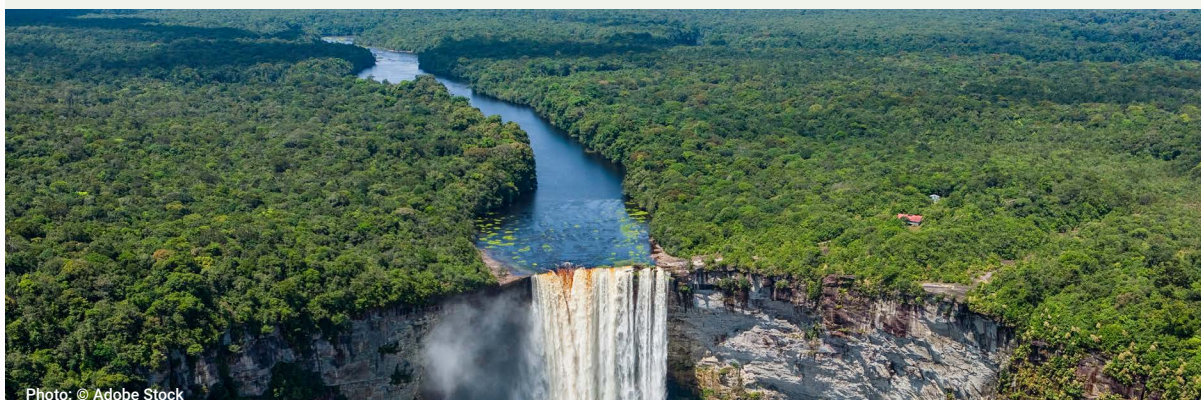


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Traditional Agroforestry Systems in São Tomé and Príncipe ^{724 725 726}

Founded in 2009, the Cooperativa de Exportação de Cacau de Qualidade (CECAQ 11) in São Tomé and Príncipe has transformed local cocoa production. Bringing together over 1,000 small-scale producers cultivating around 2,000 hectares of volcanic land, the cooperative is organised into 21 associations. CECAQ 11 has obtained fair trade and organic certifications, selling ethically produced, high-quality cocoa including the beans used in Tierra Madre chocolate. The cooperative promotes agroforestry, encouraging the planting of cocoa beneath native trees using traditional methods rather than clearing forests. This approach not only prevents deforestation, but also ensures the continued availability of materials for sustainable infrastructure development. In 2024, this agroforestry model was recognised by the Food and Agriculture Organisation of the United Nations as a Globally Important Agricultural Heritage System (GIAHS).

Over half of São Tomé and Príncipe is covered by primary forest, around 30% of which is protected. The rest is managed using traditional agroforestry systems. These age-old practices, passed down through generations, help to maintain fertile soils, protect water resources and enhance the resilience of local ecosystems and communities. Although cocoa production is central to the country's cultural identity, the agroforestry system itself is remarkably diverse, supporting both environmental and economic sustainability. Lower altitudes are used to grow cocoyam and taro; middle altitudes are used for cocoa, palm, bananas and breadfruit; and fruit trees are planted at higher elevations. Although cocoa remains a major export, farmers typically receive only a small share of its market value. Income from other crops grown within these systems is essential for smallholder farmers and provides a significant proportion of the nation's food supply.

The multi-layered structure of traditional *gleba* agroforestry systems, in which different tree species occupy distinct canopy and root zones, helps to maintain soil fertility, reduce erosion and enhance nutrient cycling. This is particularly important in the context of a remote island, where fertilisers are prohibitively expensive. The system is also unique in producing world-class cocoa with distinctive genetics, processed using centuries-old fermentation and drying methods. Local producers have built upon the agricultural systems introduced during the colonial era, adapting and innovating to strengthen them and create today's sustainable and equitable model of organic and fair trade cooperatives. This model, centred on small-scale producers creating high-value niche products, has become the country's preferred development pathway and is increasingly being replicated in other sectors, such as tourism.

The unique flora and fauna of SIDS have largely evolved in isolation, making them particularly vulnerable to predation and competition from invasive species. Restoring these ecosystems requires re-establishing native species and the natural flow of organic material and nutrients they provide. The effective management of invasive alien species — including prevention, eradication, and ongoing adaptive strategies to avoid reinvasion — is essential. Unlike continental regions, islands have a much higher likelihood of successfully eradicating or managing invasive species, often resulting in substantial ecological benefits.^{727 728}



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Mainstreaming Sustainability

Many SIDS have limited land area and very high population densities, so optimising land use and management practices is crucial to prevent land degradation. To ensure long-term resilience, sustainability considerations must be integrated into all aspects of daily life and mainstreamed across all economic sectors in SIDS.⁷²⁹

Transitioning to Clean Energy

SIDS can harness their abundant natural endowments — including solar, wind, and tidal energy — to transform their energy systems. Tapping into these renewable resources would enable them to significantly reduce their dependence on fossil fuels and transition towards more sustainable and resilient energy pathways.⁷³⁰ SIDS currently spend a large share of their national budgets on imported fuel and could collectively save an estimated USD 3.3 billion (equivalent to 3.3% of GDP) annually if they were to transition fully to

renewable energy sources. The potential savings are even higher for less developed SIDS, particularly those in the Pacific and Indian Oceans, due to their remoteness and high transport costs.⁷³¹

SIDS have already made considerable progress in the deployment of renewable energy, increasing their cumulative installed capacity from 3.7 GW in 2014 to 8.76 GW in 2023, with plans to reach 10 GW by 2030.⁷³² Countries such as Guinea-Bissau, Papua New Guinea, Vanuatu and the Solomon Islands are building

on traditional biomass systems, while at the same time adopting modern renewable energy solutions.⁷³³ To avoid maladaptation, the energy transition in SIDS should prioritise renewable solutions explicitly adapted to local land and water conditions, as well as broader ecological and governance constraints. This can be supported by integrated land use planning, participatory decision-making and cumulative impact assessments to ensure that climate mitigation efforts strengthen ecosystem resilience and community wellbeing.⁷³⁴

Sugarcane Bagasse for Bioenergy in Mauritius ^{735 736}

Under colonial rule, Mauritius became a major producer of sugar cane — the largest in the British Empire. By 1858, sugar cane was cultivated on 46,430 hectares and processed in 259 factories. Many of these factories were already meeting their own energy needs with bagasse, and the government later supported efforts to increase electricity production for supply to the national grid. By the early 1970s, sugar factories were supplying around 16% of the country's electricity demand. However, low prices and inconsistent supply discouraged investment in more efficient cogeneration technologies, resulting in a decline in generation. Up until the 1990s, Mauritius was entirely dependent on imported fossil fuels for electricity generation. This made the country highly vulnerable to price volatility, cost escalation and supply chain disruptions. To strengthen energy security, diversify the energy mix and create value from sugar by-products amid declining global sugar prices, Mauritius revisited bagasse-based electricity generation as a promising solution. This approach made use of locally available resources while delivering benefits for both the energy and agricultural sectors.

In 1985, the government introduced the Sugar Industry Efficiency Act, developed in close consultation with the private sector. The Act offered fiscal incentives to encourage the modernisation of bagasse-based energy cogeneration. These incentives included a 75% income tax exemption for sugar factories selling bagasse to electricity producers and a 50–80% income tax exemption for power producers investing in efficient cogeneration technologies and fly ash treatment plants to minimise environmental impact. Over the following decades, policy and regulatory frameworks were continually refined to increase the production of electricity from bagasse through targeted innovation.

Although sugar now accounts for less than 1% of Mauritius's GDP, and sugar companies have diversified into other sectors, political, social, and cultural support for sugarcane production remains strong. As part of a centralisation process in 2014, electricity generation was consolidated into four main sugar factories, which now supply the national grid and account for around 30% of the country's total generating capacity. It was expected that 17% of the country's electricity would come from bagasse-based generation by 2025. More recently, several ministries jointly launched the National Biomass Framework, which is aimed at enhancing energy security, creating green economy jobs and supporting Mauritius' climate mitigation commitments. Funding for its implementation was included in the 2023–2024 national budget. The framework is part of the country's strategy to increase the proportion of renewable energy to 60% by 2030, based on the increased use of biomass and the accelerated deployment of solar energy.

Dual-use land systems that combine renewable energy with other productive activities present significant opportunities for SIDS to enhance food security, conserve biodiversity, restore degraded land and reduce emissions. The LDN response hierarchy can help guide SIDS towards practical, integrated approaches that deliver multiple co-benefits. This involves prioritising

the installation of renewable energy systems in areas that are already degraded or have low productivity, such as abandoned agricultural plots, eroded coastal zones, rooftops and other existing infrastructure, to avoid putting further pressure on limited land resources. It also involves designing dual-use systems, such as agrivoltaics, ecovoltaics and small-scale

hydropower, which can improve soil moisture levels, support sustainable agriculture and grazing, and protect fragile ecosystems. These can contribute to land restoration by providing shade, buffering wind and creating microclimates that support vegetation recovery. Integrating clean energy with sustainable land, water, and coastal management can also support socio-economic objectives by expanding access to affordable electricity for farming, irrigation and drinking water, food storage and processing and the delivery of social services, thereby strengthening livelihoods and resilience across island systems.⁷³⁷

Addressing Freshwater Challenges

Efficient water use and a circular approach to water management — such as harvesting rainwater and recycling water — can transform water supply systems in SIDS. Water and energy are both essential for sustainable land management, human wellbeing and

economic development.⁷³⁸ It is critical to ensure the efficient use of existing freshwater resources and improve wastewater management and treatment systems to guarantee long-term water availability.

Integrated land and water management brings together a variety of actions, such as watershed restoration, pollution reduction, water reuse and recycling, infrastructure upgrades and maintenance, nature-based wastewater treatment solutions and rainwater harvesting, to improve resource efficiency and strengthen ecosystem health.⁷³⁹ Improved water governance, the adoption of innovative technologies and nature-based solutions can all contribute significantly to the sustainable management of scarce freshwater resources. Raising public awareness and building community capacity to conserve water resources are also important in addressing scarcity.⁷⁴⁰

Water Recycling and Coastal Protection in Singapore ^{741 742}

Singapore is one of the most densely populated countries in the world. It faces acute water scarcity due to its limited land area and lack of natural resources, as well as extremely low levels of renewable freshwater. With a population of 5.6 million, it has just 0.6 km³ of renewable freshwater, amounting to less than 110 m³ per capita. This places Singapore among the most water-stressed nations globally and the most water-scarce in Southeast Asia. The country has historically relied heavily on imported water from Malaysia, but concerns over long-term security have led the government to develop water reuse strategies since the 1970s.

For several decades, Singapore's National Water Agency (PUB) has been developing a comprehensive water management system combining rainwater harvesting, wastewater collection and treatment, water reuse, and desalination. At the heart of this system is NEWater, Singapore's high-quality recycled water. By 2017, four NEWater plants were supplying around 40% of the country's daily water needs, and it is expected that this figure will increase to 55% by 2060, with the potential to provide up to 2 million m³ per day. NEWater has gained broad public acceptance and is more energy efficient than desalination. Nevertheless, plans are in place to increase desalination capacity to meet around 30% of total demand by 2060, while local catchments are expected to supply 15%. The remainder will be sourced from imported water.

Singapore applies the same long-term planning philosophy to climate adaptation. In the face of rising sea levels and more intense rainfall threatening low-lying coastal areas, the government has tasked PUB with spearheading a comprehensive government-wide coastal protection initiative. PUB's initial focus is on developing an integrated coastal and inland flood model that can simulate worst-case scenarios involving extreme rainfall and coastal flooding. This tool will support risk assessment, adaptation planning, engineering design and emergency preparedness. Future coastal protection measures will emphasise multifunctional land use strategies and nature-based solutions wherever possible, creating safe and attractive spaces for living, working and recreation, while also strengthening climate resilience.

Integrated Water Resources Management in St. Kitts and Nevis ⁷⁴³

The College Street Ghaut (ravine) in St. Kitts, which drains 662 hectares of forest, former agricultural land and the urban centre of Basseterre, had become highly degraded due to rapid runoff, soil erosion and uncontrolled waste disposal. These pressures were intensified by repeated tropical storms, hurricanes and droughts, contributing to flooding, public health risks and sediment plumes that affected the quality of coastal waters and nearby coral reefs. Similar issues were evident at other sites in Nevis, including an abandoned quarry at Potworks Estate and the coastal wetland at Nelson's Spring, where the introduction of invasive species and land clearance had disrupted the natural hydrological cycle and fragmented ecosystems. The 'Integrating Water, Land and Ecosystems Management (IWECO)' project – funded by the Global Environment Facility and implemented by UNEP and UNDP – took a comprehensive ridge-to-reef approach to reverse the degradation and restore the ecological health needed to sustain island communities.

The Government of St. Kitts and Nevis and local partners used the IWECO approach to focus on reconnecting uplands, freshwater bodies, wetlands and coastal ecosystems. In St. Kitts, 1.5 hectares of heavily eroded ghauts were rehabilitated using hybrid nature-based solutions combining grey and green infrastructure. More than 300 gabion baskets and repaired weirs reduced the speed of stormwater flows, trapped sediment and mitigated the risk of downstream flooding. Meanwhile, deep-rooted vetiver grass stabilised the soil and created a vegetated buffer that improved water retention. Vetiver, locally known as *khus khus*, also created economic opportunities by providing material for weaving, handicrafts and essential oils. To address chronic greywater contamination from surrounding homes, the project designed a pilot system that used constructed wetlands to treat and reuse household wastewater. This restored water quality, reduced the amount of pollution entering coastal ecosystems, and provided a cost-effective, nature-based model for decentralised wastewater treatment.

On Nevis, the Nevis Historical and Conservation Society spearheaded extensive efforts to rehabilitate degraded landscapes and re-establish ecological connections between the island's interior and coast. At Coconut Walk and Potworks Estate, eroded land was reshaped using berms, swales, sediment traps and catchment structures to slow runoff, increase infiltration and rebuild soil health. Native species, including sea grape, coconut, almond, mangrove and drought-tolerant shrubs, were planted and protected from roaming livestock. These interventions quickly encouraged the return of insects, birds and early successional vegetation, signalling the recovery of ecological function. At Nelson's Spring, one of Nevis's remaining coastal wetlands, the focus of the restoration work was on removing invasive cattails, re-establishing native wetland vegetation, and re-opening the hydrological connection between the pond and the sea. Community planting days helped to restore mangroves, sea grapes and shoreline vegetation, thereby improving the site's ecological integrity, as well as its recreational and scenic value. The rapid return of native reeds, water lilies and wetland fauna demonstrated how quickly ecosystems can recover once hydrological connectivity is restored. Recognising that land degradation directly affects marine ecosystems, the project also implemented nature-based solutions focused on the sea. Artificial reef modules and coral nurseries were installed to increase habitat complexity, support reef recovery, and provide essential coastal protection, thereby buffering the impacts of storms and erosion.

The St. Kitts and Nevis IWECO experience illustrates how coordinated action across interconnected systems – such as uplands, waterways, wetlands and coastal zones – can reduce land degradation, improve water quality, restore biodiversity and strengthen resilience to storms and droughts. By combining engineered structures with ecological restoration and strong community involvement, the project provides a practical, scalable model for SIDS seeking integrated, nature-positive approaches to land and water management.

Tiny Forests in the Cook Islands ⁷⁴⁴

In the Cook Islands, a community-led ecosystem restoration initiative is planting 'Vaorākau iti' (tiny forests) to improve the health of streams on Rarotonga. This pilot project, which is part of the wider ENUA project, is being carried out by the National Environment Service (NES), Muri Environment Care (MEC), the University of Newcastle and the Groundswell Collective. Using the Miyawaki method, 600 native trees and shrubs have been planted over an area of 200 m² to accelerate forest growth, stabilise soils, and enhance freshwater systems. The approach also incorporates traditional planting practices used by the Cook Islanders. Using native species strengthens local biodiversity, supports essential ecosystem functions and contributes to healthier catchments. Many of the species planted hold cultural significance, being used for flowers, tools, carving, weaving and traditional medicine. Several of these plants have become increasingly rare, making their restoration particularly meaningful. The forests are also intended to reduce pressure on downstream lagoons where altered watercourses have contributed to ecological degradation. Alongside planting activities, the ENUA project supports the development of catchment management plans and water quality audits. The project team collaborates closely with engineers to address erosion, waste pollution and nutrient runoff — all of which are key drivers of declining stream health on the island.

Circular Waste Management

Technological advances in waste management provide SIDS with significant opportunities to recover and reuse waste, converting it into valuable products or energy. Adopting sustainable waste management, recycling and reuse approaches can help conserve natural resources, reduce energy demand, support the production of locally made fertilisers and renewable energy, and stimulate the creation of new businesses and jobs. To achieve this transformative shift, waste must be recognised as a valuable resource, and markets and industries must be developed that enable its effective recycling and reuse.⁷⁴⁵

In order to address plastic pollution, suitable alternatives to conventional plastic products must be developed and adopted. Some locally sourced substitutes may even appeal to international markets that are increasingly shifting towards sustainable materials. This transition requires an understanding of current plastic usage patterns, available recycling and waste management technologies, and the feasibility of potential alternatives, as well as the policy and market interventions needed to ensure equitable access.⁷⁴⁶



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GEF ISLANDS Project ⁷⁴⁷

Due to limited space and inadequate infrastructure, SIDS are at a heightened risk of pollution and often struggle to dispose of chemicals and waste safely. As a result, harmful toxins can leach into the soil, water and air, posing a significant threat to human health and the environment. The GEF project 'Implementing Sustainable Low and Non Chemical Development in SIDS' (ISLANDS) supports SIDS across all regions in preventing the environmental build-up of toxic chemicals, hazardous waste, mercury and plastics, and in doing so strengthens waste management systems. The project has helped to develop hazardous waste inventories, establish safe local treatment, storage and export facilities, improve national waste management legislation and raise awareness of sound chemical and waste management practices.

Fusing Traditional and Modern Practices for Food Security

Strengthening local production, improving sustainable land and resource management, and expanding value-added processing could make agriculture a key sector for future employment and development in SIDS.⁷⁴⁸ With an average of only 0.24 hectares of agricultural land per capita compared to 0.60 hectares globally, maintaining and enhancing agricultural productivity is a critical priority for SIDS.⁷⁴⁹ Coordinated policies focused on food security, improved market access, greater self-

sufficiency and domestic diversification can strengthen production systems and reduce dependence on food imports.⁷⁵⁰ Adopting sustainable agricultural, fisheries and forestry practices, such as integrated nutrient and pest management, soil enhancement, agroforestry and integrated livestock management, can boost productivity without degrading the land.⁷⁵¹

Enhancing local food production and self-sufficiency can foster new partnerships with farmers and producers, while supporting the restoration and protection of nature and ensuring that local communities have access to healthier and more affordable food.⁷⁵² Transforming

agricultural systems in this way will also require resilient farm-to-market infrastructure. Investments in innovative solutions should be encouraged, building on community-level farmers' organisations and social networks to improve smallholder productivity and help absorb the high levels of capital investment required. Examples of such innovations include centralised composting facilities, drip irrigation systems and community storage facilities. Strengthening the middle segments of value chains, including warehousing, storage, processing and farm-to-market infrastructure, can significantly boost the efficiency and competitiveness of local food production.⁷⁵³

SIDS Initiatives to Promote Local Food Production

The transition towards more locally resilient and sustainable food systems requires a comprehensive examination of the entire food chain, from production to consumption. This shift depends on several enabling factors, including improved access to land, expanded cold-storage capacity, stronger local marketing systems, and the revitalisation of traditional knowledge and food preparation practices. It also requires addressing consumer preferences for imported foods and creating conditions in which locally produced alternatives can thrive.

In the Pacific, the Innov4AgPacific project, implemented by the Technical Centre for Agricultural and Rural Cooperation (CTA) with co-funding from the International Fund for Agricultural Development (IFAD) and in partnership with the Pacific Islands Private Sector Organisation (PIPSO), works with civil society organisations across six countries. Since its launch in 2018, the initiative has collaborated closely with communities to strengthen agricultural systems and improve health and nutrition outcomes. In Fiji, for example, the Foundation for Rural Integrated Enterprises and Development (FRIEND) has helped communities to set up 300 backyard gardens based on sustainable agricultural principles. Their "9×9" backyard model incorporates nine varieties of nine different crops, including herbs, fruits, and vegetables, using organic and sustainable methods. Communities also participated in health and nutrition training, covering topics such as malnutrition, healthy meal preparation and adding value to surplus produce. In the Solomon Islands, the Kastom Garden Association (KGA) helps smallholder farmers produce high-quality planting material and expand cultivation of local root crops as an alternative to imported staples. The KGA also builds farmers' capacity in cross-pollination, establishing community gardens and germplasm centres, and improving seed packaging and storage. These community-driven approaches offer significant opportunities to expand local food production and promote the consumption of traditional, nutritious foods. 'Farm to fork' initiatives that connect farmers directly to consumers provide further opportunities to strengthen agricultural capacity, reduce dependence on imports and support household incomes and healthy diets.^{754 755 756}

In the Caribbean, CARICOM introduced the 25 by 25 Initiative, which aimed to reduce the region's USD 6 billion food import bill by 25%. Between 2022 and 2024, food production in the region increased by 24%, thanks to significant investments in infrastructure aimed at improving access to markets, finance, cold storage and processing facilities. The initiative has since been extended to 2030. Following the devastating impact of Hurricane Beryl in 2024 on the agricultural sector and supply chains, the region is developing a comprehensive framework to make agricultural systems and supply chains more competitive, sustainable, resilient and inclusive of young people and women.⁷⁵⁷ At the 40th Regular Meeting in 2019, CARICOM Heads of Government also approved the establishment of the CARICOM Private Sector Organisation (CPSO). The CPSO is responsible for mobilising private sector investment in seven priority business cases to drive innovation and strengthen infrastructure and technology across the region.⁷⁵⁸

Over generations, communities in SIDS have developed innovative solutions and adapted traditional practices to cope with environmental challenges. As a result, many Indigenous communities have established sophisticated systems for the sustainable management of natural resources.^{759 760} Revitalising these practices can play a critical role in strengthening food security and promoting healthy, culturally-grounded diets.⁷⁶¹ Indigenous land use systems are often more resilient to storms, droughts

and floods than industrial monocultures, offering valuable models for climate-smart agriculture.^{762 763} Sustainable land management strategies informed by traditional knowledge — many of them implemented by women — include rainwater harvesting, establishing plant nurseries, experimenting with salt-tolerant crop varieties, and planting native vegetation along coastlines to protect them from erosion and storm surges.⁷⁶⁴

Traditional Knowledge in the Pacific SIDS ⁷⁶⁵

In the Pacific, human history has long been defined by communities adapting to changing environmental conditions rather than extensively modifying island ecosystems. Over time, this has given rise to sustainable land management systems based on holistic ridge to reef approaches, which integrate terrestrial stewardship with marine conservation. Traditional marine taboo zones, such as the *noho* in Vanuatu, the *mechen* in the Federated States of Micronesia and the *raui* in the Cook Islands, served as community-regulated conservation areas that protected fisheries and coastal ecosystems. Strong mutual support networks facilitated the exchange of technologies and goods, fostering inter-island relationships. When one community was affected by a natural disaster, neighbouring groups provided assistance, ensuring collective resilience.

Colonisation and globalisation weakened these land use systems by eroding traditional knowledge and mutual support networks. This contributed to an 'identity crisis' characterised by reduced autonomy and increased dependence on international trade. Despite their long history of environmental stewardship, Pacific communities were increasingly portrayed as vulnerable and lacking adaptive capacity. While traditional knowledge in Pacific SIDS has declined in depth and breadth in recent centuries, it remains remarkably intact in some regions, particularly the remote or rural ones. In recent decades, there has been a renewed interest in revitalising the traditional knowledge of Pacific islanders, which has reaffirmed its importance for contemporary resilience approaches and sustainable natural resource management.

Pacific traditional knowledge has been developed through careful observation of natural environments and their predictable patterns. For example, in Samoa ten distinct wind types were identified, while communities on Pentecost Island in Vanuatu recognised ten different types of cloud that could be used to forecast the weather. Indigenous communities developed sophisticated seasonal calendars, often based on the phases of the moon, which defined the best times to plant, harvest and access key resources. The behaviours of birds, insects and other animals have long been used to predict wet weather and cyclones. For instance, when bees, wasps and hornets build their nests lower down in dense vegetation, this is taken as an indication of wetter seasons or an approaching tropical cyclone, often months in advance. Similarly, the early growth of plantain and bamboo, as well as the early fruiting of mangoes and breadfruit, are associated with impending wet weather. These indicators help communities prepare for cyclones by enabling them to store food and secure future needs. Signs of drought can also be read in the landscape: in Vanuatu, for instance, wilting *diadia* shrubs or changes in moss appearance on large trees signal water stress. Ocean conditions can also provide insights, with wave patterns being used to predict changes in the weather. There is evidence that traditional knowledge systems recognised ENSO-related climate variability: in the Torres Islands of Vanuatu, for example, ritual activities were historically aligned with El Niño periods associated with extreme rainfall or drought.

In the past, a common response to severe water shortages was to temporarily abandon an island — a practice that is still fresh in the memory of many people in the Marshall Islands. Many Indigenous Pacific peoples developed water conservation techniques, ranging from terracing and irrigation to pond field cultivation. In the Marshall Islands, for example, a 'culture of austere water usage' involved harvesting rainwater that dripped from foliage into the hollow bases of coconut trees (known as '*emmak*').

Water divination techniques were employed to locate sources of freshwater, and during periods of scarcity, communities would collect water from caves, coastal upwellings, or seeps along the shoreline. On Aneityum Island in Vanuatu, communities built complex irrigation and water diversion channels to supply terrace garden systems. In low-lying areas, raised fields created perched freshwater lenses, enabling food production on otherwise unsuitable land.

Traditional agroforestry systems have also been shown to be highly resilient to cyclones, helping communities to maintain food security after extreme weather events. Across the Pacific, communities developed techniques to reduce evapotranspiration and cultivated drought-resistant species to withstand prolonged dry periods. These adaptive agroecological practices have resulted in diverse food systems that are highly resilient to environmental shocks. Food was commonly stored in bulk, for instance in 'yam houses', or preserved by smoking, drying, fermenting or salting. Producing food surpluses was a customary practice that enabled communities to prepare for periods of scarcity. On Pentecost Island in Vanuatu, food gardens (*aragogona* and *maliudu*) were traditionally only harvested in response to shortages following extreme events.

Traditional knowledge also influenced the location of settlements, which were typically inland rather than on the coast, and how they were constructed to minimise exposure to strong winds and waves. Building techniques were adapted to withstand hurricane-force winds and tropical cyclones by using flexible connections, as well as roof and wall designs that allowed air to pass through rather than resist it. Combining this traditional knowledge with Western science offers considerable potential for developing climate-resilient settlements and infrastructure in the context of rapid global changes.

SIDS across all regions have long histories of Indigenous agroforestry practices. Although the associated cultural knowledge has in some cases been eroded through centuries of colonisation and the expansion of industrial agriculture, there is now a growing resurgence in the use of agroecology and agroforestry methods. These approaches blend Indigenous farming knowledge with modern techniques to create resilient, productive and ecologically beneficial agricultural systems. In Mauritius, for example, the COVID-19 pandemic exposed vulnerabilities in food supply chains, prompting renewed interest in traditional backyard gardening as a means of rebuilding food security.⁷⁶⁶ In Fiji, IFAD's Pacific Islands Rural and Agriculture Stimulus Facility has supported farmers in reviving the traditional practice of *solesolevaki*, in which entire communities share labour and tools to reduce harvesting time and costs.⁷⁶⁷ In the Caribbean, Indigenous communities on several islands are reclaiming traditional food systems in response to rising health concerns and the insecurity associated with their reliance on imported foods.⁷⁶⁸

Reviving traditional agricultural practices offers a powerful pathway for SIDS to increase the profitability of modern farming systems while also boosting their resilience to climate and environmental stresses.⁷⁶⁹

Sustainable agriculture — including conservation, regenerative and organic approaches — emphasises the development of healthy soils that drain well, retain moisture and nutrients, sequester carbon and maintain adequate aeration. These qualities increase land productivity and resilience to both drought and floods. Common practices across these production systems include the use of cover crops, organic fertilisers and intercropping, as well as minimising soil disturbance. Many of these practices have been used by local communities in SIDS for generations. Mulching, for example, is a long-standing practice in all three SIDS regions, where it is used to regulate soil moisture during dry periods.⁷⁷⁰ Mulching can also significantly reduce soil and nutrient loss, improve water infiltration and enhance microbial activity, thereby contributing to healthier and more resilient agricultural systems.⁷⁷¹

Agroecology is a promising approach to enhancing agricultural production, land health, and biodiversity (above and below ground) in SIDS.⁷⁷² It involves optimising species diversity and combining plants from different strata or functional levels in order to make the best use of available genetic resources. Agroecological practices also emphasise the importance of functional landscape elements and wider ecosystem processes, which is an especially valuable perspective in highly connected island environments where ecological interactions are tightly interlinked.⁷⁷³

Agroforestry Partnerships in Haiti ⁷⁷⁴

The majority of Haiti's population lives in rural areas and depends heavily on subsistence agriculture. In 2005, the Haiti Timber Reintroduction Programme (HTRIP) was set up by Haiti Friends, a US-based non-profit organisation, and the Albert Schweitzer Hospital (HAS), with the aim of addressing deforestation and human health concerns in the Lower Artibonite Valley simultaneously. The programme provided technical expertise and agroforestry inputs for agri-silvicultural practices, including planting fruit, fuelwood and timber trees alongside farm crops. The species selected were chosen according to community needs and preferences, as well as their suitability to local environmental conditions.

Training was delivered to groups of 20–30 community members over a nine-month period. It covered topics such as seed collection and preparation, nursery construction, sapling care and composting. Following the training phase, activities were handed over to a designated community leader. All trees planted through the initiative became the property of the participating farmers, thereby strengthening local ownership of, and long-term stewardship over, their restored landscapes. Alongside agroforestry activities, the hospital implemented a nutritional education programme to promote healthier diets in the community. An agroforestry garden on the hospital grounds served as an educational tool and demonstration site, ensuring that the systems promoted by HTRIP align with nutritional guidance and support community well-being.

The hospital also facilitated field operations by hosting the project team on its premises and providing administrative support. This reduced operational costs and enabled more resources to be directed towards activities on the ground. As HAS has long-standing relationships with the surrounding communities through its medical clinics, it played a key role in recruiting farmers to the programme. Community leaders helped to expand outreach by maintaining strong links with neighbouring villages. These relationships and social networks were further strengthened through cross-community events and exchange visits. The programme continued to engage with communities that had 'graduated', helping to create wider agroforestry networks and long-lasting, trusted partnerships.



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Agroecology and Organic Farming in Fiji ⁷⁷⁵

In the Indigenous Fijian concept of *vanua*, socio-ecological units are understood as part of a larger, interconnected system defined by social and cosmic relationships. Although it is often simply translated as 'land', *vanua* encompasses mountains, rivers, forests, beaches, reefs, people, plants, animals, ancestors, spirits and the socio-political and cultural structures that bind them together. Drawing on this holistic worldview, the people of Cicia Island in Fiji developed their own 'ridge-to-reef' management scheme even before the national Lau Seascape Strategy 2018–2030 was launched in partnership with Conservation International. The Cicia community integrated locally managed marine closures with certified organic agriculture, showing that traditional knowledge and modern sustainability practices can be combined to support resilient island ecosystems.

Cicia is a small, 35 km² volcanic island in the Lau Group. Most of its approximately 1,000 inhabitants rely on subsistence fishing and/or farming for a living. Due to its considerable distance from the capital, with only a weekly flight and an infrequent, often irregular, monthly ferry, very few commodities produced on Cicia are exported. Local communities have access to, and management rights over, customary fishing areas (*iqoliqoli*), which extend from inshore waters to the outer limits of the coral reefs. Each village establishes taboo areas to restore and sustain local fish stocks, which are monitored by the community. Chiefs may grant temporary permission for harvesting in these areas.

In 2006, the District Council banned all chemical fertilisers and approved the island's transition to organic farming. In 2013, the entire island was certified as organic by a third party – a process initiated by Selavo Agro Business that involved local farmers directly in the assessments. A total of 200 farmers were certified. To oversee compliance, the Cicia Organic Monitoring Agency (COMA) was established, consisting of agriculture officers, the District Council chair, village headmen and community representatives. The island's organic principles are based on long-standing traditional practices: bird manure is used as a natural fertiliser, ash and dried seagrass serve as substitutes for pesticides, seeds brought from elsewhere are thoroughly washed to prevent contamination, crop rotation is encouraged to maintain soil health, and the burning of vegetation has been eliminated or kept to a minimum. The transition to organic farming has also encouraged communities to adopt an 'organic lifestyle', favouring unprocessed, locally sourced food and natural resources over imported products.

One of the key motivations behind the shift to organic agriculture was the decline in marine resources. Community members believed that banning agricultural chemicals and reducing the burning of vegetation would improve the condition of coral reefs, encourage the growth of healthy seaweed and ultimately increase the availability of seafood for local villages. The combination of organic farming and marine closures was seen as an effective strategy for achieving co-benefits across ecosystems. These practices reflect a deep understanding of the interconnectedness of land and sea: degraded or 'dry' land (*'dravu i segue'*) is believed to result in a 'poor and unproductive' sea (*'dravudravua'* or *'drava'*), whereas healthy land contributes to abundant marine ecosystems.

The restoration of local agrobiodiversity can enhance productivity, improve community health and wellbeing, and help to reduce the consumption of ultra-processed foods and red meat in SIDS.⁷⁷⁶ To ensure that human activities remain within the carrying capacity of island ecosystems, more sustainable production and consumption patterns that are nature-positive will be essential.⁷⁷⁷

Reducing the cost of agricultural inputs, diversifying local food production, and investing in irrigation infrastructure to prepare for dry periods can significantly

strengthen the resilience of smallholder farmers and food systems in SIDS.⁷⁷⁸ Integrated pest management techniques, such as biological control, and using agricultural waste to produce fertilisers, can lower input costs, ease pressure on foreign exchange reserves and create new employment opportunities. Subsidies for harmful agricultural products, such as pesticides and chemical fertilisers, could be redirected towards more sustainable alternatives that reduce pollution.⁷⁷⁹ In addition to this, supporting the transformation of food systems in SIDS will require addressing land tenure challenges, revitalising traditional knowledge

and skills related to local food production and preparation, and shifting consumer behaviour by reducing the preference for imported foods.⁷⁸⁰

Conserving Agrobiodiversity in the Pacific SIDS

The Centre for Pacific Crops and Trees (CePaCT), located within the Secretariat of the Pacific Community, is an internationally recognised gene bank that maintains an extensive in vitro collection of 18 key food crops. The centre has a particular focus on yam and taro, both of which are essential staples across the region.⁷⁸¹ The centre also houses a seed conservation facility and serves as a regional hub for germplasm health testing. It provides pathogen diagnostics and ensures high-quality planting material for Pacific countries. In addition to conserving agrobiodiversity for crop development and long-term preservation, CePaCT supplies germplasm to support disaster recovery efforts.⁷⁸² Through the Land Resources Division's Sustainable Forest Management and Landscapes Programme and the Pacific Agricultural Plant Genetic Resources Network (PAPGREN), the Centre collaborates with member countries to identify priority trees and crops for conservation. The genetic resources held in the genebank are accessible to all Pacific users, as well as international partners, through formal material transfer agreements. This ensures that these valuable resources can be used for research, crop development and building resilience across the region.⁷⁸³

Embedding Sustainability Principles into the Urban and Tourism Sectors

Urbanisation, tourism and infrastructure development exert significant pressure on land and water resources. However, these sectors can generate substantial environmental and socio-economic benefits by transitioning to more sustainable and inclusive practices. For example, tourism ventures that shift from full foreign ownership to more inclusive business models can reduce financial leakage and ensure that a greater share of revenue remains within the local economy. 'Buy local' initiatives can further strengthen domestic markets by supporting local entrepreneurs and small businesses. Supply chain assessments can identify opportunities to strengthen links between sectors, such as tourism and agriculture, supporting

local livelihoods while promoting responsible, environmentally-sound production and consumption. Inclusive sustainable tourism development must include local communities into planning processes and decision-making. Effective tourism regulations should also anticipate and mitigate negative environmental impacts, helping to safeguard ecosystems, cultural heritage and community livelihoods.⁷⁸⁴

Environmental Standards for Tourism in the Seychelles

The tourism sector is a central pillar of the Seychelles' economy, contributing an estimated 60% to GDP when direct and indirect benefits are taken into account, as well as its role in adding value domestically, generating export earnings and creating jobs. Around two thirds of the labour force is employed in tourism. Recognising that expanding tourism without safeguarding environmental and social wellbeing is unsustainable, the Government of Seychelles adopted the Seychelles Sustainable Tourism Policy Framework (SSTPF). This framework promotes a model of tourism growth that balances strong economic performance with environmental integrity and a vibrant cultural and social life.⁷⁸⁵ In order to protect local ecosystems, the Seychelles has implemented stringent ecological standards within the tourism sector. Over 43% of the country's land and extensive marine zones are designated as protected areas.⁷⁸⁶ In addition, the Ministry of Finance, National Planning and Trade introduced the Tourism Environmental Sustainability Levy, which is collected on a per person, per night basis with increasing rates according to hotel size. Revenue from this levy is directed towards conservation and rehabilitation initiatives, ensuring that tourism directly contributes to safeguarding the natural assets on which it depends.⁷⁸⁷

Many SIDS are characterised by rapid urbanisation and a large proportion of the population living in cities. Creating more sustainable, green urban areas that balance environmental, economic, social and institutional considerations can significantly improve the physical and mental health of urban residents while enhancing biodiversity and strengthening climate change adaptation.⁷⁸⁸ Urban agriculture can contribute to improved food security, while electric mobility can support the transition to sustainable

transport systems.⁷⁸⁹ Creating healthier, more resilient urban landscapes requires clear vision and integrated planning that incorporates green, blue and grey infrastructure, emphasising inclusivity and system-wide benefits.^{790 791}

In some SIDS, green public–private partnerships have been established to expand green infrastructure in areas such as energy, sustainable mobility, green cities and buildings, and water and waste management.⁷⁹²

Promoting Green Urban Development in Singapore ^{793 794}

Following its independence, Singapore adopted a unique town and country planning approach, integrating green spaces into urban development as a core part of its national strategy. Recognising from the outset that high-density living required compensatory natural environments, the government launched the Garden City programme just two years after independence in 1967. The programme aimed to create a highly liveable city with abundant greenery to rival that of more developed nations. During this period, nature reserves were protected and expanded, and a systematic network of community parks was established across the island.

Green space planning has become a core component of Singapore's development model. Urban development is deliberately limited to 34% of the country's total area, ensuring that greenery remains a defining feature of the urban landscape. Around 56% of Singapore's land is covered by vegetation, including 27% of actively managed green spaces such as parks and gardens, and 29% of spontaneous vegetation. A further 10% of land is dedicated to public facilities and infrastructure that are integrated with open spaces. Urban greenery is now a cornerstone of Singapore's strategy for maintaining a high quality of life in the context of extreme population density. The city's built form and green spaces create a diverse landscape that incorporates woodlands, wetlands, parks, and semi-natural areas within the urban environment. These spaces support cultural, social and economic activity, while also improving environmental conditions, such as air quality, storm water management and thermal comfort.

Singapore's experience shows that highly dense cities can be exceptionally liveable if they are planned holistically and in the long term. Firstly, the city prioritises long-term growth and renewal, maintaining a forward-looking planning horizon that anticipates future needs rather than responding reactively to emerging pressures. It also embraces diversity and fosters inclusiveness, ensuring that different communities and income groups coexist harmoniously. A central pillar of Singapore's model is the ambition to bring people closer to nature by integrating green spaces into dense urban areas, relieving stress, enhancing well-being, and strengthening social cohesion. Complementary policies promote affordable, mixed-use neighbourhoods that reduce travel needs and ensure broad access to essential services. Public spaces are designed to 'work harder', providing multifunctional, flexible environments that maximise social benefits and land use efficiency.

Singapore prioritises environmental sustainability by promoting green transport and building initiatives, such as encouraging the use of public transport and walkable spaces, and developing low-carbon projects. Urban design principles, such as the use of greenery, varied streetscapes and transitional spaces, help to relieve the perception of density by reducing the sense of overcrowding. Active public space design improves safety by ensuring that streets and parks are vibrant, well used and naturally monitored. Innovation also plays a major role. Singapore encourages unconventional and experimental solutions, enabling the adoption of new technologies and creative approaches to urban challenges. Finally, the city emphasises the importance of forging 3P (public–private–people) partnerships, leveraging collaboration across sectors to deliver more inclusive, resilient and sustainable outcomes. Together, these principles form the foundation of a model that enables a highly dense city to remain green and liveable.

Nature-based solutions (NbS) are particularly relevant for SIDS and can be designed to take into account the close interconnections between land and sea. NbS can be more cost-effective than engineered alternatives, for example by lowering maintenance costs and creating jobs, while delivering multiple environmental benefits.⁷⁹⁵ For example, the use of locally available natural materials can contribute to more sustainable and resilient infrastructure development by providing opportunities to draw on traditional knowledge and decentralised systems that benefit local communities.

Research, capacity building and policy support can help to ensure quality control and material standardisation, as well as the integration of sustainable materials into mainstream construction practices. Public-private partnerships can help to overcome constraints relating to financing and market access, while ensuring access to appropriate technologies and training.⁷⁹⁶ Institutional capacity and coordination mechanisms are crucial for sustainable urban planning, as they ensure that unsustainable construction materials and practices are discouraged and sustainable alternatives are incentivised.⁷⁹⁷



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Integrated Land Use Planning and Inclusive Governance

Strong land use governance frameworks — combining clear policies and long-term spatial planning with transparent tenure systems and participatory approaches — are a critical transformative lever for scaling up integrated land and water management practices.

Operationalising Spatial Planning Frameworks

Although coastal and marine ecosystems underpin the economies of many SIDS, the drivers of negative ecological and socio-economic impacts in these areas often originate from land-based activities.⁷⁹⁸ Some SIDS have adopted holistic Ridge-to-Reef (R2R) approaches to address these interconnected challenges.⁷⁹⁹ However, these efforts must be supported by a policy and regulatory environment that recognises the interdependence of ecosystems and economic sectors, rather than segregating policies into distinct portfolios, such as the blue economy, climate adaptation or land management.

Land use planning tools are essential for balancing competing demands, such as those relating to housing, agriculture, tourism and conservation, and for aligning major economic developments with environmental limits and needs. Ideally, waste and pollution should be accounted for in the planning stage. Effective, integrated land use planning requires access to high-resolution spatial data on soils, invasive species, coastal ecosystems, ecological connectivity, land tenure, hydrology and disaster risks. While local governments and institutions often lack the data and financial resources for such planning, an integrated approach can ensure that key sectors, such as tourism which relies heavily on pristine natural environments, contribute to the financing of conservation and restoration.

Cross-sectoral coordination mechanisms can be designed to prevent fragmented interventions and strengthen collaboration among different government institutions and stakeholders.⁸⁰⁰

Harnessing Data for Sustainable Land and Agriculture in Rodrigues, Mauritius ⁸⁰¹

The establishment of the Central Natural Resource Information System (CNRIS) in Rodrigues, Mauritius, is a significant step towards strengthening data-driven decision-making for sustainable land management and agricultural production in a small-island context. Designed to consolidate previously fragmented datasets on soils, land use, water resources, climate and agricultural practices, the system provides access to centralised, interoperable information. By integrating geospatial and statistical data from multiple institutions, the CNRIS has improved coordination across sectors and enhanced the availability, quality and usability of natural resource information.

A key achievement of the CNRIS is its ability to support evidence-based planning and policy development. Through user-friendly interfaces and analytical tools, the system enables stakeholders to assess land suitability, monitor land degradation trends, and identify priority areas for intervention. This facilitates the more targeted and efficient allocation of investments in sustainable land management, ecosystem restoration, and agricultural development. At the institutional level, CNRIS has strengthened capacity by promoting data standardisation and shared protocols, as well as collaboration among agencies. It has also provided a foundation for continuous monitoring and reporting in relation to national commitments concerning land degradation neutrality, climate change and biodiversity conservation.

In practice, the CNRIS has supported the Integrated Land Use Planning (ILUP) process by providing guidance on the most appropriate use of scarce land resources. Through land suitability analysis, planners and national stakeholders can identify areas with high agricultural production potential, while also highlighting zones that are better suited to tourism development, infrastructure or nature conservation. By improving access to reliable, detailed data, CNRIS helps farmers, planners and policymakers to balance productivity with environmental sustainability. This enhances agricultural resilience, strengthens land governance, and supports long-term food security and ecosystem resilience in Rodrigues.

UNDP's Blue and Green Islands Integrated Programme (BGI-IP) ⁸⁰²

The UNDP's Blue and Green Islands Integrated Programme (BGI IP) comprises 15 projects aimed at improving food systems (including agriculture and fisheries), promoting sustainable tourism, and supporting the development of sustainable rural and urban areas. Financed by the Global Environment Facility (GEF), the USD 135.6 million initiative is a comprehensive programme that helps SIDS address environmental challenges and 'build back better, greener and bluer'. It is being implemented in Belize, Cuba, Saint Lucia and Trinidad and Tobago in the Caribbean region; the Federated States of Micronesia, Palau, Papua New Guinea, Samoa, Timor-Leste and Vanuatu in the Pacific region; and Cabo Verde, Comoros, the Maldives, Mauritius and the Seychelles in the AIS region. By focusing on food systems, tourism and sustainable urban and rural development, the BGI-IP aims to generate multiplier effects and prioritise nature in development planning, fiscal policy and decision-making processes. Implementing nature-based solutions will be strengthened through collective action, coordination and knowledge exchange among SIDS, thereby supporting the scaling up and scaling out of effective solutions and innovations.

Embracing Customary Tenure Systems

Securing and clarifying land tenure rights — including aligning customary and statutory systems in areas being rehabilitated or restored — is essential to incentivise long-term investment in sustainable land management, and to reduce conflicts over land use that would otherwise undermine restoration outcomes and the resilience of food systems.⁸⁰³ Governance structures that recognise the value of traditional knowledge, build community capacity, and empower and encourage creativity and leadership at the community level can play a critical role in transforming

SIDS economies into green and blue economies centred on the restoration and conservation of natural capital.

In SIDS with decentralised governance systems and strong cooperation between national and local authorities, significant potential exists to leverage diversity, flexibility and social networks in support of sustainable land and natural resource management.⁸⁰⁴

To ensure the sustainable use of land and natural resources in SIDS, formal land administration systems must work in partnership with customary institutions, and strengthen community-based land-use planning and enforcement.⁸⁰⁵ As noted, SIDS have diverse customary tenure systems. Despite having large diaspora communities, land retains immense symbolic value and is closely linked to identity through lineage, clan or family affiliations.⁸⁰⁶ This sense of belonging helps to ensure that land use continues to be influenced by customary authority and collective responsibilities. Effective and sustainable natural resource management in SIDS requires strong

community ownership and the active involvement of traditional leaders. This is particularly important in contexts where community-based governance and customary institutions continue to exert significant influence at the local level, as is often the case in Pacific SIDS. Engaging with customary systems can generate substantial local support for sustainable development priorities. Successful ridge-to-reef implementation therefore calls for a flexible, adaptive “Community to Cabinet” governing philosophy that connects formal state structures with informal traditional systems and empowers local communities to play a central role in ridge-to-reef project planning.⁸⁰⁷

Customary Land Tenure Systems in Samoa and Tonga ⁸⁰⁸

A study compared the effectiveness of two customary tenure systems in Samoa and Tonga in facilitating the transition to renewable energy. In Samoa, the ‘Samoa way of life’ (*Fa’asamoa*) is a cultural system based on shared responsibilities, intergenerational trust and reciprocity. This principle is deeply embedded in Samoan society. Samoa’s chiefdom culture, which is based on kinship, is closely intertwined with the government and central administration ‘by virtue of elections with inbuilt community influence’. Issues are first discussed within cultural forums, and only once consensus is reached are they channelled through government institutions. This cultural–institutional configuration helps ensure that sustainable development projects and programmes benefit the wider population, as well as enable a higher degree of self-determination in their implementation.

In contrast, Tonga’s customary system is characterised by complex traditions and a strongly hierarchical structure that tends towards centralisation and bureaucracy. The king sits at the apex of this structure, followed by nobles, attendant speakers (*mātapule*) and estate holders or heads of clans, creating what has been described as a ‘system of pyramids within village pyramids under a national pyramid’. At the household level, the ceremonial family head (*fahu*), consisting of the father’s sister and her children, occupies the highest position in the family hierarchy. These community structures are often not well integrated with democratically elected government institutions. Decision-making takes place within this multi-tiered system, where distrust of politics and competing interests can impede consensus. Consequently, these dynamics pose challenges for achieving sustainable and ambitious development outcomes.

The prevalence of customary land tenure systems often conflicts with Western notions of land ownership. Innovative solutions are required to resolve land issues, recognise and enforce legitimate tenure rights, reconcile issues of equity and inheritance, and guarantee that local communities reap the benefits of their stewardship of, and investment in, land, water and other natural resources.⁸⁰⁹

Ensuring Economic Benefits from Communal Land in the Pacific

Fiji established the Native Land Trust Board to administer customary land on behalf of indigenous peoples. Despite facing internal criticism, this quasi-governmental body has built a significant portfolio by creating a leasehold structure that makes land available for production and development, generating economic returns for landowners in the process. This demonstrates that leasehold arrangements need not undermine customary tenure.⁸¹⁰ In Papua New Guinea, the Ahi people of Lae set up the Ahi Corporation to oversee their land and other financial interests. The corporation is governed by community leaders from the Ahi tribe, who are paid for their work and ensure that rental income and profits are reinvested in the community. This demonstrates that communal tenure can deliver economic returns and improve community wellbeing.⁸¹¹

Addressing gender inequalities, youth unemployment and the marginalisation of Indigenous and rural communities are also essential for implementing more inclusive and effective management solutions in SIDS. Training and capacity building initiatives that specifically target women as both participants and decision-makers can significantly advance women's empowerment and leadership in land restoration and in the implementation of nature-based solutions.⁸¹² Strengthening local institutions, cooperatives and community-based organisations further supports this shift by providing social safety nets and enabling communities to take a leading role in land stewardship.

Land, identity and cultural continuity are deeply intertwined in many SIDS, making cultural relevance a key component of land governance and planning.

The experience of Ragged Island in the Bahamas, for example, where the entire population was displaced from their ancestral homeland by Hurricane Irma in 2017, illustrates how environmental disruption can fracture community cohesion and a sense of place. However, these same cultural ties can also inspire strong community-driven rehabilitation efforts, as demonstrated by residents' initiatives to return and rebuild.⁸¹³ Recognising and integrating cultural values, traditional knowledge and community aspirations into regenerative land management strategies can strengthen long-term acceptance and ownership.



Technology Transfer and Digitalisation

Enhanced access to technology and effective technology transfer are vital for SIDS. Modern tools and innovations can significantly reduce the economic, environmental and logistical constraints that currently hinder sustainable land management and broader development goals. Access to appropriate, affordable and adaptable technologies — including renewable energy systems, water-saving systems, digital land use planning tools, early warning systems and climate-smart agricultural innovations — can help to break this cycle by reducing dependence on costly imports, improving resource efficiency and lowering long-term operational expenses. Therefore, external support for technology transfer, capacity building, and the localisation of technological expertise is essential.^{814 815}

Data Availability and Access to Support Decision-Making

SIDS require high-resolution, locally relevant, openly accessible spatial data to budget, plan, design, implement and monitor integrated programmes.⁸¹⁶

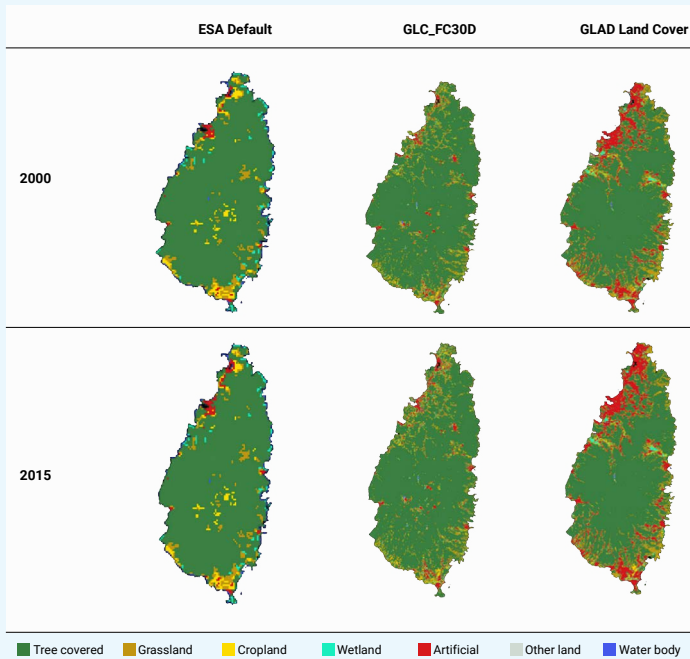
However, many current data and digitalisation efforts rely on global or moderate resolution datasets (e.g. 10–30 m), which are often inadequate for SIDS, where land is extremely limited, fragmented and heterogeneous. On small islands, coarse-resolution data can obscure critical land use dynamics such as narrow agricultural plots, coastal vegetation buffers, informal settlements, erosion pathways and small but ecologically significant habitat patches.^{817 818} High-resolution Earth observation data at the metre or sub-metre scale — such as PlanetScope imagery⁸¹⁹ — are therefore essential for fine-scale monitoring of land degradation, restoration planning and the targeting of nature-based solutions.

Integrated, high-resolution datasets on land cover and land use, soil conditions, topography, hydrology, coastal and near-shore ecosystems, infrastructure and exposure to climate hazards can enable a more accurate assessment of the condition of ecosystems, agricultural productivity and land use changes. They can also strengthen integrated land use and ridge-to-reef planning. Investing in accessible, high-resolution data systems combined with national capacity building efforts and the incorporation of local knowledge can significantly enhance the effectiveness, credibility and sustainability of regenerative land management and resilience strategies in SIDS.

Developing High Resolution Land Cover Data for UNCCD Reporting

Two new land-cover datasets with a spatial resolution of 30 metres are currently under consideration for LDN reporting. While both provide significantly greater spatial detail than the 300-metre global default maps produced by the European Space Agency (ESA),⁸²⁰ they still have limitations: 12 SIDS lack full coverage in both datasets. Moreover, the Global Land Analysis and Discovery (GLAD) dataset is available only at five-year intervals from 2000 to 2020,⁸²¹ whereas the GLC-FCS30D dataset provides annual data from 2000 to 2022, but with less spatial coverage of SIDS than GLAD.⁸²² The **Land Cover Comparison Tool for SIDS** can help countries identify which dataset is most suitable for their specific national context.⁸²³ The example of Saint Lucia below highlights these differences, many of which require field or ground validation to resolve.

FIGURE 23 Land Cover Maps for Saint Lucia (seven UNCCD classes)⁸²⁴



For the time being, SIDS will require bespoke solutions to obtain high-resolution land-cover information for national LDN reporting. Because each dataset applies a different land-cover classification methodology, notable discrepancies arise that require aggregation and cross-mapping to align with the seven UNCCD reporting classes.⁸²⁵ To ensure reliable land-degradation assessments, both the accuracy and temporal consistency of the classifications in these datasets must be evaluated.⁸²⁶

Looking ahead, the Copernicus Land Monitoring Service (CLMS) Land Cover and Forest Monitoring (LCFM) product⁸²⁷ represents a significant advance for land-cover monitoring

in SIDS. Building on earlier research initiatives such as ESA WorldCover,⁸²⁸ the LCFM is now an operational, global land-cover dataset at 10 m resolution, with annual land-cover maps and change layers available from 2020 onwards (currently covering 2020–2026 in this phase), and with plans for sub-annual products and future back-processing to improve historical comparability. SIDS coverage has also been expanded, addressing previous data gaps in small and complex island settings. While the limited temporal depth remains a constraint for establishing long-term baselines for UNCCD reporting, the LCFM and related CLMS products represent an increasingly valuable Earth-observation resource for fine-scale land-use monitoring, restoration planning, and the proactive management of land degradation and drought risks in SIDS. Furthermore, Copernicus Land Monitoring Service High-Resolution Hot Spot Monitoring (HSM) products provide an on-demand capability for high-resolution land-cover and land-cover-change mapping, and have already been applied in SIDS contexts such as the Caribbean Islands and Timor-Leste, offering valuable support for fine-scale land monitoring, restoration planning and integrated reporting where global datasets are too coarse to capture island-specific land use dynamics.⁸²⁹

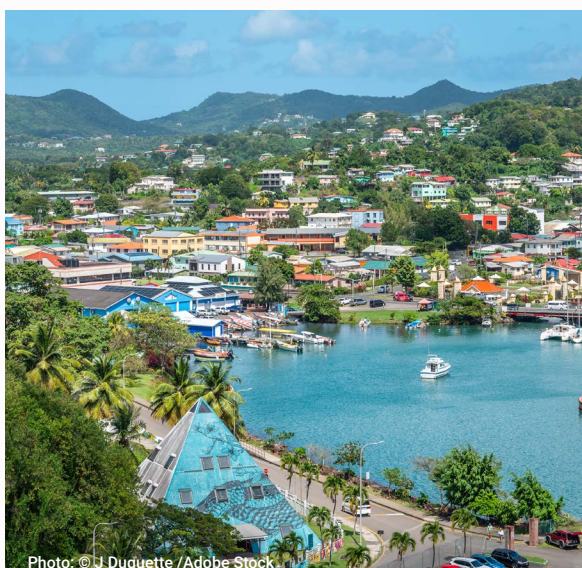
Regional data platforms, such as those hosted by SPREP⁸³⁰ and PISLM,⁸³¹ already provide environmental datasets tailored to national and local governance needs. Expanding and strengthening these initiatives can enhance the capacity of SIDS to develop evidence-based policies, planning frameworks and land-management strategies.

Resilience in Motion: Adaptive Island Landscapes

Low-lying coral reef islands in atoll nations are highly sensitive to environmental change. Atolls are formed through coral-reef growth, where waves and currents deposit sand and gravel onto the reef surface.⁸³² These islands are dynamic landforms that can adjust their size, position and elevation in response to changing wave conditions and sediment supply, as well as rising sea levels.⁸³³ As many atoll islands remain largely unmodified, natural coastal and sedimentary processes continue to operate, enabling the islands to adapt over time. Understanding island-scale dynamics, including patterns of erosion, accretion, stability and mobility, is therefore essential for informed land use planning and climate adaptation strategies.⁸³⁴

The Tuvalu Coastal Adaptation Project is a seven-year initiative designed to strengthen the resilience of one of the world's most vulnerable atoll nations to climate change and sea level rise. It is funded with USD 36 million from the Green Climate Fund and USD 2.9 million from the Government of Tuvalu. The project enhances coastal protection on Funafuti, Nanumea and Nanumaga, while also building the long-term capacity of the nation and its communities to adapt to worsening climate impacts. A major project achievement is the development of a state-of-the-art online coastal risk platform. This enables Tuvalu to map inundation risks, monitor shoreline change, assess storm impacts, and make evidence-based decisions regarding land use, infrastructure planning and early warning systems for the first time. Supported by sophisticated modelling, LiDAR baselines and physical wave experiments, and covering all nine atolls, the platform empowers government agencies, communities and planners to better understand coastal dynamics, prepare for extreme events, and design appropriate adaptation measures. Ongoing training will ensure that the system becomes an integral tool for nationwide resilience planning and long-term coastal zone management.⁸³⁵

In order to improve the availability of data for evidence-based decision-making, data collection must be standardised and stored within a common system that supports the regular updating and sharing of data across departments and sectors.^{836 837} This requires sustained long-term support and capacity building. Regional initiatives, such as those led by the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Caribbean Community (CARICOM), have already established environmental data platforms that are tailored to the needs of national and local governance.⁸³⁸



SPREP INFORM Project in the Pacific⁸³⁹

With funding from the GEF, Pacific Island countries have partnered with SPREP and UNEP to improve access to environmental data across the Pacific. The INFORM project has supported enhanced field sampling and GIS capacity for site-scale environmental impact assessments, as well as the creation of integrated environmental data portals and the production of comprehensive State of the Environment reports. An indicator guidebook has also been developed to enable trend comparisons across SIDS, and an e-learning platform has been launched to support national agencies in data management and the use of these newly developed tools. However, the amount of land-related data in these portals remains limited due to a lack of systematic data collection.

Participatory data collection and knowledge generation can strengthen evidence-based policymaking and deepen stakeholder engagement. Local communities often possess detailed knowledge of island ecosystems and ecological change that has been passed down through the generations.

Co-designing and jointly collecting and monitoring data that combines Indigenous knowledge with robust scientific methods can help build data systems that are 'technically resilient, culturally grounded and socially equitable'.⁸⁴⁰ Citizen science can also play a critical role in validating and ground-truthing

spatial datasets by providing context-specific, locally collected information that improves classification accuracy, corrects misinterpretations and strengthens the credibility and usability of satellite-derived data for land management and reporting purposes.⁸⁴¹

Blending Tradition and Technology for Climate Resilience in Vanuatu ^{842 843 844}

In Vanuatu, where communities rely on accurate and reliable weather information to prepare for increasingly frequent natural disasters, the ClimateWatch Vanuatu project is strengthening local climate resilience by combining traditional knowledge with contemporary science. Implemented by the Earthwatch Institute Australia, the project takes a participatory approach, empowering communities to contribute actively to climate knowledge.

As the intergenerational transmission of customary forecasting practices declines and scepticism towards modern climate forecasts persists, the project offers a culturally grounded solution in the form of the ClimateWatch App: a digital platform delivered in Bislama. The app enables communities to document traditional knowledge and record observations of agricultural, marine, and terrestrial species over time. Financed by a grant from the Global EbA Fund — a funding mechanism managed by the International Union for Conservation of Nature (IUCN) and its partners, with support from the International Climate Initiative of the German government — ClimateWatch Vanuatu has expanded rapidly since its launch in 2023. Hundreds of data points have been collected across all provinces and 11 ClimateWatch trails have been established with the support of trained Community Climate Champions.

By integrating ClimateWatch activities into school curricula, the initiative preserves traditional knowledge and empowers young people in Vanuatu to become citizen scientists. Crucially, the data collected feeds directly into national climate and cyclone forecasting systems, enabling government agencies to produce hybrid forecasts that combine traditional and scientific knowledge. This approach strengthens preparedness for extreme weather events while informing broader, ecosystem-based adaptation efforts. Combining community engagement grounded in traditional knowledge, capacity building and institutional uptake serves as a replicable model to guide future climate resilience initiatives in Pacific Island nations facing similar challenges.



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Digital Tools for Integrated Land and Water Management

Developing and expanding digital communication infrastructure and capacity can improve resource efficiency, strengthen economic resilience, and provide essential tools for environmental monitoring.⁸⁴⁵

Digital access can support smallholder farmers by improving their ability to forecast conditions, assess risks and make informed decisions, thereby enhancing productivity. On-farm tools can enable the site-specific management of crops, livestock and agricultural inputs, optimising the use of human, financial and natural

resources. Digital platforms that facilitate marketing and access to extension and financial services can further strengthen farm-to-market integration and increase smallholder incomes. Supporting agricultural technology in SIDS can make local producers more competitive in domestic and export markets.⁸⁴⁶

Many SIDS have already made significant strides in incorporating digital technologies into their public service delivery systems, infrastructure planning and economic initiatives.⁸⁴⁷

Digital Tools to Support Farmers and Consumers in the Pacific^{848 849}

Established in 2017, TraSeable Solutions Pte Ltd. is a Fijian technology start-up that has become one of the leading innovators in digital traceability systems for agriculture and fisheries in the Pacific. Drawing on their combined experience of over a decade in ICT, leadership and regional fisheries management, the founders set out to address the persistent challenges faced by Pacific producers, particularly the lack of supply chain transparency, limited market access, and difficulty in meeting international traceability requirements. Initially developed for the fisheries sector, TraSeable's digital tools have expanded rapidly as the company has grown and more Pacific technologists have joined the team. Today, the platform supports agricultural and fisheries value chains across Fiji, Samoa and the Solomon Islands. The system integrates blockchain-ready architecture, mobile applications and Internet of Things (IoT) technologies to provide end-to-end traceability. These tools enable producers, buyers and regulators to verify product provenance, monitor quality and access real-time supply chain information — capabilities that are especially valuable for small producers entering premium and export markets, which require strict traceability standards.

In collaboration with stakeholders across Fiji, TraSeable has developed TraSeable Farms, a mobile agricultural value chain application. Key features include enhanced access to information (i.e., pricing trends) to support production planning, support with farm management, guidance on sustainable practices, improved market access and digital product provenance. By connecting producers directly with markets, the platform reduces the need for intermediaries, increases transparency, and encourages fairer participation in domestic and regional value chains.

My Kana: Supporting Healthy Diets and Local Food Systems in Fiji⁸⁵⁰

The high prevalence of diet-related non-communicable diseases (NCDs) in Pacific SIDS prompted two women from the University of the South Pacific and Fiji's Ministry of Health to develop the My Kana application. In the indigenous iTaukei language, 'kana' means 'food'. The app enables Fijians to monitor their diets and learn about planting and maintaining community gardens. It was presented at the 2021 SIDS Solutions Forum, organised by the Government of Fiji and FAO. My Kana was designed to address the Pacific's 'triple burden of malnutrition' — underweight, overweight and obesity, which are often accompanied by micronutrient deficiencies — which is driven in part by the rising consumption of imported foods that are cereal-dense, processed, fatty, sugary and salty. As a local solution to a local problem, the app provides free access to nutrition information across Fiji's 300 islands.

The app is primarily based on foods commonly available in Fiji and converts the widely recognised Pacific Island Food Composition Tables, developed by FAO and the University of the South Pacific, into a digital format. These tables support the calculation of nutrient intake, the design of special diets for people with specific health needs, and the planning of nutrition improvement programmes. My Kana also includes information on processed foods, enabling users to compare nutritional values. The gardening feature encourages households to grow their own produce and offers guidance on homemade fertilisers, natural pesticides and gardening techniques that are best suited to local conditions. The developers hope to secure funding to expand the app for use in more Pacific island nations, with content adapted for different local languages and food systems.

Effective digitalisation in SIDS requires more than just technology transfer; it also requires governments, institutions and communities to be able to access, use and operationalise digital tools. Many SIDS face constraints relating to digital connectivity, institutional capacity and technical complexity, all of which can hinder the adoption of advanced geospatial and analytical systems. Partnerships with technology companies — including providers of cloud-based platforms, open-access data services and user-friendly analytical tools — can significantly reduce certain technical barriers by offering intuitive interfaces, application programming interfaces (APIs) and decision-support systems that are tailored to national and local needs. Combined with targeted capacity building, such partnerships can enhance the practical usability of digital tools, enable real-time data integration and analysis, and support evidence-based decision-making for land restoration, climate resilience, and sustainable development in SIDS.^{851 852}



Photo: © Adobe Stock

Advocacy and Partnerships for Regional Cooperation

The Samoa Pathway recognises that sustainable development in SIDS can only be achieved through a broad alliance of people, governments, civil society and the private sector working together to create a better future for current and future generations.⁸⁵³ Based on this principle, the Antigua and Barbuda Agenda for SIDS (ABAS) emphasises the importance of partnerships, calling for strengthened, inclusive, and results-oriented collaboration between governments, civil society, the private sector, and international partners. This collaboration aims to mobilise finance, share knowledge, and co-deliver solutions tailored to the specific vulnerabilities and aspirations of SIDS.⁸⁵⁴ This principle is reflected in the way SIDS have mobilised partnerships, built institutions and strengthened governance systems, despite facing persistent environmental, economic and geographical constraints.⁸⁵⁵

In recognition of the unique vulnerabilities and capacities of SIDS, the international community established the SIDS Partnership Framework to encourage more effective cooperation. The framework supports the development and implementation of regional approaches, strengthens relationships between donors and recipients, and improves the monitoring of commitments across multiple SIDS partnerships. By bringing together governments, the private sector, multilateral institutions, and civil society organisations, the framework promotes more coordinated, long-term engagement tailored to SIDS contexts.⁸⁵⁶

Given the scale of the climate, environmental and development challenges that SIDS face, regional and international cooperation, including South-South and triangular cooperation, is essential.

Such partnerships create opportunities for economies of scale, which are particularly important for countries with small populations and limited administrative capacities. At the national level, multi-stakeholder partnerships involving governments, academia, civil society organisations, local communities and the private sector enable SIDS to expand successful pilot initiatives into programmes that are relevant at a national or regional level.

The Partnership Initiative for Sustainable Land Management in Caribbean SIDS (PISLM)

The Partnership Initiative for Sustainable Land Management in Caribbean SIDS (PISLM) functions as a coordinating mechanism for SLM projects and facilitates the exchange of successful practices among participating countries and international agencies.⁸⁵⁷

Financed by the GEF and implemented jointly by PISLM and FAO across Antigua and Barbuda, Barbados, Belize, Grenada, Guyana, Haiti, Jamaica and Saint Lucia, the Caribbean SIDS SOIL CARE project has strengthened the technical and financial capacities of participating countries to advance sustainable land management. This has included developing more detailed soil datasets and implementing integrated landscape management projects designed to address the drivers of land degradation. These interconnected initiatives support improved food security, strengthened climate resilience and reduced land-based pressures on coastal and marine ecosystems through climate smart agriculture, landscape restoration, enhanced drought risk management and the development of livelihood alternatives for local communities.⁸⁵⁸

In Dominica, PISLM has contributed to the creation of a 'whole island' landscape restoration framework for planning, implementing, monitoring and adapting integrated SLM practices and watershed restoration projects.⁸⁵⁹ Following Hurricane Maria in 2017, efforts have focused on reforestation of denuded areas, while technical and market-based mechanisms have been introduced to promote more hurricane-resilient forestry and agricultural practices.⁸⁶⁰

SIDS have demonstrated exceptional leadership in global climate negotiations. Through the Alliance of Small Island States (AOSIS), they have played a key role in advocating for the 1.5°C temperature goal, the establishment of the Loss and Damage Fund, stronger global adaptation commitments, and the recognition of SIDS's specific vulnerabilities. Their consistent demand for parity between the UNCCD, CBD and UNFCCC processes highlights the interconnected nature of climate change, land degradation and biodiversity loss in island contexts. Despite their small geographic and economic size, SIDS have built a strong, coordinated voice that commands significant global attention.⁸⁶¹ Iconic advocacy moments, such as the Maldives' underwater cabinet meeting, have helped to maintain their visibility and moral authority in international forums, setting a powerful example for other vulnerable groups.⁸⁶²

Beyond climate negotiations, SIDS continue to form strategic alliances to strengthen their bargaining power and influence within international policy processes. The Organisation of African, Caribbean and Pacific States (OACPS), which includes all SIDS except Singapore, plays a central role in promoting

sustainable development and poverty reduction across its 79 member states. Its environmental and climate action initiatives focus on food security, resilience and sustainable fisheries management.⁸⁶³

Such alliances also strengthen technical cooperation and knowledge exchange, while regional platforms can facilitate the sharing of best practices, the coordination of initiatives, and joint capacity building. In the Pacific, for instance, stakeholders have observed that a more coordinated regional approach could alleviate the administrative burdens associated with funding applications and programme implementation, thereby creating efficiencies for small administrations with limited human and financial resources. Long-term collaboration also depends on mechanisms for institutionalised learning and coordinated data collection. Given the scarcity of data in many SIDS and the importance of harmonised information for monitoring and planning, regional cooperation on data systems could be highly beneficial. Shared methodologies, regional datasets and coordinated monitoring frameworks help reduce costs and strengthen evidence-based decision-making.



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Regional Dialogue Platforms for Exchange and Coordination in the Pacific

The GEO LDN Regional Dialogue Forum for Pacific Small Island Developing States (PSIDS), which took place in July 2025, emphasised the importance of regional platforms for facilitating exchange, coordination, and capacity development. Bringing together representatives from eight Pacific SIDS — the Federated States of Micronesia, Fiji, Nauru, Papua New Guinea, Samoa, the Solomon Islands, Tuvalu and the Cook Islands — alongside regional and international partners, the forum explored ways to strengthen regional collaboration and support the use of high-resolution geospatial data for monitoring land degradation (SDG indicator 15.3.1). The objectives of the forum were to strengthen regional collaboration, support the use of high-resolution geospatial data for monitoring land degradation (SDG indicator 15.3.1) and reporting to the UNCCD, and explore how geospatial data and integrated land use planning can address challenges relating to land, climate, biodiversity and disaster risk together.

The forum brought together national stakeholders and organisations, including SPC, SPREP, Conservation International, UNU-EHS, UNCCD and FAO, as well as technical partners such as Data Terra, to create a space for peer-to-peer learning and dialogue. Exchanging experiences, good practices and tools supported the use of Earth observation data in land use planning and strengthened collaboration between countries and data providers. Integrating Earth observation data into this collaborative dialogue format helped to streamline environmental reporting at national, regional, and international levels. It also enhanced the consistency and comparability of reporting processes, including UNCCD reporting cycles and SDG monitoring frameworks, while strengthening project planning, monitoring, and evaluation. This approach also bolstered institutional capacities for evidence-based decision-making and reporting.

Learning from the Ridge to Reef Programme in the Pacific ^{864 865}

Financed by the GEF, the Pacific Islands National Priorities Multi-Focal Area Ridge to Reef (R2R) Programme sought to strengthen national capacities, promote cross-sectoral knowledge sharing and cooperation, and facilitate the exchange of ideas among SIDS in similar contexts. Pacific SIDS pooled their GEF STAR allocations to integrate multiple land, water and coastal management projects at the national level and test small-scale methodologies, technologies and policy reforms, to enable future scaling up and replication. The programme also provided technical assistance, training and policy support, including the development of geospatial portals and planning manuals. While the programme produced a number of national-level outputs, the terminal evaluation of its first phase found that the regional cooperation mechanisms created unnecessarily complex procedures with limited value to country implementation and, in some cases, overlapped with existing initiatives. This illustrates that, although investment in cooperation, coordination and knowledge sharing can be beneficial, such processes may exacerbate challenges if they are poorly designed or implemented. Adaptive management approaches can ensure that cooperation mechanisms address the needs of SIDS without overburdening limited human capacities.

Finance for Integrated Land and Water Management

The capacity of SIDS to prepare for and mitigate the challenges outlined above largely depends on today's investment in sustainable land and water management. Coordinated efforts are required at local, national and international levels to reorient land management policies, practices and financing, ensuring that investments are targeted to support the restoration, protection and sustainable management of land and water resources.

Diversifying Investments

Foreign direct investment (FDI) will continue to be crucial in providing the financial capital needed to deploy new technologies, strengthen local capacities, and expand access to international markets.⁸⁶⁶ A key strategy for SIDS will be to diversify resource flows and mobilise private investment, while also increasing domestic public resources and development finance. This will require strengthening national financial systems and implementation capacity in order to support long-term investment in sustainable land management and restoration activities. To attract private investment,

SIDS will need to address cumbersome administrative procedures while ensuring that investments are aligned with national priorities, including climate and sustainability goals. Engagement with the private

sector should be inclusive, ensuring local stakeholders participate in decision-making processes, their rights are respected, and financial flows are tracked transparently to ensure accountability.⁸⁶⁷

Scaling Parametric Disaster Insurance: Opportunities for Regional Resilience Across SIDS

Parametric insurance has emerged as a promising tool for mobilising rapid post-disaster finance in SIDS. Unlike traditional indemnity-based insurance, parametric products automatically pay out when a pre-defined physical threshold, such as wind speed, rainfall intensity or wave height, is reached. This eliminates the need for lengthy disaster loss assessments and enables governments to access funds within days of a disaster.

The Caribbean Catastrophe Risk Insurance Facility (CCRIF), established in 2007, was the world's first regional insurance fund to use parametric insurance for earthquakes, tropical cyclones and severe rainfall events. Since then, similar models have been adopted in other regions, including the African Risk Capacity (ARC) Group,⁸⁶⁸ which covers Cabo Verde, Comoros, Guinea-Bissau and São Tomé and Príncipe, the Pacific Catastrophe Risk Insurance Company, which covers all Pacific SIDS except Timor-Leste,⁸⁶⁹ and the South-East Asia Disaster Risk Insurance Facility, which includes Singapore.⁸⁷⁰

These schemes have enabled SIDS to access critical resources immediately after disasters, helping to stabilise public finances during periods of acute stress. By pooling risk across member countries, premium savings of up to 50% are achieved compared with each country bearing disaster risks individually.⁸⁷¹ The Maldives is currently conducting a feasibility study on a bilateral parametric climate insurance mechanism dedicated solely to coral bleaching events, in collaboration with AXA Climate. This signals the emergence of parametric tools tailored to ecosystem-specific risks.⁸⁷²

The UNCCD report, *Securing Land and Livelihoods: Integrating Sustainable Land Management and Index Insurance for Drought Resilience*, highlights the strong potential of combining sustainable land management (SLM) with parametric climate risk insurance. This approach can protect vulnerable farmers from the impacts of drought while incentivising long-term land stewardship. It emphasises that traditional indemnity insurance is often inaccessible or unsuitable for smallholders, whereas index insurance, supported by satellite monitoring, mobile technologies, and simplified payout mechanisms, can deliver rapid and predictable financial relief following climate shocks. The report also argues that combining insurance with SLM creates a mutually reinforcing system: healthy soils, vegetative cover, and water retention measures reduce the baseline risk of drought, while insurance provides an essential safety net, enabling households to recover quickly without resorting to unsustainable coping strategies. This integrated approach can strengthen food security, reduce vulnerability to climate extremes and enhance financial inclusion, offering a promising model for SIDS, where drought, land degradation and limited financial markets amplify systemic risk.⁸⁷³

As remittances account for most of the external financing for SIDS, developing incentives and programmes to channel these funds into sustainable land and water management would maximise their long-term benefits for receiving communities. One approach for financing locally approved projects is remittance matching initiatives (RMIs), which use public or donor funds to match migrant contributions at a fixed ratio. By leveraging private capital, RMIs can strengthen rural productivity and entrepreneurship, enabling community projects that would otherwise be too costly for local landowners to undertake alone. As remittances are private funds, RMIs depend on migrants' willingness to invest in land-based initiatives

with well-functioning value chains. However, they only benefit remittance-receiving households, potentially excluding the most vulnerable.⁸⁷⁴ To avoid diverting resources from local priorities, such schemes must be cost-effective, in terms of administration, and embedded within broader efforts to strengthen rural economies. This includes creating an environment that encourages investment, building local technical, financial, and business skills, and improving market and infrastructure access. Strengthening these foundations attracts private investment, including remittances, while increasing efficiency and ensuring that the benefits reach the most vulnerable members of the community.⁸⁷⁵

Addressing Debt Levels

Addressing the high debt levels of SIDS, for instance by suspending, restructuring or forgiving debt, can create the fiscal space required for investment in sustainable development and long-term planning.⁸⁷⁶ Currently, high debt burdens limit the capacity of SIDS to restore, manage, administer and monitor sustainable land and water management initiatives. Tackling this challenge requires a committed, multi-layered approach to debt restructuring combined with long-term resilience-building efforts. From 1990 to 2021, SIDS collectively repaid around USD 395 billion in debt. It is estimated that multi-layered debt relief strategies, including pause clauses to suspend payments during crises, debt reprofiling and debt swaps, could reduce annual debt servicing costs by almost a quarter and halve total debt. This would generate GDP gains of around 3% and support long-term resilience.⁸⁷⁷

Debt restructuring has been at least seven times more effective than debt-for-nature swaps at reducing debt.⁸⁷⁸ For this reason, instruments such as debt-for-nature swaps and resilience bonds should complement, rather than substitute, comprehensive restructuring efforts. Debt-for-nature swaps involve cancelling part of a

country's debt in exchange for investment in designated environmental projects. Resilience bonds, meanwhile, are insurance-linked instruments through which investors finance risk-reduction projects that lower future disaster losses and insurance costs. Both can unlock crucial funding for long-term resilience without increasing public debt. In 2024, Barbados was the first SIDS to complete a debt-for-nature swap with a focus on terrestrial climate resilience. Earlier swaps in the Bahamas, Barbados, Belize and the Seychelles focused primarily on marine protection, the blue economy and mangrove conservation.^{879 880}

For debt-for-climate and debt-for-nature swaps to be effective, they must include robust monitoring mechanisms to ensure they truly add to existing climate finance and public environmental spending. Although they should remain secondary to broader restructuring efforts for heavily indebted SIDS, they must be large enough to outweigh the significant administrative and negotiation costs involved. Finally, such swaps must be transparent and locally grounded, aligning with community priorities to address the shortcomings of earlier programmes, which were criticised for their opaque transactions and poorly adapted conservation models.^{881 882}

Global SIDS Debt Sustainability Support Service ⁸⁸³

The establishment of the Global SIDS Debt Sustainability Support Service (DSSS) is central to the ABAS Declaration, representing an important mechanism to help SIDS countries break free from the chronic pressures of debt and build fiscal resilience in the face of climate change. The service was developed by a strategic advisory group led by IIED and co-chaired by the presidents of the Maldives and Antigua and Barbuda, with broad stakeholder participation. It is now in the process of becoming operational. In 2025, the DSSS was formally adopted as part of the Sevilla Commitment.⁸⁸⁴ It is built around four interconnected pillars, with each pillar supporting the others.

Strategic layering of debt relief measures: The aim of this pillar is to increase the fiscal space available to SIDS by providing them with collective negotiation mechanisms that allow them to secure measures such as pause clauses, debt restructuring and reprofiling, and debt-for-climate or debt-for-nature swaps. The objective is to enable SIDS to redirect resources towards sustainable development and climate resilience, rather than servicing unsustainable debt.

Pooling risk insurance and contingency funds: To protect SIDS against climate-related shocks, this pillar will support the development of pooled risk insurance arrangements and contingency financing. These mechanisms enable rapid post-disaster recovery without increasing debt burdens.

Catalysing investment in climate resilience: This pillar seeks to mobilise capital for climate-resilient infrastructure, ecosystem protection and long-term adaptation programmes through new and blended financial instruments, including resilience-linked bonds, thereby strengthening the adaptive capacity of SIDS.

Legal and financial support services: This pillar aims to provide technical expertise to help SIDS navigate complex debt and investment negotiations, secure fair and advantageous terms, and strengthen their domestic public finance and debt management capacity for the future.

In order to expand access to concessional finance for SIDS, it will be necessary to move beyond income-based eligibility criteria and incorporate vulnerability metrics that more accurately reflect SIDS's structural exposure to climate, economic and environmental shocks. Recognising multidimensional vulnerability could provide more predictable and affordable financing for climate resilience, ecosystem restoration and sustainable land and water management.^{885 886} At the same time, innovative domestic resource mobilisation strategies, such as payments for ecosystem services, tourism levies and environmental taxes, can strengthen national financing bases and reduce dependence on external aid. If these instruments are designed transparently and the revenue is reinvested in conservation, resilience and community development, they can generate stable revenue streams while reinforcing the value of healthy ecosystems and sustainable land use.

Tailoring Finance Mechanisms

Initiatives that address local vulnerabilities, needs and priorities directly, and are funded and implemented locally, tend to be more effective and sustainable in the long term.⁸⁸⁷ Transformative sustainable land management in SIDS depends on creating conditions that enable sustained, locally driven action, which is rooted in the interconnected nature of island ecosystems. Currently, environmental and development projects in SIDS are usually designed around funding cycles of four to five years. Such timeframes are rarely sufficient to address systemic land and water management challenges, which require long-term engagement and continuity in monitoring and evaluation.⁸⁸⁸ New projects are often launched with similar or complementary objectives, but they operate in isolation from earlier initiatives. This results in a patchwork of interventions rather than a coherent, sequenced strategy that builds on lessons learned and delivers long-lasting results.⁸⁸⁹

Focus on Integrated, Long-Term Programming:

Effective programming requires predictable, multi-year financing that aligns with ecological timeframes. The GCF's Independent Evaluation Unit has recommended shifting towards programmatic approaches that provide continuity, enable adaptive management and support the multifaceted nature of land restoration, forest management and ridge-to-reef interventions. Long-term financing provides governments and communities with the stability required to plan, monitor, and adapt interventions as landscapes and climatic conditions change.⁸⁹⁰ Underpinning these enablers is the need for programming that recognises

the ecological connectivity of island systems, from upland forests to rivers, wetlands, reefs and lagoons. Programmatic financing enables integrated landscape-to-seascape approaches, ensuring that interventions in one part of the ecosystem reinforce benefits elsewhere.

Expanding Direct and Enhanced Direct Access: It is equally essential to expand Direct Access and Enhanced Direct Access (EDA) for SIDS. Currently, only around 10% of climate action and disaster risk reduction financing reaches local organisations.⁸⁹¹ Therefore, increasing SIDS' ability to access finance – for example, by providing dedicated funding streams under the GCF's EDA pilot – is critical.⁸⁹² Only a few SIDS have nationally accredited entities capable of receiving climate finance directly, which highlights the importance of strengthening national institutions so that funding can flow more efficiently and be managed closer to the point of impact.⁸⁹³ Direct access accelerates implementation and ensures programmes reflect national development priorities and the specificities of island geographies.

This closely aligns with the principles of Locally Led Adaptation (LLA), which emphasise devolved decision-making, predictable funding and investments that build lasting local capabilities. LLA is most effective when decisions are made at the lowest appropriate level, granting communities and local institutions the genuine authority to define, design, implement and monitor adaptation priorities. It requires the active addressing of structural inequalities to ensure that women, young people, people with disabilities, displaced people, Indigenous peoples and marginalised groups can participate meaningfully and take on leadership roles. Long-term, predictable and accessible finance is essential for establishing stable governance processes, and sustained investment in local capabilities ensures that institutions can assess climate risks, generate solutions and manage adaptation beyond short project cycles. Effective locally led action also depends on integrating scientific and traditional knowledge to navigate climate uncertainty and support flexible programming that can adapt over time. Transparency, accountability and strong engagement across and between governance levels can build trust and foster collaboration across sectors, as well as funding streams to ensure holistic implementation.⁸⁹⁴

Incorporating these principles into SLM programming guarantees that strategies reflect the knowledge, values and lived experiences of communities that depend on, and actively shape, their land and coastal ecosystems. This approach strengthens local resource management

capacities and empowers island-based organisations to develop and implement SLM practices that are tailored to local contexts. The LLA principles reinforce this model by ensuring that the communities and local organisations who have the best understanding of ecological linkages play a leading role in designing, governing and monitoring interventions. When community groups, government institutions and local knowledge holders collaborate under stable, long-term financing arrangements, SLM becomes an ongoing process rather than a project cycle.

Strengthening Institutional Capacity: Another critical enabler is strengthening institutional capacity at national and subnational levels. Assessments by the Independent Evaluation Unit (IEU) highlight the importance of providing support for readiness, technical assistance and improved coordination systems. This enables institutions responsible for land, freshwater, coastal management, agriculture and disaster risk reduction to work through integrated spatial planning processes. Once these capacities have been reinforced, SIDS can transition from externally driven project management to long-term, nationally owned environmental stewardship.⁸⁹⁵

Improving Access to Climate and Environmental Data: Reliable access to high-quality climate and environmental data is also essential for successful programming. The IEU has identified persistent data gaps that hinder many SIDS from developing robust climate rationales for funding proposals. A regional SIDS climate data hub would enable countries to share historical and current climate information, develop robust project justifications and track trends in adaptation and land condition in a way that supports learning and improves programme design over time.^{896 897}

Synergies Across Conventions

There are significant opportunities for SIDS to strengthen synergies across the Rio conventions – the UNFCCC, the CBD and the UNCCD – by aligning their commitments and implementation plans. This would allow them to leverage complementarities, reduce duplication and ease the administrative burden on national authorities. This is particularly important for SIDS, which often have limited capacity and dispersed institutions, as well as high reporting requirements relative to their size.

At COP 8, the Convention on Biological Diversity (CBD) adopted Decision VIII/1 on island biodiversity, establishing a comprehensive Programme of Work and urging Parties to integrate island biodiversity

into their National Biodiversity Strategies and Action Plans (NBSAPs). The decision requests the Global Environment Facility (GEF) to simplify its procedures in recognition of the special circumstances of SIDS. The decision also invites the UNFCCC and UNCCD to strengthen their collaboration on activities relevant to conserving and restoring island biodiversity, with a particular focus on sustainable and integrated agricultural development. This creates a solid foundation for collaboration across conventions.⁸⁹⁸

Similarly, UNCCD decision 2/COP.16 highlights the need for capacity development and regional cooperation to provide data and technical support, as well as enhanced financial and technical assistance for SIDS.⁸⁹⁹ At COP 16, the UNCCD SIDS Forum held its inaugural meeting, establishing a dedicated space for SIDS to discuss and coordinate efforts to combat desertification, land degradation and drought.⁹⁰⁰ Together with decisions taken under the CBD and UNFCCC, this emerging platform offers a unique opportunity to strengthen synergies across the Rio conventions, their forums, caucuses and platforms, by aligning priorities, coordinating implementation and advancing joint action on shared, island-specific challenges.

There are several thematic areas that provide strategic entry points for advancing synergies across commitments relating to climate, biodiversity and land degradation.

The conservation, sustainable use and restoration of land and ecosystems is a key objective of all three conventions. It supports climate change mitigation and adaptation, protects habitat and enhances ecological connectivity, and land productivity, while improving livelihoods and strengthening drought resilience.⁹⁰¹ Spatially explicit targets for land-based restoration actions are included in many of the strategies and implementation plans of country Parties. All three conventions recognise the importance of integrated land use and spatial planning in achieving their objectives.⁹⁰²

Consistent approaches would enable SIDS to harmonise projects and programmes focused on biodiversity conservation, climate change adaptation, disaster risk reduction and land degradation neutrality, thereby supporting evidence-based decision-making and coherence across national strategies. Another important area of focus is the land–food–water nexus, and the transition towards sustainable agri-food

systems that can ensure long-term food security.⁹⁰³ The Rio conventions already collaborate on cross-cutting issues, such as gender and land tenure⁹⁰⁴ — particularly women's land rights⁹⁰⁵— and all maintain strong youth constituencies. There are various pathways that have been identified to strengthening synergies between the three Rio conventions.^{906 907 908}

Multi-Convention Coordination Platforms: At a national level, these platforms could facilitate collaboration between national focal points, their respective ministries and the technical advisory teams responsible for implementing the commitments made under the Rio Conventions and related processes.⁹⁰⁹

Aligning National Plans and Strategies: Integrated policy frameworks can help SIDS to pursue ecosystem restoration, sustainable agriculture and climate adaptation as coherent, mutually reinforcing interventions. Projects and programmes with overlapping elements can be easily cross-referenced in their NBSAPs, NDCs/NAPs, and LDN targets, as well as in their land-based sectoral strategies and budgetary allocations.

Funding Mechanisms: The GEF's Integrated Programs portfolio is structured to help countries pursue systems transformation, collective action and long-lasting results across environmental domains. This includes the Blue and Green Islands Integrated Program, as well as initiatives dedicated to food systems and ecosystem restoration. Many of these projects are jointly funded with the GCF, and are a welcome first step towards funding more holistic and transformative programmes for SIDS. Similarly, there are numerous funding mechanisms specifically tailored for biodiversity conservation and climate mitigation and adaptation that deliver co-benefits for people, land and climate.

Research, Data Systems and Planning: Shared data platforms, joint ecosystem assessments and harmonised spatial datasets can dramatically reduce the burden on national implementing agencies. These tools can be used to support integrated reporting, ensure data consistency, and provide a common foundation of evidence for NDCs, NBSAPs, and LDN targets. Regional centres of excellence and coordinated monitoring systems — such as those provided by SPREP in the Pacific region and CARICOM institutions in the Caribbean region — can provide countries with access to technical expertise while reducing transaction costs.⁹¹⁰

Monitoring and Evaluation: Indicators that capture ecosystem health, land degradation, carbon dynamics

and biodiversity status can fulfil multiple reporting requirements simultaneously. While this approach eases the reporting burden on SIDS, its main advantage is that it can improve the quality, comparability and accessibility of data and information across institutions and conventions.⁹¹¹

Demonstration and Scaling Pathways: Demonstration initiatives and pilot projects in selected SIDS can play a catalytic role in operationalising synergies across the Rio conventions. Specifically, they can be used to test coordinated planning, joint data systems and harmonised implementation activities. Demonstration cases provide tangible evidence of effectiveness, reduce uncertainty and generate models that can be replicated and adapted to diverse island contexts. Visible success and measurable outcomes can build confidence among policymakers and development partners, mobilise additional financing and encourage wider participation from other SIDS. Scaling up such experiences through regional platforms and knowledge-sharing mechanisms is key to transitioning from isolated pilots to systemic, cross-convention integration.⁹¹²



Conclusion



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As Large Ocean States, where what little land we have is sacred, we underscore that every hectare must be protected and restored – sustainably, equitably, and guided by the principles of intergenerational stewardship. [...] For us, sustainable land and water management is a matter of human security and survival. - Opening Statement of Pacific SIDS at UNCCD CRIC23

Land lies at the heart of what defines Small Island Developing States (SIDS): their food and freshwater, livelihoods, cultures and economies, as well as their collective futures. Land is fundamental to the identity, spirituality and cohesion of island communities. Not only does land degradation erode ecosystem health, it also undermines the indigenous knowledge systems, local economies and social safety nets. Conversely, managing land and water resources from ridge-to-reef and restoring health to soils and vegetation, brings a wide array of social, economic and environmental benefits. Investing in holistic, integrated approaches to natural resource management can ensure sustainable use and significantly increase the resilience of SIDS and their people.

The transformative levers described in this report form an interconnected architecture for sustainable development in SIDS, putting land and water at the centre of decision-making, participatory governance and economic prosperity. Experience shows that, no matter how successful they are individually, scattered short-term initiatives cannot overcome the structural barriers to sustainability. When pursued together, transformative levers can create mutually reinforcing, programmatic pathways that move SIDS from a position of vulnerability to one of long-term resilience. Rather than simply implementing stand-alone, time-bound projects, SIDS have the opportunity to embark upon new development trajectories that include small and large-scale initiatives under a common vision focused on ecological connectivity, cultural identity and intergenerational stewardship.

Transformative approaches must start from the local context, listening deeply to island priorities and leveraging the immense value of customary land management systems. All too often, policy prescriptions, financing instruments and technical solutions are designed externally and then adapted to island circumstances. Integrated management solutions are most effective when they are co-designed with local communities and firmly rooted in their knowledge, skills and experience. Finance and development partners must commit to ‘participatory innovation’ – working collaboratively with SIDS to strengthen their Indigenous knowledge systems and local institutions for context appropriate sustainable development.

SIDS urgently require genuine, long-term partnerships and responsible business practices at all levels – from local to global – to unlock their socio-economic potential and confront their growing environmental challenges.

The inherent attributes of SIDS – their small size, geographic isolation, tight ecological connectivity and community stewardship – make them ideal incubators of innovation for the implementation of integrated land and water management approaches that account for the close linkages between terrestrial and marine ecosystems. These approaches also have the potential to generate nature-positive, economic development models that can be scaled up from islands to continents.



Photo: © Adobe Stock

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Supplement

Extent of Degraded Land, and the Drivers and Impacts of Land Degradation

(based on the UNCCD Data Dashboard and National Reports Submitted by Parties)

Caribbean	Extent of Degraded Land ¹	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries			
GREATER ANTILLES AND THE BAHAMAS			
	The Bahamas² 99,100* ha in 2019 10.16% of the total land area	Climate change (extreme weather events, storm surges, flooding) Tourism and urban development Sand mining and quarrying Unsustainable agriculture (poor chemical management, slash and burn) Illegal waste dumping and burning in coastal areas	Saltwater intrusion Chemical leaching Wildfire Loss of habitat and biodiversity Prevalence of invasive species
	Cuba^{3 4} 429,400* ha in 2019 4.01% of the total land area	Conversion of natural land uses Intensive agricultural practices Expanding settlements and infrastructure Climate change (drought)	Loss of habitat and biodiversity Soil erosion Salinisation of irrigated areas Reduced long-term soil health and productivity
	Dominican Republic⁵ 1.49 million ha in 2019 31.25% of the total land area	Conversion of forest to cropland Urbanisation and infrastructure development Unsustainable agricultural practices Climate change Poor solid waste management Intensive grazing on marginal hillslopes Deforestation for charcoal production	Reduced soil health and productivity (salinisation, compaction and microbial sterilisation) Erosion Soil contamination Loss of habitat and biodiversity
	Haiti⁶ 611,600 ha in 2019 23% of the total land area	Historic mass deforestation Erodible soil structure and landscape Climate change (extreme weather events) Use of marginal lands for agriculture Loss of productive lands to settlement growth	Desertification Reduced soil fertility and productivity Soil erosion Food insecurity
	Jamaica⁷ 83,800 ha in 2019 7.71% of the total land area	Climate change (extreme weather events, drought) Land clearing for agriculture Conversion of forest and agricultural land for informal / unregulated settlement Deforestation for fuel wood	Landslides and soil erosion Flash flooding Reduced food security and increased reliance on imports

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Caribbean	Extent of Degraded Land	Drivers	Impacts	
*Estimated values based on global datasets, which have not been validated by countries				
LESSER ANTILLES				
	Antigua and Barbuda⁸	3,800 ha in 2019 10.33% of the total land area	Urbanisation Conversion to agriculture Invasive species proliferation Climate change	Fragmentation and loss of habitat
	Barbados⁹	No Data Reported to UNCCD	Climate change (extreme weather events) Conversion of croplands and grasslands for residential and commercial development Clearing (“debushing”) of uncultivated grasslands, motivated by the perception that “all bush is bad” Limestone, sand and clay mining	Soil erosion (especially in Scotland District) Reduced land productivity and SOC Habitat loss
	Dominica¹⁰	300 ha in 2019 0.4% of the total land area	Climate change (extreme weather events, drought) Deforestation for agriculture Uncontrolled informal settlement Intensive use of farming chemicals Improper control of waste and pollutants	Landslides and soil erosion Flooding Invasive species proliferation and associated more extreme fire Soil acidification and leaching Loss of biodiversity
	Grenada¹¹	No Data Reported to UNCCD	Overgrazing and cropping on steep slopes Slash and burn agriculture Overuse of chemical inputs Aggregate mining Climate change (extreme weather events)	Water erosion Acidification and pollution Soil fertility loss Pest and disease infestation Invasive alien species proliferation
	Saint Kitts and Nevis¹²	2,800 ha in 2019 11.2% of the total land area	Deforestation and erosion Sedimentation Squatting and unregulated settlements Poor agricultural practices, including overgrazing	Water pollution Coastal degradation Flooding / poor drainage Fires Erosion and sedimentation
	Saint Lucia¹³	500 ha in 2019 0.85% of the total land area	Climate change Poor agricultural practices, including deforestation and removal of natural forests to facilitate intensive agriculture Overgrazing Planned and unplanned urban development	Soil erosion, siltation of drainage networks, and coastal sedimentation Loss of productivity in cultivated areas Landslides Decreased freshwater resources
	St. Vincent and the Grenadines¹⁴	200 ha in 2019 0.54% of the total land area	Squatting, and poorly planned development Poor agricultural techniques, including overuse of agrochemicals Illegal clearance of forests for agriculture, charcoal and fuelwood Climate change (more intense tropical storms, droughts and wildfires) Sand mining Invasive alien species	Pollution Habitat loss and fragmentation
	Trinidad and Tobago¹⁵	44,700 ha in 2019 8.92% of the total land area	Climate change (extreme weather events) Squatting Quarrying Poor waste management Deforestation and unsustainable forest resource extraction	Landslides and soil erosion Declining soil fertility Coastal erosion and salinisation Habitat fragmentation Increasingly severe flooding Soil and water pollution

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Caribbean	Extent of Degraded Land	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries			
CONTINENTAL LATIN AMERICA			
 Belize¹⁶	160,300 ha in 2019 7.46% of the total land area	Climate change (extreme weather events) Illegal and/or unsustainable logging for export products Unsustainable extraction of non-timber forest products Unregulated urban development Intensive cash crop agriculture (sugarcane, citrus) Slash and burn agriculture Illegal gold mining	Increased sediment loads and excess nutrients in runoff, leading to coastal ecosystem degradation ¹⁷
 Guyana¹⁸	3.34 million ha in 2019 15.89% of the total land area	Notes that land degradation is not widespread. However, mining has caused 89% of deforestation, with some minor impacts due to logging, agriculture, and settlement expansion.	Reduced rainforest carbon storage Polluted freshwater resources
 Suriname¹⁹	2.53 million ha in 2019 15.47% of the total land area	Climate change (extreme drought and rainfall patterns) Unsustainable agricultural practices, especially high agrochemical use in coastal rice production Unsustainable mining, especially for bauxite and gold Unsustainable forestry practices	Decreased land fertility Water pollution

AIS	Extent of Degraded Land ²⁰	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries			
ATLANTIC OCEAN			
 Cabo Verde²¹	4,100* ha in 2019 1.05% of the total land area	Climate change / drought Unsustainable use of drylands Overgrazing livestock, tourism, and demand for wood ²²	Severe wind and water erosion Desertification
 Guinea-Bissau²³	907,000 ha in 2019 27.94% of the total land area	Land clearing by slash and burn, especially for cash crops (cashews, peanuts and cotton), and domestic uses Informal settlement Mangrove clearing and harvesting Mining (emerging)	Loss of biodiversity Decreased forest resources and ecosystem services Food insecurity
 São Tomé and Príncipe²⁴	26,900 ha in 2019 28.5% of the total land area	Conversion of forests and savannahs for agricultural development Uncontrolled settlement growth Illegal logging Charcoal production Sand and aggregate extraction Illegal garbage dumping Poor wastewater management Overgrazing	Habitat and biodiversity loss Water pollution Soil erosion

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AIS		Extent of Degraded Land ²⁵	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries				
INDIAN OCEAN				
	Comoros²⁶	No Data Reported to UNCCD	Climate change / increasingly intense drought Land clearing for unsuitable agricultural practices (slash-and-burn), domestic energy, construction timber, and fuel for the distillation of ylang-ylang flowers Overgrazing on steep hillslopes Rapid urbanisation	Floods, exacerbated and worsened by the denudation of the relief Gully erosion Landslides
	Maldives²⁷	No Data Reported to UNCCD	Improper management of annual, perennial, scrub and tree crops ²⁸ Coastal development Poor waste and wastewater management Climate change	Coastal and ocean pollution Salinisation of freshwater resources Coastal erosion Mangrove die-off
	Mauritius²⁹	20,200 ha in 2019 10.34% of the total land area	Climate change Intensive open grazing Expansion of urban areas and infrastructure	Landslides / soil erosion Coastal erosion, inundation and saline water intrusion Flash floods Invasive alien species proliferation
	Seychelles³⁰	200* ha in 2019 0.85% of the total land area	Urbanisation, including into wetland areas Mining and quarrying for construction materials Climate change (extreme weather and sea-level rise) Intensive farming practices	Invasive species proliferation Flash floods Landslides Forest fire Saline water intrusion and coastal erosion/inundation
SOUTH CHINA SEA				
	Singapore³¹	No Data Reported to UNCCD	Historic urban and industrial expansion	Reduction in terrestrial and coastal habitat and biodiversity Water pollution, resulting in reduction in coral and seagrass habitats

Pacific		Extent of Degraded Land ³²	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries				
MELANESIA AND TIMOR-LESTE				
	Fiji^{33 34}	No Data Reported to UNCCD	Climate change Deforestation for urban and agricultural development, especially the expansion of sugarcane and other crops on marginal land Destruction of mangrove swamps Overgrazing Intensive subsistence farming	Soil erosion Reduced soil health Long term reduction in yield of subsistence agricultural lands Loss of habitat and biodiversity

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Pacific	Extent of Degraded Land ³⁵	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries			
 Papua New Guinea³⁶	8.94 million* ha in 2019 19.57% of the total land area	Illegal and/or unsustainable industrial logging Over-exploitation of other forest resources for domestic use Urbanisation and resettlement Overgrazing Poor agricultural practices Poor environmental controls for industrial waste disposal / discharge	Loss of habitat Reduced carbon storage/sequestration Soil erosion Water pollution
 Solomon Islands³⁷	44,700* ha in 2019 1.71% of the total land area	Widespread unsustainable, often illegal, industrial logging Large-scale industrial monocultures, especially oil palm Reduced fallow periods and cropping on increasingly marginal lands Mining Climate change Invasive species	Reduction in habitat and biodiversity Siltation of reefs in downstream coastal areas Reduced soil fertility Increasing agricultural pests and diseases
 Timor-Leste³⁸	54,900* ha in 2019 3.71% of the total land area	Conversion of forests to cropland (slash and burn agriculture) Cultivation on steep slopes Illegal logging and firewood collection Uncontrolled grazing Improper management of forest fires Climate change (drought)	Soil erosion Loss of soil fertility Loss of habitat and biodiversity
 Vanuatu³⁹	No Data Reported to UNCCD	Climate change (extreme weather events) Deforestation for agricultural and urban development Overgrazing	Soil erosion Loss of habitat and biodiversity
MICRONESIA			
 Federated States of Micronesia⁴⁰	No Data Reported to UNCCD	Climate change (extreme weather events, saltwater intrusion, droughts) Conversion of native forests to agroforestry and cash crop monocultures, encroachment into upper watersheds, increased use of fertilisers and pesticides Forest disturbance and resource extraction: unsustainable timber harvesting Infrastructure development and urbanisation Coastal development and mangrove clearing Invasive alien species facilitated by habitat disturbance, road networks, and land abandonment Poor solid waste dumping Migration from outer and atoll islands to high islands	Declining soil fertility, SOC, and infiltration capacity Reduction in availability of clean and adequate water supply, food production, productive inshore fisheries, storm protection and carbon sequestration, particularly affecting the poorest and most vulnerable communities Increased soil erosion and sedimentation of reefs Expansion of invasive plants Fragmentation of habitats
 Kiribati⁴¹	No Data Reported to UNCCD	Climate change (sea-level rise, coastal erosion, saltwater intrusion, extreme weather events) Mining activities, especially for phosphate Improper or overuse of agricultural chemicals	Lagoon pollution Reduced food security and water availability Loss of productive agricultural land

35 UNCCD (2022). UNCCD Data Dashboard. <https://data.unccd.int>

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Pacific		Extent of Degraded Land ⁴²	Drivers	Impacts
*Estimated values based on global datasets, which have not been validated by countries				
	Marshall Islands⁴³	No Data Reported to UNCCD	Climate change (sea-level rise, coastal erosion, saltwater intrusion, extreme weather events)	Loss of land and water resources
	Nauru⁴⁴	No Data Reported to UNCCD	Historic phosphate mining	Complete loss of productive topsoil (70-80% of interior of the island) Loss of habitat and biodiversity Coastal pollution by heavy metals
	Palau^{45 46}	3,900 ha in 2019 10.77% of the total land area	Climate change (increased temperatures and more extreme weather events, droughts) Destruction of mangroves for coastal infrastructure Commercial logging Unsustainable agricultural practices	Exacerbated wildfires Loss of soil fertility Soil erosion Reduced water availability Coastal erosion
POLYNESIA				
	Cook Islands⁴⁷	No Data Reported to UNCCD	Climate Change Formal urban development, especially for tourism Increasing use of agricultural chemicals Abandonment of agricultural land Invasive species Overburdened waste management systems	Lagoon degradation (pollution, sedimentation and siltation) Soil erosion Increased reliance on food imports Migration, especially from islands other than Rarotonga (Pa Enua)
	Niue⁴⁸	No Data Reported to UNCCD	Historic deforestation Climate change (extreme weather events, drought) Limited arable land, leading to clearance of marginal lands for farming Unsustainable agricultural practices (overuse of agricultural chemicals, reduced fallow periods, shifting cultivation, monocropping of taro for export)	Poor soil fertility Ecological fragmentation Vulnerability to natural disasters Water insecurity
	Samoa⁴⁹	No Data Reported to UNCCD	Deforestation for agriculture and settlement expansion Intensive agricultural practices Invasive species Climate change Consumption of forest resources for domestic purposes	Habitat and biodiversity loss Decline in soil quality Reduced ecosystem services Increasingly severe flooding Soil erosion and landslides Loss of soil fertility, salinisation, compaction and contamination
	Tonga⁵⁰	1,100* ha in 2019 1.72% of the total land area	Climate change (increased storm intensity, and variability in temperatures and precipitation, sea-level rise) Inadequately treated sewage and agricultural run-off Land clearing, including of mangroves and coastal wetlands, for agricultural and urban development	Increased plant diseases Habitat fragmentation and loss, and loss of biodiversity (especially on Tongatapu) Water pollution
	Tuvalu⁵¹	No Data Reported to UNCCD	Climate change (sea-level rise, extreme weather events, bushfires) Uncontrolled waste disposal Clearing for housing and roads	Coastal erosion Saltwater intrusion and salinisation of traditional Pulaka pit gardens Loss and fragmentation of habitats

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45 Government of Palau (2002). National Report to the UNCCD. <https://www.unccd.int/sites/default/files/prais-legacy/Palau/2002/Palau%20-%20ACP%20-%202002%20eng.pdf>

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47 Government of the Cook Islands (2018). State of the Environment Report 2018. <https://cookislands-data.sprep.org/resource/cook-islands-state-environment-report-2018>

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50 Government of the Kingdom of Tonga (2018). National Biodiversity Strategy and Action Plan to 2030. <https://www.cbd.int/doc/world/to/to-nbsap-v2-en.pdf>

51 Government of Tuvalu (2006). National Action Plan to Combat Land Degradation and Drought. <https://www.unccd.int/sites/default/files/naps/tuvalu-eng2006.pdf>

GLOBAL LAND OUTLOOK

The United Nations Convention to Combat Desertification (UNCCD) recognises that addressing and reversing land degradation is one of the key sustainable development priorities for many countries, particularly in the developing world. In response, the UNCCD secretariat produces strategic communications publications under the brand of the Global Land Outlook (GLO) to facilitate insights, debate, and discourse on a transformative vision for land management policy, planning and practice at various scales.

The aim of the GLO is to communicate and raise awareness of evidence-based, policy-relevant information and trends to a variety of stakeholders, including national governments formulating their responses to commitments to better manage and restore land resources, including the SDGs and associated targets, such as Land Degradation Neutrality (LDN). The evidence presented in the GLO reports demonstrates that informed and responsible decision making can if more widely adopted help to reverse the current worrying trends in the state of our land resources.

All GLO reports and working papers, can be found at:
<https://www.unccd.int/resources/global-land-outlook/overview>



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